

Investigating weight-related lifestyle choices in pregnant women who are overweight

SMITH, Janice

Available from the Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/24457/>

A Sheffield Hallam University thesis

This thesis is protected by copyright which belongs to the author.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.

Please visit <http://shura.shu.ac.uk/24457/> and <http://shura.shu.ac.uk/information.html> for further details about copyright and re-use permissions.

**Investigating weight-related lifestyle choices in pregnant women who are
overweight**

Janice M. Smith

A thesis submitted in partial fulfilment of the requirements of Sheffield Hallam
University for the degree of Doctor of Philosophy

August 2017

Abstract

There are serious health implications associated with pregnant women being overweight (BMI 25-29kg/m²) (Lewis, 2007). Despite 'overweight/obesity' in pregnancy being highlighted in key government documents and research, the predominant focus is often on obesity (BMI \geq 30kg/m²). Women who are overweight (WO) tend to exceed the IOM weight gain guidelines (Phelan et al., 2011), compared to normal weight or obese women. Therefore, understanding the issues influencing dietary and physical activity choices for WO is crucial. Maternity staff can potentially influence behaviour change, so their experiences of providing support to WO, and the advice they provide to them was explored.

When reviewing maternal literature, gaps were identified highlighting that WO had adverse health risks during pregnancy, but limited guidelines/policies, clinical practices and resources were available specifically with them, as either a preventative measure or a treatment option. Therefore, qualitative evidence was synthesised to explore WO experiences of the barriers/facilitators when attempting to follow a healthy lifestyle. No papers could be identified that met this aim.

In the first study, two focus groups (10 Obstetricians/GPs; 8 midwives) explored factors influencing whether staff raised the issue of weight with WO, and the advice provided. Results indicated that staff struggled to discuss weight with WO and that ambiguity surrounds the term 'overweight', how it is defined/ recognised, and what information is provided to WO as a result. The second study (a survey) aimed to establish what staff (n=81) understood about the term 'overweight', what advice they provide to WO and factors influencing whether they raise the issue of weight. 'Overweight' was not correctly identified, rather the term was used interchangeably when having weight-related discussions with obese pregnant women. There was variation in the factors reported which influenced whether weight was raised with WO, and why some staff provided the advice they did.

Whether WO follow a healthy lifestyle during pregnancy, the advice staff provide to them, and the impact of weight-related discussion during consultations with staff was explored in study 3 (7 interviews). Numerous factors influenced healthy dietary and physical activity choices for pregnant WO. Advice from staff focussed on foods to avoid during pregnancy, rather than managing excessive gestational weight gain. Whether these factors were exclusively experienced by WO, or shared by women within other weight categories, remained unanswered. This was the focus of the final study. Structured interviews, based on the Theoretical Domains Framework, were conducted with 18 women (6 normal weight, 6 overweight, 6 obese). No specific factors influencing lifestyle decisions applied exclusively to WO. Rather there were a number of domains shared between women across all weight categories.

Candidate's Statement

I declare that the work in this thesis was carried out in accordance with the regulations of the Sheffield Hallam University and is original except where indicated by the specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Janice M. Smith

Acknowledgements

To the women and healthcare professionals who participated in this research- a huge and heartfelt thank you. I hope that I have done justice in representing your views with the sincerity in which they were shared.

To Anne Smith, without you much of this would not have been possible. You diligently believed in what I was trying to achieve and the ethos of the research when I first discussed my ideas with you. I truly appreciate the time you spent in methodically helping during the recruitment process for each study. Your commitment and enthusiasm for delivering quality maternal health are outstanding.

During the PhD process I have felt incredibly fortunate for the gentle guidance, advice and support from my supervisors, Prof. Maddy Arden, Dr. Penny Furness and Prof. Hora Soltani. Each of you has taught me very different skills, which have shaped me to become a reflective and pragmatic researcher. Collectively, your support over the past four years, have been invaluable. I am grateful more than you could ever know, and feel very lucky to have been supervised by such inspirational women.

To my fellow PhD colleagues, for your humour and support. Thank you for always taking the time to talk through an idea (or a difficulty) and helping me to believe there is light at the end of the tunnel!

To my lovely family, particularly Mark and Mike: my champions! Your constant and continued support is bountiful in anything I ever set out to do. My wonderful little cherubs, there is nothing better in life than to spend time with you both. I hope I make you proud.

Published Materials from this Thesis

Conference presentations:

Smith, J.M., Arden, M., Furness, P, Soltani, H. (2014). Exploring the experiences of overweight women attempting to follow a healthy lifestyle in pregnancy. *Sheffield Hallam University 1st PhD Conference*, Sheffield 24th June 2014.

Smith, J.M., Arden, M., Furness, P, Soltani, H. (2014). Barriers and facilitators overweight pregnant women face when attempting to follow a healthy lifestyle: perspectives from staff and women. *Sheffield Hallam University, Psychology, Sociology & Politics Departmental Conference*, 16th December 2014.

Smith, J.M., Arden, M., Furness, P, Soltani, H. (2015). Exploring overweight women's experiences of leading a healthy lifestyle in pregnancy: staffs perspective. *Sheffield Hallam University, Maternal and Infant Health Research Group (MIHRG) Seminar*, 8th January 2015.

Poster:

Smith, J.M., Arden, M., Furness, P, Soltani, H. (2012). Exploring barriers specific to overweight women attempting to follow a healthy lifestyle throughout pregnancy and post-partum. *BPS Health Psychology Conference*, 5-7th September 2012.

Contents

Abstract.....	2
Candidate's Statement	3
Acknowledgements.....	4
Published Materials from this Thesis.....	5
Contents.....	6
List of Tables.....	10
List of Figures.....	11
Abbreviations.....	12
 Chapter 1: Thesis Aims & Structure	
1.1 Thesis Aims.....	13
1.2 Thesis Structure.....	13
 Chapter 2: Review of literature relevant to Pregnant and Non-Pregnant Population	
2.0 Introduction.....	21
2.1 Body Mass Index As a Measure.....	21
2.2 Overweight & Obesity in the non-pregnant population.....	23
2.3 NICE Guidelines for Weight-Management.....	26
2.4 The Role of Theory when Developing Complex Interventions.....	32
2.5 Weight management interventions in the non-pregnant population.....	40
2.6 Issues of weight in pregnancy.....	43
2.7 Impact of excessive Gestational Weight Gain (GWG) in pregnancy.....	50
2.8 Factors influencing lifestyle changes during pregnancy.....	56
2.9 Lifestyle Interventions During Pregnancy.....	69
2.10 Systematic Review of the Qualitative Literature on Barriers/Facilitators Pregnant WO face attempting to lead a Healthy lifestyle.....	73
2.11 The Role of Maternity Staff in Supporting Women to lead a Healthy Lifestyle.....	77
2.12 Why focus research on pregnant women who are overweight.....	82
2.13 Chapter summary.....	86

Chapter 3: Philosophical Underpinnings: Pragmatism and Mixed Methods Methodology

3.0 Introduction.....	87
3.1 Epistemology & Ontology.....	87
3.2 Controversy with using mixed methods.....	88
3.3 The Pragmatic Approach.....	90
3.4 Rationale: using a mixed methods approach.....	93
3.5 Triangulation.....	97
3.6 Ethical considerations.....	100
3.7 Analyses.....	102
3.8 Chapter summary.....	103

Chapter 4: "*Opening Pandora's box*" A qualitative investigation examining whether staff have weight-related discussions with overweight pregnant women.

4.0 Introduction.....	104
4.1 Background.....	104
4.2 Method.....	105
4.3 Results.....	109
4.4 Discussion.....	122
4.5 Strengths & Limitations.....	127
4.6 Implications.....	127
4.7 Chapter summary.....	129

Chapter 5: Are staff offering 'NICE' advice to pregnant women who are overweight? A survey exploring the support provided.

5.0 Introduction.....	131
5.1 Background.....	131
5.2 Method.....	133
5.3 Results.....	138
5.4 Discussion.....	150
5.5 Strengths & Limitations.....	156
5.6 Implications.....	157

5.7 Chapter summary.....	158
 Chapter 6: What influences women who are overweight to follow a healthy lifestyle during pregnancy? An exploratory study	
6.0 Introduction.....	159
6.1 Background.....	159
6.2 Method.....	160
6.3 Results.....	164
6.4 Discussion.....	183
6.5 Strengths & Limitations.....	189
6.6 Unanswered Questions.....	190
6.7 Chapter summary.....	191
 Chapter 7: Using the Theoretical Domains Framework (TDF) to explore lifestyle choices for weight-management with overweight pregnant women.	
7.0 Introduction.....	192
7.1 Background.....	193
7.2 Method.....	195
7.3 Results.....	198
7.4 Discussion.....	208
7.5 Strengths & Limitations.....	214
7.6 Potential Implications for Practice.....	215
7.7 Chapter summary.....	216
 Chapter 8: Thesis Discussion, Recommendations, and Conclusions	
8.0 Thesis Aims.....	217
8.1 Staff Perspectives on Supporting WO during Pregnancy.....	217
8.2 Women's Perspective's on Leading a Healthy Lifestyle During Pregnancy.....	222
8.3 Summary of Findings.....	228
8.4 Implications for Practice, Education and Research.....	229
8.5 Conclusion.....	237

Chapter 9: Reflexive Account

9.0 Introduction.....	238
9.1 Why I Researched this Topic?.....	239
9.2 Experiences During Data Collection.....	240
9.3 Analysing the Data.....	242
9.4 Evolving As a Researcher.....	243
References	245
Appendix 1: Study 1 Executive Summary	295
Appendix 2: Study 1 Information Sheet	308
Appendix 3: Study 1 Consent Form	312
Appendix 4: Study 1 Focus Group Interview Schedule	317
Appendix 5: Sample of Transcribed Data from Obstetrician/GP & Midwife Focus Groups	321
Appendix 6: Initial Themes from Midwife Data (Sample)	324
Appendix 7: Study 2 Information Sheet	326
Appendix 8: Study 2 Survey	329
Appendix 9: Study 3 Interview Schedule	338
Appendix 10: Study 3 Information Sheet	342
Appendix 11: Study 3 Consent Form & Debrief Sheet	346
Appendix 12: Sample of Transcribed Data (Study 3)	350
Appendix 13: Sample of Initial Themes (Study 3)	352
Appendix 14: Study 4 Interview Schedule	354
Appendix 15: Study 4 Information Sheet	360
Appendix 16: Study 4 Consent Form & Debrief Sheet	364
Appendix 17: Sample of Transcribed & Coded Data (Study 4)	367
Appendix 18: Domains Influencing Lifestyle Decisions for Pregnant Women who are Overweight, compared with Normal Weight and Obese Pregnant Women	369

List of Tables

Table 2.1: The International Classification of adult underweight, overweight and obesity according to BMI.....	22
Table 2.2: Table 2.1 IOM Recommendations for Total and Rate of Weight Gain during Pregnancy, by Prepregnancy BMI.....	51
Table: 2.3 Metasynthesis Search Terms.....	74
Table 4.1: Thematic Findings.....	110
Table 5.1: Participant Characteristics.....	139
Table 5.2: Social & Health Issues Rated in Order of Importance to Discuss During Consultations with Pregnant Women.....	141
Table 5.3: Responses To Guideline Knowledge In Maternity Staff.....	143
Table 5.4: What, When & Where Advice is Provided to Overweight Pregnant Women by Staff.....	146
Table 5.5: Correlation Matrix of Variables with Frequency Staff Provide Advice to Women who are Overweight.....	148
Table 5.6: Staff Suggestions To Increase Their Confidence To Discuss Weight With WO.....	150
Table 7.1: Participant Characteristics.....	199

List of Figures

Figure 1: Structural Diagram of the Thesis.....	20
Figure 2.1: The Health Belief Model (Rosenstock, 1966).....	33
Figure 2.2: Theory of Planned Behaviour (Ajzen, 1991).....	34
Figure 2.3: The COM-B system (Michie, van Stralen, West, 2011).....	39
Figure 2.4: Flow chart of study selection.....	76
Figure 6.1: Thematic Diagram Exploring Whether Overweight Pregnant Women Follow A Healthy Lifestyle.....	164
Figure 7.1: Behaviour Change Wheel for Designing Interventions (Michie et al., 2014).....	194

Abbreviations

BCT	Behaviour Change Technique
BMI	Body Mass Index
COM-B	Capability, Opportunity, Motivation Behaviour
DoH	Department of Health
GDM	Gestational Diabetes Mellitus
GP	General Practitioner
GWG	Gestational Weight Gain
HCP	Healthcare Professional
‘Healthy lifestyle’	refers to physical activity and diet
IOM	Institute of Medicine
MW	Midwife
NHS	National Health Service
NICE	National Institute of Clinical Excellence
OB	Obstetrician
Obesity	medically defined as BMI $>30 \text{ kg/m}^2$
‘Overweight/obese’	studies that have used these terms but not the medical BMI definition.
Overweight	medically defined as BMI $25\text{-}29 \text{ kg/m}^2$
TDF	Theoretical Domains Framework
WO	Women who are overweight

CHAPTER 1

Thesis Aims & Structure

1.0 Thesis Aims

There is a dearth of literature about weight management in pregnancy for overweight rather than obese women. To advance knowledge specifically relating to issues impacting on healthy lifestyle choices for women who are overweight (WO) during pregnancy, the overall aim of this thesis is to explore their experiences of attempting to follow a healthy lifestyle during pregnancy. This thesis will examine the barriers and facilitators overweight pregnant women face when attempting to follow a healthy lifestyle in pregnancy. Secondly, it will establish whether the facilitators and barriers identified by the women correspond to those identified by healthcare professionals supporting women in pregnancy. Furthermore, the research will also aim to capture what advice these professionals provide to women about healthy lifestyle throughout pregnancy.

1.2 Thesis Structure

This thesis is comprised of four studies, with a literature review, systematic review of qualitative studies examining factors influencing weight being addressed with overweight pregnant women and a methodology chapter. A structural diagram of this thesis is presented in Figure 1. Each study provides a unique contribution to knowledge within the field of weight management and pregnancy overall, but also provides specific insights into women who are overweight who are underrepresented within this context. An iterative approach was adopted whereby findings from one chapter informed the development of the next. The literature and systematic review (chapter 2) highlighted that although women who are overweight had increased

adverse health risks during pregnancy, the dominant focus in key national guidelines, policies, interventions and research is the impact of women beginning their pregnancy obese rather than overweight. Investigating this using mixed methodologies and pragmatic approach was the focus of chapter 3. Two focus group discussions with healthcare professionals, explored raising the issue of being overweight during pregnancy and staff confidence, as well as the lifestyle advice they provide to these women (chapter 4). Exploring what healthcare professionals understand about the term ‘overweight’ during pregnancy, the advice they provide to overweight pregnant women and factors, which influence them having weight-related discussions with WO were the aims of study 2 which was a questionnaire study completed by 74 midwives and 7 obstetricians (chapter 5). Seven pregnant WO participated in qualitative interviews, with the aim of understanding what influences them to follow a healthy lifestyle throughout their pregnancy (study 3, chapter 6). It was unclear from this study whether factors experienced by WO were also shared by normal weight and obese pregnant women. Chapter 7 therefore aimed to understand some of the processes that influence whether or not women follow a healthy lifestyle in pregnancy. Chapter 8 discusses the findings from the thesis and provides an overall summary, as well as, implications for practice and recommendations for future research. The aim of chapter 9 was to provide a reflexive account on my role within the research project and the potential implications of this at each stage of the research process.

A short summary of the aim of each chapter and findings is provided below.

Chapter 2: Review of literature relevant to Pregnant and Non-Pregnant

Population

A broad literature review was conducted to examine what types of weight management services exist in the general population. The health issues associated with being overweight or obese during pregnancy, as well as exploring the barriers and facilitators experienced by these women when attempting to lead a healthy lifestyle. The importance of theory in the development of interventions was discussed and capability, opportunity and motivational factors influencing women who are overweight to lead a healthy lifestyle were explored. The majority of studies reviewed reported findings of 'overweight/obese' collectively, making it difficult to understand if there were issues specifically for women who are overweight. Since this is a poorly understood area, a systematic review of qualitative evidence, was conducted to examine these factors further. The rationale for having a qualitative focus was that it would enable greater exploration into the experiences of WO. The role of the healthcare professional in supporting women who are overweight was analysed and the implementation of national guidelines to support staff to manage these women effectively within maternal care were also reviewed. This review identified gaps in the literature such that women who are overweight were identified as having adverse health risks during pregnancy, but limited guidelines, policies, clinical practices and resources were available specifically with these women as either a preventative measure or a treatment option. The majority of studies reviewed reported findings of 'overweight/obese' collectively, making it difficult to understand if there were issues specifically for women who are overweight.

Chapter 3: Philosophical Underpinnings: Pragmatism and Mixed Methodologies

In this chapter the rationale for using a mixed methods methodology to address the project aims was discussed and some of the controversies with using this approach. Also, rather than take a particular epistemologically defined stance for the PhD, the choice for an alternative paradigm to be taken for this investigation: a pragmatic approach and some of the criticisms with adopting this was explored. To provide a multidimensional perspective in what might influence women who are overweight to follow a healthy lifestyle, triangulation was used. The ethical framework on which factors within each study were considered was also explored.

Chapter 4: "Opening Pandora's box" A qualitative investigation examining whether staff have weight-related discussions with overweight pregnant women. (Study 1)

Findings from the literature and systematic reviews (chapter 2) highlighted that healthcare professionals have a number of issues when supporting WO women, that obese women are the predominant focus for healthcare professionals, and that women who are overweight are ignored. Two focus groups were conducted (FG1 8 Obstetricians & 2 GPs; FG2 8 midwives) which aimed to explore what factors were impacting on staff raising the issue with women who are overweight, their confidence, as well as, the information they provide to these women. This is one of the first studies beginning to shed light on the support provided specifically to women who are overweight, making an original contribution to knowledge. The findings showed that staff struggle to discuss weight with women who are overweight and highlighted that ambiguity surrounds the term 'overweight', how it is defined and recognised, and what information is provided to these women as a result.

Chapter 5: Are staff offering 'NICE' advice to pregnant women who are overweight? A survey exploring the support provided. (Study 2)

Qualitative research explores the 'why' and 'how' of phenomena compared to quantitative methods (Green & Thorogood, 2010) and this enabled a number of barriers to be identified in chapter 4 that impact on staff communicating about weight with overweight pregnant women. However, it is unclear the impact this has on some of the lifestyle choices these women subsequently make during pregnancy. Using a questionnaire design study 2 aimed to establish what staff understand about the term overweight, what advice they provide to women who are overweight and factors which influence whether they raise the issue of weight with these women. 81 participants (74 midwives & 7 obstetricians) completed the questionnaire. Results indicated the minority of staff reported overweight correctly as a BMI 25-29kg/m². Most staff did not use the term overweight with women and many incorporated it into weight-related discussions with obese pregnant women. A number of reasons were proposed why this was the case. There was variation in the factors reported which influenced whether weight was raised, and when it was, why some staff provided the advice they did. This study makes a unique contribution to weight management literature in maternity, as it highlights factors that impact on when and how staff discuss weight with women who are overweight.

Chapter 6: What influences women who are overweight to follow a healthy lifestyle during pregnancy? An exploratory study (Study 3)

Interviews were conducted with 7 WO (either pregnant or early postpartum) to explore the factors influencing whether they follow a healthy lifestyle during pregnancy, the advice staff provide to them, and the impact of having their weight raised as an issue in consultations with health professionals. Transcribed data was

thematically analysed and results indicated that a number of factors (e.g. pregnancy symptoms, family/friends, work and childcare commitments) affected their dietary and physical activity choices. Many women had the necessary skills to manage and reduce their weight pre-pregnancy, and while some continued to implement these when pregnant, others viewed pregnancy as a time when they were 'exempt' from following a diet/physical activity regime. Advice provided by staff focussed on foods to avoid during pregnancy, rather than managing excessive GWG. In the absence of advice from healthcare professionals, many women relied on alternative sources. Whether the barriers to leading a healthy lifestyle experienced by women who are overweight are specific to them, or overlap with those for normal weight and obese women, remained unanswered. This is the first study specifically focussing on the views of women who are overweight, what they feel influences their choices to leading a healthy lifestyle during pregnancy, as well as the information they receive and the impact of raising their weight as an issue.

Chapter 7: Using the Theoretical Domains Framework (TDF) to explore lifestyle choices for weight-management with overweight pregnant women. (Study 4)

Changing an individual's behaviour involves changing one or more of the capability (C), opportunity (O), and motivation (M) factors relating to either the behaviour itself or those that compete or support it (Michie et al., 2011). Theoretical Domains Framework (TDF) describes 14 factors from theories of behaviour change that fall into the COM categories. Findings from the study 3 (chapter 6) reported on a number of barriers (e.g. physiological symptoms) and facilitators (pre-pregnancy strategies to manage weight) that influenced whether women who are overweight followed a healthy lifestyle during pregnancy. Some of these have also been reported in the maternal obesity literature, but many findings report

'overweight/obesity' as one group, making it difficult to identify the specific barriers and facilitators to healthy lifestyle choices experienced by women who are overweight. Therefore, the aim of this study is to explore which constructs of behaviour change relate to which weight groups, with a specific focus on women who are overweight. Structured interviews, based on the TDF, were conducted with 18 women (6 normal weight, 6 overweight, 6 obese). Results indicated that there are no specific factors influencing lifestyle decisions that apply to just overweight pregnant women, rather there are a number of domains shared between women across all weight categories. This highlighted the potential role of midwives to provide all women, irrespective of their BMI, with brief interventions on how to make changes and maintain these throughout pregnancy and beyond.

Chapter 8: Thesis Discussion, Recommendations, and Conclusions

Findings from both women and staff perspectives were discussed, that staff face a number of barriers which interfere with them supporting women who are overweight, and that WO, have some skills and knowledge to follow a healthy lifestyle during pregnancy but struggle to do so. Changing the content of advice provided to these women might be useful and also teaching them how to lead a healthy lifestyle. Recommendations for clinical practice, education and research are discussed.

Chapter 9: Reflexive Account

Reflections of the research process, and developmental processes are discussed in this chapter.

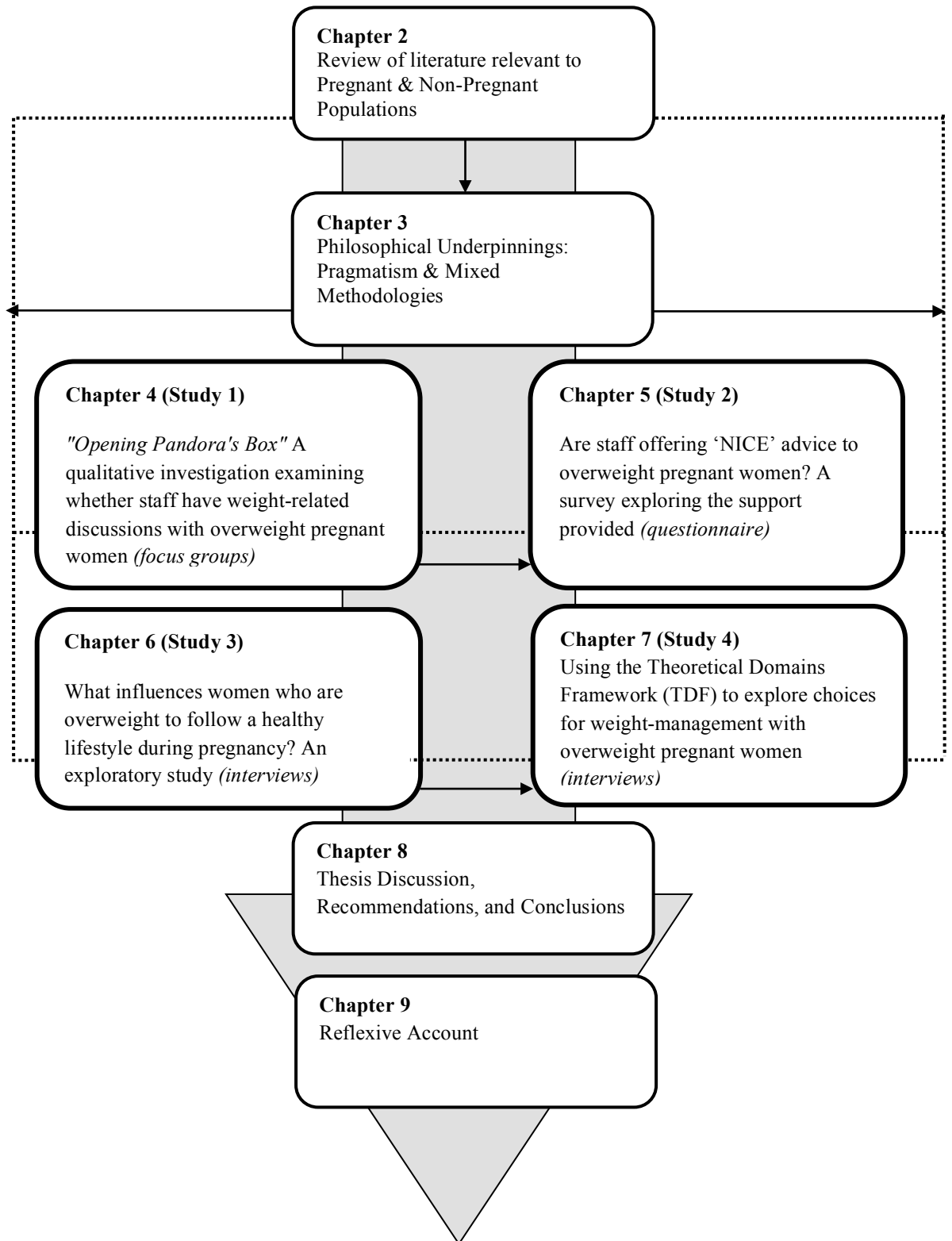


Figure 1: Structural diagram of the thesis

CHAPTER 2

Review of literature relevant to Pregnant and Non-Pregnant Population

2.0 Introduction

This chapter will discuss the role of BMI as a measure of weight and health, and provides an overview of the existing types of weight management treatment offered within the National Health Service (NHS) and current pathways in place for non-pregnant overweight (BMI 25-29 Kg/m²) and obese (BMI ≥ 30 kg/m²) individuals. Weight management guidelines to prevent/treat excessive weight gain for overweight individuals and also pregnant women are reviewed. The importance of theory in the development of weight management interventions, with reference to the relevant literature will be discussed. Capability, opportunity and motivational factors influencing whether women who are overweight follow a healthy lifestyle during pregnancy will also be discussed, as well as, the application of lifestyle interventions with this group. A systematic review of qualitative evidence was conducted to understand the factors influencing whether WO lead a healthy lifestyle during pregnancy and the advice staff provided to them. The role healthcare professionals have in supporting women during pregnancy to make lifestyle changes is explored. Finally, evidence contributing to the guidance used to support staff when discussing weight management with pregnant women is reviewed.

2.1 Body Mass Index as a Measure

Body Mass Index has been used as a measure to estimate body fat, and gauge risk of diseases that can result with increased body fat (Booth, Prevost, Gulliford, 2013). The BMI index is as follows:

Table 2.1: The International Classification of adult underweight, overweight and obesity according to BMI

Classification	Principal cut-off points
Underweight	<18.50
Normal range	18.50 - 24.99
Overweight	25.00-29.99
Obese	≥30.00
Obese class I	30.00 - 34.99
Obese class II	35.00 - 39.99
Obese class III	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

Calculating a person's BMI requires their weight and height, and so it seen as an inexpensive and easy tool for clinicians (and individuals) enabling a comparison of weight status with the general population (National Obesity Observatory, 2009). Some evidence suggests, the higher an individual's BMI, the higher their risks are of associated conditions, such as hypertension, heart disease and type 2 diabetes (Booth, Prevost, Gulliford, 2013; Whitlock, Lewington, Sherliker, 2009). However, controversy surrounds whether the BMI measure is a good predictor of disease risk. Results from some systematic reviews have highlighted significantly lower levels of risks of mortality and/or cardiovascular disease in individuals classed as overweight or obese, compared to normal weight individuals (Romero-Corral, Montori, Somers, 2006). Also, overweight and obesity (BMI 30-35kg/m²) was not linked with higher levels of mortality rates, rather highest levels were evident in those with BMIs >35kg/m² (Flegal, Kit, Orpana, Graubard, 2013). One explanation proposed by such findings was the lack of discriminatory power of the BMI measure to differentiate between body fat and bone and lean mass, and its lack of ability to account for other

factors impacting on BMI and body fatness, such as ethnic origin. Some have proposed that combining BMI and waist circumference could be a more accurate measure of body fat, and assessing risk for potential obesity-related comorbidities/mortality (Cerhan, Moore, Jacobs, Kitahara, Rosenberg. et al., 2014).

Despite the limitations with using the BMI as a measure, it remains the most widely used tool in health services to assess body weight. Therefore, BMI categories will be used throughout this thesis.

2.2 Overweight & Obesity in the non-pregnant population

Increased weight is due to excess energy consumption relative to energy expenditure although a complex interaction of a number of factors (genetics, social, psychological, environmental and political) have been proposed primarily as the aetiology of obesity ($\text{BMI} \geq 30\text{kg/m}^2$) (Aronne, Nelinson, Lillo, 2009). Obesity has become a major global health challenge, with the UK being cited as having one of the highest rates in Europe and rated fourth in the world in terms of prevalence (Organisation for Economic Co-Operation & Development, 2012). Results from the Health Survey for England (HSE, 2015) indicated that 62.9% of adults (over 16 years old) were overweight or obese. The rate of obesity rose from 14.9% to 26.9% between 1993-2015, with the prevalence of overweight adults having remained relatively stable (36-39%) during this same period. After smoking, obesity is the second largest public health expenditure in the UK, costing approximately £4.47 billion in 2012 (Dobbs, Sawers, Thompson, Manyika, Woetzel, 2014). Despite its rising prevalence and the number of pharmacological, surgical and non-surgical treatments available, no country has reported national success in reducing obesity rates, in the past 33 years (Ng, Fleming, Robinson, Thomson, Graetz et al., 2014). In the UK, a number of Government guidelines and schemes to tackle the obesity epidemic have been introduced with varying degrees of success (e.g. Change4Life,

2007). Despite treatment, many people continue to have difficulty losing, or maintaining their weight, and of those who have lost significant weight, often this initial reduction is regained within one year (Wing, 2004).

Treatment Pathways for non-pregnant Overweight and Obese Patients

The NHS currently operates using tiered services to manage overweight and obese patients, where specific tiers provide different levels of input. Although definitions can vary locally usually tier 1 provides overall weight management services (e.g. health promotion or primary care); tier 2 provides lifestyle interventions; tier 3 services provide specialist weight management input (usually multidisciplinary from teams); and tier 4 provides bariatric surgery. The National Institute of Clinical Excellence (NICE, 2014) have stipulated guidelines for practitioners about when specialist input is required for a patient referred on from tiered 1 services to lifestyle interventions.

As people's first point of contact is typically their General Practitioner (GP), they have a key role in addressing obesity in the UK (National Obesity Forum, 2014). NICE (2014) recommends that overweight patients are provided with general dietary and physical activity advice by their GP, if their BMI is on the lower overweight threshold (although it does not provide specific cut-off ranges). If their BMI falls within the upper range of the overweight category patients can be considered for a referral onto a lifestyle intervention, and/or pharmacological treatment, if there are associated co-morbidities, such as diabetes. Referral onto a lifestyle intervention for these patients might prevent them from becoming obese, as these programmes implement behaviour change techniques (BCTs) known to be effective (e.g. self-monitoring, goal setting) in changing diet and physical activity behaviours (Wing 2002). Obese individuals qualify for behavioural,

pharmacological or surgical interventions, dependent on the severity of their associated co-morbidities. The NHS currently offers a 12-week Weight Watchers/Slimming World scheme, to help overweight or obese individuals change their dietary and physical activity lifestyle behaviours (NICE, 2014). Dependent on the geographical area, funded places on this scheme are offered firstly to obese patients and free access for overweight patients is dependent on whether there is capacity on the scheme and if they have other health risk factors (comorbidities such as type 2 diabetes) (NICE, 2014). Overweight individuals who are at the lower end of the BMI category or are unable to pay to attend such an intervention, might be more reliant on the advice provided by their GP. Therefore, the role of the GP then becomes more important in helping to change overweight patient's weight-related behaviours.

Some evidence suggests that not only are GPs unlikely to discuss weight with their patients (Michie, 2007), but patients are less inclined to engage with their GP if they feel their weight will be addressed in a consultation (Bank, Shield & Sharp, 2011). GPs have reported they lack confidence when raising the issue of weight, and are concerned that doing so may result in their patient responding negatively (van der Pligt, Campbell, Wilcox, Opie, Denney-Wilson, 2011). The Quality and Outcomes Framework (QOF, 2004) might influence a GPs decision whether or not they raise the issue of weight with overweight individuals. GP practices receive financial incentives to register patients aged above 16 years, with a BMI ≥ 30 , and not overweight patients. They are not incentivised to provide further input to obese patients, which might be one reason they are referred onto secondary services (Health & Social Care Information Centre, HSCIC, 2014). However, the Academy of Medical Royal Colleges (2013) has pressed for revisions in the obesity QOF

indicator to encourage GPs to improve support for both overweight and obese patients.

2.3 NICE Guidelines for Weight-Management

2.2.1. Guidelines for Non-Pregnant Populations

Currently, three sets of guidelines exist that support healthcare professionals (HCP) to help individuals: prevent excessive weight gain (NICE, 2015); identify, assess and manage overweight and obesity for children and adults (NICE, 2011) and manage overweight and obesity in adults (NICE, 2014). NICE (2015) reported that the mean BMI for adults is 27kg/m² and so recommendations from these guidelines are applicable for both healthy weight and overweight individuals. Therefore, all three sets of guidelines are applicable to supporting overweight individuals either prevent excessive weight gain or help them change their weight-related behaviours. Whereas, two sets of guidelines (NICE, 2011; 2014) focus on how best to support obese individuals. Healthcare professionals are expected to tailor advice for varied groups (children, adults, ethnic minorities) and those at different life stages (e.g. pregnancy) (NICE, 2011). Apart from providing advice, the guidelines recommend that staff, assess patients readiness for change, explore individual's potential barriers to change (NICE, 2011), reduce the stigmatisation associated with having a higher BMI, whilst ensuring the tone of any communication with them is respectful and non-judgemental (NICE, 2014).

All guidelines (NICE, 2011; 2014; 2015) offer recommendations to HCPs on what advice to provide individual's across the three weight categories. Behavioural and practical techniques are suggested to support children and adults increase their physical activity, create healthy eating habits and/or encourage the use of self-

monitoring to monitor their weight or associated behaviours. Some of these strategies include reducing snacking between meals; eating together as a family at a table, rather than in front of the television or computer and limiting screen time of TV and/or game consoles. It is anticipated these will; help healthy weight individual's maintain their weight; prevent overweight patients gaining excessive weight; and help those who are overweight or obese change their weight-related behaviours and lose weight.

NICE recognises the difficulty in tackling the multiple factors, which contribute to the rise of overweight and obese conditions and review their guidelines in place to address weight management. The partial update of the guidelines to identify, assess and manage overweight and obesity for children and adults (NICE, 2011), acknowledged the range of interventions (psychological, pharmaceutical and surgical) needed to prevent overweight individual's gaining excessive weight and treat those who are obese. However, there is a significant mismatch between what is needed and what is available for patients across the UK (Ahmad, Lavery, Aasheim, 2014). Guidelines are unable to address this disparity and furthermore, there are issues with the uptake and implementation of them, potentially influencing the approach utilised by services across the UK. Staff reportedly experience barriers to implementing the guidelines, for example some lack confidence in the effectiveness of the preventative interventions, whereas others have difficulties communicating messages that will motivate individuals to change their behaviour (Geense, van de Glind, Visscher, van Achterberg, 2013; McAlpine & Wilson, 2007).

The evidence-base which has contributed to the development of these guidelines lacks details on the efficacy of specific approaches and consequently the guidance tends to be somewhat general. The reviews used to inform the guidance

report significant variation of study design and question the applicability and generalisation of the results given the lack of evidence from UK studies, vulnerable and minority groups and short follow-up. For example, an evidence review provided a summary of modifiable behaviours that are likely to affect healthy weight maintenance and weight gain (Bazian, Johnson & Sebire, 2014). This contributed to the guidelines on maintaining a healthy weight and helping overweight individuals not gain excessive weight (NICE, 2015). Some methodological limitations were noted, including the use of reviews of studies (rather than primary), which might result in multiple counting of some studies in more than one review. There were limited RCTs included in the reviews, with the predominant focus on cohort studies. This is important to consider given their tendency to adjust for confounding variables. The intake of beverages has shown to impact differently on individual's energy intake and satiety and has been associated with weight gain with some (Johnson, Appel, Brands, Howard, Lefevre, et al., 2009). Within the included studies it was difficult to identify what the modifiable behaviours were, which in part could have been due to little uniformity between definitions. For example, some calculated energy density of diet based solely on food, whereas others included drinks also. Issues of reporting were also present, in that there was wide variation on how the included studies addressed and considered confounding factors in their results. The implications of this could be that the results are not behaviours associated with factors that maintain a healthy weight and impact on weight gain (Bazian, Johnson & Sebire, 2014). This evidence has contributed to the NICE (2015) guidance to help those overweight not gain excessive weight.

A second review which contributed to the guidelines on maintaining a healthy weight (NICE, 2015) examined the most effective ways to communicate

information about modifiable behaviours related to healthy weight maintenance for adults and children, using qualitative studies (Bazian, Johnson & Sebire, 2014). Attention was drawn to communicating about the impact of small lifestyle changes and how to convey this information effectively. The review highlighted the need for sensitivity, careful phrasing and tailoring of information for specific groups, particularly those from different ethnic backgrounds or those within different BMI categories. However, there was variation between the techniques used to change behaviour, with some reporting that 'shock tactics' could be effective in eliciting behaviour change. There is significant evidence to suggest that 'shock tactics' have limited effect on changing behaviour and in some cases can 'backfire' and trigger the unwanted behaviour (Peters, Ruiter, Kok, 2013; Hastings, Stead, Webb, 2004; Witte & Allen, 2000). Therefore, the techniques that individuals think might change behaviour are likely to be different to which techniques effectively change behaviour. This is an important consideration given that individuals can only provide commentary on factors, which affect conscious decisions and beliefs, and less so on factors affecting automatic processes, like habits, impulses or emotional responses (West, 2006).

2.2.2 Guidelines for Pregnant Women

In an attempt to address weight management before, during and after pregnancy, NICE (2010) produced guidelines for staff and commissioners who have a direct/indirect role for women who are pregnant, planning a pregnancy or have had a baby in the past 2 years. Six recommendations have been proposed to address weight at these stages with women, none specifically for women who are overweight (WO). Women (with a BMI ≥ 30 kg/m²) at the booking appointment are offered a referral to a dietician or appropriately trained HCP for assessment and tailored

advice on healthy eating and suitable physical activity. Women who are overweight and normal weight women are provided with generic healthy eating information (foods to avoid during pregnancy) and encouraged to engage in 'moderate' physical activity. Issues with the methodology and design of maternal lifestyle interventions (discussed below) mean that weight management recommendations during pregnancy are strategies and interventions taken from those shown to be effective for the general population to achieve and maintain a healthy weight. They include practical strategies, i.e. what kind of foods to eat; suggestions on the approaches to use e.g., address the reasons why someone might find it difficult to lose weight (pg. 7) and advice on how to change women's behaviour (plan women's changes in terms of easy steps over time, pg. 8). Self-monitoring is a key technique used in many lifestyle interventions in non-pregnant individuals to manage their weight successfully (Wing, 2004). However, in the 1990's the practice of routine weighing throughout pregnancy was investigated and it was recommended to cease as weight gain had little or no predictive value in identifying women at risk of small for gestational age infants or hypertension (Dawes & Grudzinskas, 1991). This study informed NICE's decision (2008) not to routinely weigh women repeatedly. Rather, healthcare professionals were advised to weigh women once during early pregnancy in order to calculate their BMI or if they were identified 'at risk' (either underweight (BMI <18.5) or obese class II (BMI >35)). As a result of this (and lack of gestational weight gain (GWG) guidelines, discussed below), women are not actively encouraged to monitor their weight during pregnancy (Warriner, 2000). Recently, NICE (2017) published a surveillance report, reviewing published evidence (1996-2016) on the impact of dietary and physical activity interventions before, during and after pregnancy on weight loss and any associated harms/benefits to the mother or unborn child, as well as, safe weight gain thresholds during pregnancy. From the

evidence reviewed, 48 new studies and 4 ongoing projects were identified, which impacts directly on two of the current NICE (2010) recommendations. No evidence reviewed suggested there are harms linked with ‘controlled’ weight loss during pregnancy, which impacts on recommendation 2, not to advise dieting during pregnancy as it could harm the unborn baby. Evidence also suggested that the US Institute of Medicine (2009) guidelines could be appropriate to be used with a UK population, and adherence to these might improve outcomes (linked to recommendation 1). Therefore, a partial update of the NICE (2010) guidelines is advised, specifically for both recommendations 1 and 2. Although there was no evidence that directly impacted on the remaining recommendations, advice from topic experts and evidence from this surveillance review highlighted that all recommendations need to be updated for clarity and refreshing of references.

NICE recognises the complexity of tackling overweight and obesity, and the challenges various professionals face when addressing it. The guidelines NICE (2010; 2015; 2011; 2014) provide, recommend to staff advice and strategies to prevent overweight individual's gaining excessive weight and support overweight and obese patients changing their weight-related behaviours. NICE have reviewed evidence to help inform the guidance provided. However, some of the studies reviewed indicate methodological issues, and the generalisation and applicability of some of the results. Although the advice recommended for women during pregnancy includes weight management strategies applicable for the whole population, it is unclear whether there are specific factors impacting on the ability of WO to lead a healthy lifestyle during pregnancy. Identification of these are important to establish whether differences exist for this group, compared to normal weight and obese pregnant women, and to tailor and target behaviour change

support. Theory represents the pooled knowledge of the mediators of action, moderators of change, whilst considering the a priori assumptions of human behaviour and its influences (Davis, Campbell, Hildon, Hobbs & Michie, 2015). Evidence suggests that interventions based on theory are more likely to be effective (Albarracin, Gillette, Earl, Glasman, Durantini, 2005). In order to change behaviour, intervention studies need to report the theory or behaviour change techniques used to help us to understand if they worked and why (Abraham & Michie, 2008). However, this was not always clear in the evidence, which contributed to the guidelines. This might in part explain why some HCPs believe the advice they are providing to overweight patients changes weight-related behaviour, and suggested strategies are less effective.

2.4 The Role of Theory when Developing Complex Interventions

The application of theory in the design and evaluation of complex interventions is advocated by the Medical Research Council (MRC, 2006) in their guidance on developing and evaluating complex interventions. Use of theory should result in more effective interventions and in evaluation plans that provide clarity on why and how the intervention components lead to behaviour change. The multiple aetiology of overweight and obesity means that it requires a complex intervention (MRC, 2006).

Theoretical models can help our understanding on what thoughts an individual has in relation to their weight-related behaviours. Understanding these cognitions might enable us to predict who will perform such behaviours and enable identification of targets for intervention (Abraham et al., 2008). The Health Belief model (HBM, Rosenstock 1966; Figure 2.1) posits that an individual's behaviour is determined by their beliefs and perceptions regarding severity of threat to their

wellbeing. Preventative action will be undertaken if the health risk is perceived to be serious, and there are fewer costs than benefits to engaging in protective action (Rosenstock 1966; Becker, 1974; Rosenstock, Strecher, Becker 1994).

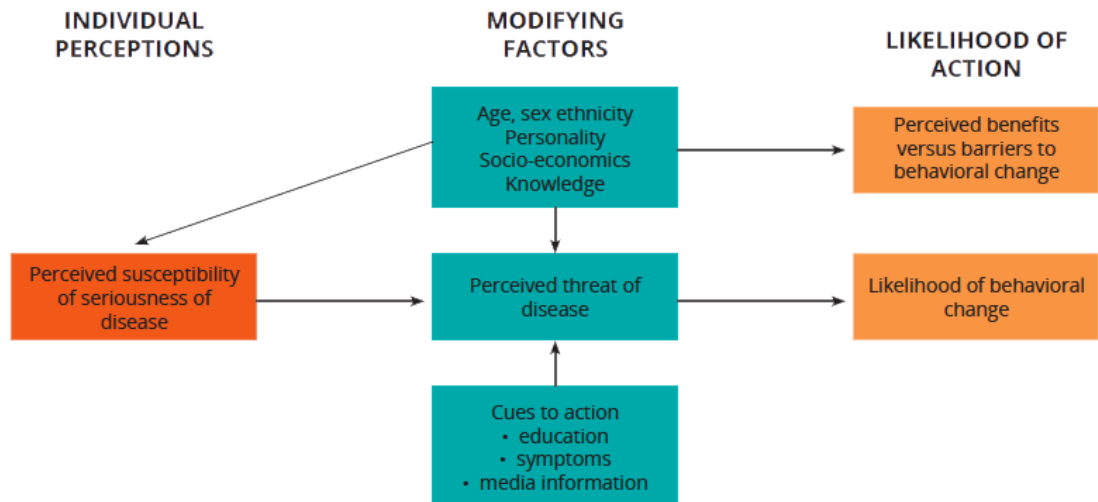


Figure 2.1: The Health Belief Model (Rosenstock, 1966)

The individual must then have a high degree of self-efficacy to ensure the new behaviour is maintained. The interplay of internal and/or external variables will enable behaviour change to arise. How effective the HBM is in predicting health behaviour changes has been systematically reviewed through a number of reviews and meta-analyses (e.g. Jones, Smith, Llewellyn, 2014; Riebl, Dunsmore, Savla, Frisard, Dietrich, 2015). Although there is some support for the predictive utility of the HBM, this has largely been in support of individual components of the model rather than its effectiveness collectively (e.g. Abraham & Sheeran, 2005). The HBM's weak predictive power and conflicting results has been partially explained by its poor definition of constructs, a lack of combinatorial rules (Armitage & Conner, 2001), as well as its 'static' approach to health beliefs (Schwarzer, 1992). It has been suggested that constructs from the HBM are based on the assumption that individual's behaviour is driven by their perceptions, so are rational beings able to

change through conscious processing (Taylor, Bury, Campling, Carter, Garfield et al., 2007). Like the Theory of Planned Behaviour (TPB, Azjen, 1991), it fails to account for the role of habit and emotional factors on health behaviours (Ogden, 2007). It has been applied in a range of healthcare contexts promoting individual preventative behaviours such as immunisation uptake and sexual practices (Jackson, 2005). A recent systematic review aimed to identify interventional adherence in studies, which used the HBM as the theoretical basis for intervention design (Jones, Smith, Llewellyn, 2014). Results indicated that successful interventions were largely unrelated to the HBM constructs.

The Theory of Planned Behaviour (Azjen, 1991; Figure 2.2) proposes that intentions are influenced by a person's evaluation of the behaviour (attitude), their perception of the social pressure to engage in that behaviour (subjective norm) and their perception of their ability to carry out that behaviour (perceived behavioural control). These constructs are further underpinned by individual beliefs, which are learnt and influenced by social and cultural factors.

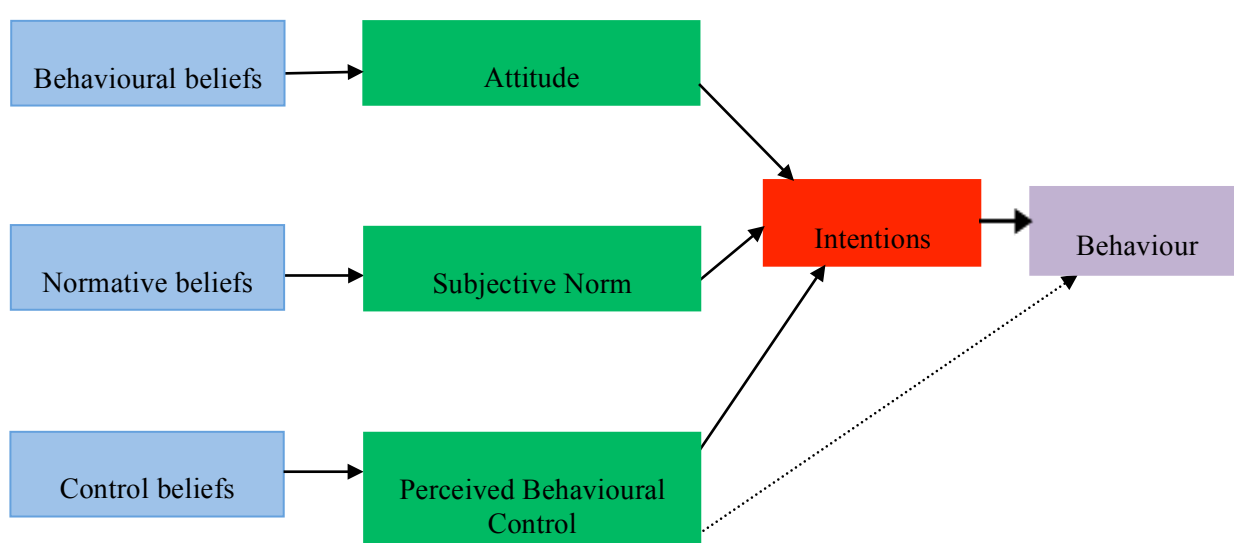


Figure 2.2: Theory of Planned Behaviour (Azjen, 1991)

Attitudes towards the behaviour come from a combination of beliefs about its consequences (behavioural beliefs) and evaluations of those consequences (outcome evaluations). Subjective norms are based on the views about the behaviour of other individuals/groups (normative beliefs) and how strong the individual's desire is to gain approval from these individuals/groups (motivation to comply). Perceived behavioural control comprises of self-efficacy and controllability which are related to whether an individual perceives they are able to perform a particular behaviour and the extent to which they perceive they can control that behaviour (Ajzen, 1991).

The TPB has been widely applied across a range of health care settings, for example in predicting addictive behaviours (Godin & Kok, 1996); HIV prevention (Albarracín, Johnson, Fishbein, Muellerleile, 2001); and weight management (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003). In the context of exercise behaviour, Hausenblas, Carron, & Mack (1997) reported large effect sizes as a result of utilising constructs from the TPB. However, the TPB has demonstrated its efficacy in only moderately predicting behaviour (Armitage & Conner, 2001). One significant criticism of TPB is that being able to predict one's intentions to behave in a certain way, does not necessarily mean this behaviour will be actioned, as it fails to account for variables influencing intention such as emotions, past experience and habit (Perugini & Bagozzi, 2001). This is also known as the intention-behaviour gap (Sheeran, 2002). There is a noticeable absence of the functional interplay of self-control and momentary emotional reactions in behaviour which have shown to impact on decision-making (Sheeran, Gollwitzer, & Bargh, 2013). Sniehotta, Pesseau, Araújo-Soares (2014) recommended that the TPB should be abandoned to enable a more comprehensive understanding on reasoned actions that change health behaviour to be examined.

The HBM and the TPB have been designed to predict behaviour rather than to facilitate behaviour change (Taylor, Bury, Cartling, Camper, Garfield, 2006). Central to both theories is the concepts of self-efficacy and motivation, and behaviour change is unlikely to occur without elements of both. They have, to varying degrees, provided insight into factors that influence whether an individual changes their behaviour. A common feature of both models lies in their inconsistent application in the development of interventions and/or health promotion (Conner & Armitage, 2001). For example, studies that have adopted components of the TPB and utilised these within their interventions, have reported relatively small effect sizes (Hardeman, Johnston, Johnston, Bonetti, Wareham, et al., 2002). Overall, any effectiveness observed could not be directly related to the use of the theory in the development phase, as is the case with HBM (Hardeman et al., 2002). The models have been criticised for their lack of integration of economic, social, and environmental factors into predicting and understanding health related behaviour changes (Conner & Armitage, 2001). Given the complex aetiology of being overweight or obese, developing more comprehensive integrated models which would encapsulate these aspects of behaviour would be useful.

The self-regulation theory (Kanfer, 1986) attempts to explain the psychological mechanisms underlying changes in health behaviours, applied in both a clinical context and through spontaneous self-change. A more comprehensive explanation of behaviour change to include six processes, were proposed by Miller and Brown (1991): informational input, self-evaluation, instigation of change, planning, implementation, and plan evaluations. The first three processes are relevant to motivating people to consider making changes in their behaviour. The model proposes that in the first phase of self-regulation (informational input), the

individual receives information about a potentially problematic behaviour from various sources, including self-monitoring and self-focusing. This facilitates to increase their awareness of the nature and impact of that behaviour. When this stage highlights to the individual their current behaviour might be problematic, self-evaluation occurs. During this stage observed behaviour is compared to a personal criterion, which can be internal (e.g. a comparison of current self vs ideal self) or external (e.g. a comparison between the individual and social norms). A negative affect can then be triggered if the individual feels their current behaviour does not reach the standard criterion. When these affective, cognitive, and behavioural reactions become high, as a result of the trigger, this can prompt change in the individual to try and reduce the negative affect by rebalancing the discrepancy and/or inconsistent cognitions (Miller and Brown, 1991). Deficits in any of these self-regulatory processes can potentially contribute to disorders of behaviour regulation, as seen in weight management (Teixeira, Going, Houtkooper, Cussler, Metcalfe et al., 2004). The role of self-monitoring in the prevention and treatment of overweight and obesity has been identified as one of the cornerstones of weight management (Wing, 2004), along with goal setting, self-efficacy and effective coping strategies (Michie, Abraham, Whittington, McAteer, Gupta, 2009). However, the weight loss literature (e.g. Byrne, 2002; Shaw, O'Rourke, Del Mar, Kenardy, 2005) highlights how these factors impacting on weight loss and weight maintenance are poorly understood. In addition, it has been demonstrated that an individual's level of self-efficacy, i.e. belief in his/her ability to succeed in a particular situation (Bandura, 1997), can influence the utility of these strategies and subsequent self-regulatory success (Bandura, 1998). Having higher levels of self-efficacy is strongly associated with successful weight loss (Elfhag & Rossner, 2005; Byrne, 2002; Teixeira et al., 2004). Being involved in a weight loss intervention alone has demonstrated

improvements in levels of self-efficacy (Elfhag & Rossner, 2005). Annesi and Gorjala (2010) reported that equipping individual's with self-regulatory skills early in behaviour change enhances future self-efficacy levels. Therefore, supporting individual's to increase their self-efficacy, promptly when changing weight-related behaviours could result in higher goal-related persistence and higher belief in eventual goal attainment (Bandura, 2004).

Over recent years, much focus has been paid to refining and classifying behaviour change techniques (BCTs) in order to improve the design, implementation and reporting of health interventions. The BCT taxonomy is a tool used to extract active 'ingredients' of interventions enabling comparisons between successful and unsuccessful components of behaviour change interventions (Michie, Richardson, Johnston, Abraham, & Francis, 2013). Therefore, inclusion of BCT taxonomies to ensure consistent replication of interventions has been highlighted as advantageous (Michie et al., 2013). The development of such taxonomies has redefined how factors, which explain or determine health-related behaviours are conceptualised. This psychological approach to understanding behaviour in context and develop behavioural targets on which to design an intervention, proposes that behaviour occurs as an interaction between three necessary conditions Capability (C), Opportunity (O), and Motivation (M) (Michie, van Stralen, West, 2011) (See Figure 2.3).

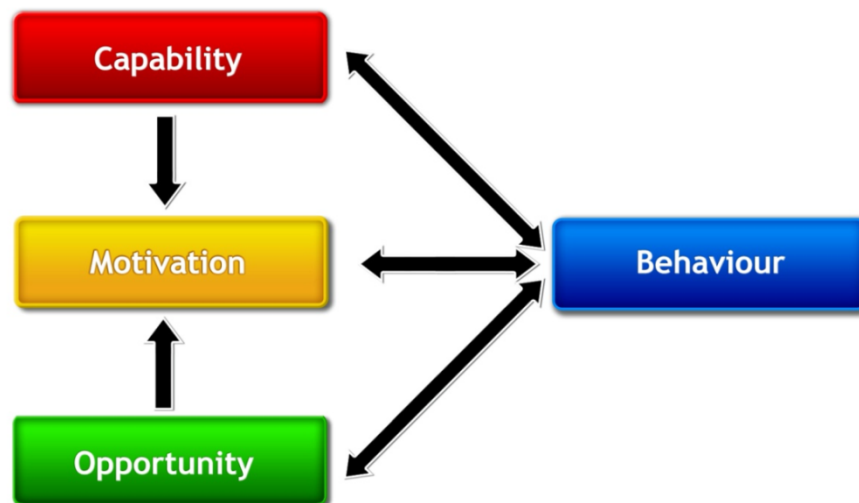


Figure 2.3: The COM-B system (Michie, van Stralen, West, 2011)

For example, for an individual to change their weight behaviour (B) they must be physically and psychologically able to at any given time (C) and have the physical and social opportunity (O) to do the behaviour and, in that moment want/need to do the behaviour more than any other competing behaviours i.e. be sufficiently motivated (M). Motivation within the model includes automatic processes (habits/impulses) and reflective processes (intention/choice). Strengthening an individual's motivation to engage in the desired behaviour is required, for example, helping them develop appropriate beliefs and reduce motivation to continue with the undesired behaviour. Maximising their self-regulatory capacity by developing relevant skills and specific plans to change will help, as well as enhancing supportive activities, for example, elicit social support and change routines/environment.

The model can signpost to psychological theories and sits within a much larger framework called the behaviour change wheel (BCW) (Michie, van Stralen, West, 2011; Michie, West, Campbell, Brown, Gainforth, 2014) which steers interventionists away from a 'common sense' analysis of the problem to designing an intervention based on evidence. A significant criticism of behaviour change

theories/models is there is an abundance to choose from, many with overlapping constructs, so it can pose a significant challenge to choose which one to base an intervention on (Michie, van Stralen, West, 2011). A review led by economists, sociologists, psychologists and anthropologists identified 83 theories of behaviour and behaviour change, containing over 1700 theories (Davis et al., 2014). The Theoretical Domains Framework (TDF) was developed to address this challenge, to help support healthcare professionals improve the translation of research into practice (Michie, Johnston, Abraham, Lawton, Parker, 2005). It comprises of 14 domains 1) knowledge, 2) skills, 3) social/professional role and identity, 4) beliefs about capabilities, 5) optimism, 6) beliefs about consequences, 7) reinforcement, 8) intentions, 9) goals, 10) memory, attention, and decision processes, 11) environment context and resources, 12) social influences, 13) emotion, and 14) behavioral regulation (Cane, O'Connor, Michie, 2012). The TDF has been used in the design of interventions by enabling understanding and systematic assessment of the barriers and facilitators faced by HCPs when implementing weight management guidelines during pregnancy (Heslehurst, Newham, Maniatopoulos, Fleetwood, Robalino et al., 2014).

2.5 Weight management interventions in the non-pregnant population

Some lifestyle interventions have shown promise in changing weight-related behaviours leading to clinically significant improvements in the health of overweight and obese individuals (Lindstrom, Peltonen, Eriksson, Ilanne-Parikka, Aunola, Keinanen-Kiukkaanniemi et al., 2013). These improvements have resulted in a reduction of diabetes incidence over a sustained period of time (10 - 20 years) (Li, Zhang, Wang, Gregg, Yang, et al., 2008; Knowler, Fowler, Hamman, Christophi, Hoffman, et al., 2009). However, it is unclear whether the carry-over risk reduction

was as a result of the legacy effect of earlier improvements in glycaemia or to sustained lifestyle changes in physical activity and dietary behaviours (Lindstrom et al., 2013). A number of systematic reviews (e.g. Peirson, Douketis, Ciliska, Fitzpatrick-Lewis, Ali, 2014; Schwingshackl, Dias, Hoffman, 2014) have reported that diet with physical activity and/or behavioural therapy interventions yield greater overweight and obesity management results (e.g. weight loss, reduction in hypertension, reduction in risk of type 2 diabetes and metabolic syndrome), compared to diet or physical activity interventions alone. However, these reviews have not singled out specific 'ingredients' of the intervention, which result in the behaviour changes reported. There is also widespread variation on their effectiveness, specifically in the longer term (Curioni & Lourenco, 2005). This in part is due to insufficient details of the intervention design being reported, and poor evaluations on what has led to changing behaviour (Michie, Ashford, Sniehotta, Dombrowski, Bishop, 2011).

In an attempt to understand how behaviour change has occurred some studies have identified which weight-related behaviour change techniques (Abraham & Michie, 2008) are presented within interventions. Greaves, Sheppard, Abraham, Hardeman & Roden's (2011) systematic review aimed to identify intervention components effective in positively changing diet and/or physical activity for overweight and obesity, at risk factors of developing type 2 diabetes. Greater effectiveness was associated with using a number of self-regulatory techniques, which included goal setting, prompting self-monitoring, providing feedback on performance and goal review. Furthermore, there was limited evidence to recommend a minimum threshold regarding the intensity of the intervention and amount of clinical contact. Although the review focussed on high quality studies

due to the lack of behavioural interventions described within individual studies, it proved difficult when categorising intervention content and subsequently analysing data to establish content to effectiveness (Greaves et al., 2011). A meta-regression reviewed 122 interventions of physical activity and healthy eating (Michie, Abraham, Whittington, McAteer & Gupta, 2009). Results indicated interventions which included self-monitoring behaviour and at least one other behaviour change technique (goal-setting; feedback on performance; goals in relation to contextualised actions and review of goals) were more successful at increasing physical activity and healthy eating behaviour compared to those that did not (Michie et al., 2009). The role of self-regulatory behaviour (self-monitoring) appears to be a pivotal component to successful weight loss interventions. Self-weighing is the typical self-monitoring method used by those who successfully maintained their weight loss of >30lbs for at least one year and more frequent weighing was associated with higher scores of cognitive restraint and a lower BMI (Butryn, Phelan, Hill, Wing, 2007). A systematic review of self-monitoring strategies for weight loss (diet and/or exercise diaries and/or self-weighing) reported similar findings (Burke et al., 2011). Dombrowski, Sniehotta, Avenell, Johnston, MacLennan (2012) reported that higher numbers of BCTs in behavioural weight loss interventions did not produce better outcomes. Indeed for low-income groups interventions with fewer BCTs have been more successful (Michie, Jochelson, Markham, Bridle, 2009). It seems it is not the quantity of BCTs, but who the intervention is targeted at and the BCT type, which is associated with better outcomes. Some BCTs appear particularly successful for weight loss, namely: provision of instructions; self-monitoring; relapse prevention; and exercise promotion (Dombrowski et al., 2012). This confirms that theory-based interventions and theory-derived techniques (i.e. BCTs) are also more likely to positively impact on behaviour change, relating to weight management. However,

understanding the determinants of behaviour change for the intended target group is also an important consideration, given there some factors impact on specific cohorts e.g. low-income groups.

2.6 Issues of weight in pregnancy

The rates of pre-pregnancy BMI ≥ 25 kg/m² have continued to rise since the 1990s in the UK (Heslehurst, Rankin, Wilkinson, Summerbell, 2010), with elevated BMIs having serious implications for some overweight and obese women who are pregnant. The Confidential Enquiry into Maternal and Child Health (CEMACH) proactively investigates the deaths that occurred during obstetric care in the UK with the aim of preventing future deaths. Each report raises the profile of standards of care to address, health inequalities or areas of clinical practice to improve, which might have been a contributing factor towards women's deaths. In the 2007 CEMACH report, there was significant emphasis placed on managing obese women (BMI 30-60 kg/m²) more effectively. There continues to be an overrepresentation of these women in maternal deaths, with obesity being highlighted as a risk factor for maternal death (Draycott, Lewis & Stevens, 2011). According to the CEMACH (2007) report, of the 119 women with a BMI > 25 kg/m² who died from direct or indirect causes, 55 were overweight (BMI 25-29kg/m²) rather than being obese. The report stated that the *"predominance of obese women among those who died from thromboembolism, sepsis and cardiac disease means that early multidisciplinary planning regarding mode of delivery and use of thromboprophylaxis for these women is essential"* (CEMACH, 2007, pg. 28).

Compared to obese women, women who are **overweight** who died from thromboembolism (6 Vs 14), sepsis (5 Vs 3), and cardiac disease (14 Vs 15) was also significant. However, women who are overweight were subsequently neglected

in the report, with specific actions for practice focussing only on obese women. One key recommendation was to develop national guidelines to manage obese women during pregnancy (CEMACH, 2007). This resulted in the Centre for Maternal and Child Enquiries (CMACE) and the Royal College of Obstetricians and Gynaecologists (RCOG) publishing a joint guideline on the management of women with obesity in pregnancy (CMACE/RCOG, 2010). Managing the adverse impact of being overweight during pregnancy has not featured in the 'top 10 key recommendations for practice reform' in the CEMACH reports, which minimises its perceived importance to be addressed at national and local levels.

Key government documents and numerous studies have reported the short and longer-term health implications of being overweight (BMI 25-29 kg/m²) or obese (BMI 30-40 kg/m²) during pregnancy (e.g. CEMACH 2007; Catalano, 2006). However, research has predominantly focussed on the implications of BMIs in excess of 30 kg/m², thereby addressing the needs of obese pregnant women, but overlooking those classified as overweight. Although the terms overweight and obesity are often used interchangeably within research, the impact of specifically having a BMI of 25-29 kg/m² during pregnancy has received minimal research attention. Studies tend to group all women with a BMI above 25 kg/m² together, so separating findings related to different subgroups of 'overweight' women (e.g. those classified as overweight BMI 25-29 kg/m², or obese BMI ≥ 30 kg/m²) is an almost impossible task. In light of this, it was considered important to also review some of the maternal obesity literature.

Health risks of obesity in pregnancy

Maternal obesity is emerging as a grave public health concern, as the incidence of BMI of ≥ 30 kg/m² continues to rise. Over a 19-year period (1989 -

2007) the number of obese women presenting to maternity units in their first trimester has increased from 7.6% to 15.6% (Heslehurst et al, 2010). CEMACH (2007) identified obesity as one of the biggest threats to UK women of a childbearing age. Although the overall maternal mortality rate has declined, being obese or overweight is associated with 49% of the total maternal deaths from direct and indirect causes (CEMACH 2011). Obesity was discussed extensively in the previous CEMACH report (2007), reporting that 28% of all maternal deaths (between 2003-2005) were obese mothers. There has since been a reduction in mortality rates for obese and overweight pregnant women which might be partially due to the implementation of the joint guideline on the management of women with obesity in pregnancy (CMACE/RCOG, 2010).

Some increased adverse health risks for the mother with a BMI of $\geq 30 \text{ kg/m}^2$ include, pre-eclampsia (Catalano, 2006) and miscarriages (Lashen, Fear & Sturdee, 2004). These women are also vulnerable to developing gestational diabetes, and if they do, have a 7.5-fold greater chance of developing type 2 diabetes post pregnancy, compared to women with a normal blood sugar during pregnancy (Bellamy, Casas, Hingorani & Williams, 2009). Emergency caesarean sections are more likely to be performed in this population, leading to longer operating times, higher amounts of blood loss, wound infection and endometritis in the post-partum period, compared to normal weight women and those who are overweight (Sebire, Jolly & Harris, 2001). Delivery of babies to obese women may be further compromised, as there is a higher need for invasive procedures, increasing risks of further health complications including post-partum haemorrhages (CEMACH 2007).

During pregnancy foetal growth can be reduced in obese mothers (Lefcourt & Rodis, 1996) and significant increased risks of stillbirths and neonatal death rates

have been reported (CEMACH, 2007). Evidence also indicates that infants born to obese women may be macrosomic; are twice as likely to be obese by two years old, compared to infants born to normal weight women (Whittaker, 2004) and have a 1.5-fold increased risk of being overweight or obese at age 16 years (Laitinen, Jaaskelainen, Hartikainen, 2013). This potentially contributes to the cyclical nature of obesity, in that the numbers of women aged 16-24 years entering their childbearing period, overweight or obese are steadily increasing (HSCIC, 2010).

Health implications of being overweight in pregnancy

As with obesity, trends of a pre-pregnancy BMI of 25 - 29 kg/m² have also continued to rise steadily since the 1990s (Heslehurst et al, 2010) with little attention on addressing the health implications of being overweight during pregnancy. To the authors knowledge, the prevalence of overweight pregnant women in England is currently unknown.

Being overweight (BMI 25-29 kg/m²) in pregnancy is associated with increased conditions such as hypertension, gestational diabetes, and pre-eclampsia (Nuthalapaty & Rouse, 2004; Scott-Pillai, Spence, Cardwell, Hunter & Holmes, 2013). Pre-eclampsia deaths for women who are overweight were found to be double that of obese women (6 Vs 3) (CEMACH, 2007). It is estimated that women who are overweight have a 50% increased risk of having a caesarean delivery, with reduced positive outcomes (Poobalan, Aucott, Gurung, Smith, Bhattacharya, 2009). Therefore, because these women will labour with increased medical intervention, this will consequentially incur financial costs for intrapartum and postnatal care (Scott-Pillai, Spence, Cardwell, Hunter, Holmes, 2013). The link between immobility and thrombosis is predominantly associated with obesity and so, an increase risk might be expected during pregnancy. However, some research has

indicated this is not necessarily the case. Ovesen, Rasmussen & Kesmodel (2011) in a large population-based study of 369,347 women, reported that a risk of thrombosis was evident only in women who are overweight, and not in obese or severely obese pregnant women. Exploring this finding further, the authors proposed an explanation for this difference could be that all obese women who are immobilized during pregnancy or after a caesarean delivery receive prophylactic anticoagulation, whereas women who are overweight tend not to receive this treatment. Extending this treatment to women who are overweight also could be considered, given that thromboembolism was cited recently as being responsible for 78% of overweight or obese mother's deaths (CEMACH 2011). Lack of national guidelines and policies result in women who are overweight not being screened for conditions they are currently at risk of developing because of their elevated BMI. This potentially highlights anomalies in care for women who are overweight during pregnancy and a lack of attention being provided to this group.

Cedergren (2004) reported that as the trajectory of weight increases in pregnancy, so does the risk of foetal death. This was recently confirmed by Aune, Didrik Saugstad, Henriksen, & Tonstad (2014) who conducted a systematic review on studies reporting thousands of stillbirths, foetal, perinatal, neonatal and infant deaths. Results indicated that even modest increases in maternal BMI were associated with increased risk of these deaths and stillbirths (Aune et al., 2014). For example, the absolute risk of foetal deaths rose from 76 per 10, 000 for women with a BMI of 20 kg/m² to 82 for those with a BMI of 25 kg/m², and for perinatal death it jumped from 66 per 10, 000 for BMI of 20 kg/m² to 73 for BMI of 25 kg/m². Furthermore, it has been shown that maternal BMI is strongly associated with foetal

death in later pregnancy, compared to early pregnancy (Nohr, Bech, Davies, Frydenberg & Henriksen, 2005).

The impact of being overweight have immediate health effects on the mother and her baby, but significant risks, which are longer lasting, have also been reported. There is an increased risk of obesity in the offspring of obese mothers (Laitinen, Jaaskelainen, Hartikainen, 2013). Comparatively, the risk of obesity observed in infants born to overweight mothers is not as high, but a similar relationship has also been observed. Andres, Shankar & Badger (2012) reported that compared to lean mothers, infants of overweight mothers were born heavier (0.24kg on average) and had greater body fat mass (300g on average) 3 months later, despite controlling for confounding feeding factors. It is unclear the impact of maternal body composition on foetal metabolism at this 3-month period. Currently, the lack of research between overweight mothers and their infants makes it difficult to report any potential trans-generational effects. There is evidence that maternal body composition and metabolism (the strongest regulators of foetal growth) increase the risk of overweight and obesity in children (Lain & Catalano, 2006).

It is undisputed there are elevated health risks for pregnant women associated with obesity and current guidelines and resources are focussed on managing these risks. However, evidence suggests there are also adverse health implications for women who are overweight at risk during their pregnancy, but there is an absence of management of these risks within current guidelines and resource provisions, which is potentially challenging for healthcare professionals when caring for women who are overweight.

Resource Implications of being Overweight During Pregnancy

To date, research and key reports (e.g. CEMACE, 2007) has largely focussed on the adverse impact of obesity ($\text{BMI} \geq 30 \text{ kg/m}^2$) during pregnancy for the mother and her baby. There is an increased risk of complicated labours, resulting in an increased need for interventions (inductions and operative deliveries, Sebire et al., 2001). The cost of prenatal care for overweight and obese pregnant women has been shown to be significantly higher (5.4-16.2 fold) compared to normal weight women. When considering the costs of pre and postnatal care, as well as neonatal care for their infants, the costs rose even higher and went beyond this range for those with a $\text{BMI} \geq 25 \text{ kg/m}^2$ (Galtier-Dereure, Boegner, Bringer, 2007; Chu, Bachman, Callaghan, Whitlock, Dietz et al., 2008; Morgan, Rahman, Hill, Khanom, Lyons et al., 2015). The costing report (NICE, 2010) examined the resource-impact of implementing recommendations from the NICE (2010) guidance. The report considered the additional resources needed to implement the recommendations or where savings could be made. Additional resources were directed solely towards the provision of specialist input and monitoring of obese women, despite women who are overweight being cited as having high risks attributed to their weight also. Again, this highlights the disparity between health risk being identified and actions being proposed to address overweight in pregnancy. However, a large-scale study reported that hospital costs are significantly higher for maternal obesity compared to women who were underweight, healthy weight and overweight, but that increased costs for babies were attributed to underweight mothers (Watson, Howell, Johnston, Callaway, Khor et al., 2013). Provision of care for obese women during pregnancy, labour and postpartum period are undoubtedly higher compared to other BMI categories. However, health risks attributed to being overweight during pregnancy

and complications during labour and postpartum have also been identified repeatedly in key documents (NICE, 2010; CEMACE, 2007). No policies, guidelines or provisions are being implemented to manage these risks nor are preventative measures being resourced to prevent women who are overweight excessively gaining weight during pregnancy and potentially beginning subsequent pregnancies obese.

2.7 Impact of excessive Gestational Weight Gain (GWG) in pregnancy

Currently there is little monitoring of GWG in pregnancy, and closer monitoring has been proposed to improve obstetric outcomes (Fitzsimmons, Modder & Green, 2009). Although the IOM guidelines aim to support women gain healthy weight limits during pregnancy (See table 2.2) NICE (2010) did not support the development of GWG guidelines in the UK. This was because the observational study outcomes used to develop the IOM guidelines, were considered of poor quality.

Table 2.2: IOM Recommendations for Total and Rate of Weight Gain during Pregnancy, by Prepregnancy BMI

Prepregnancy BMI	Total Weight Gain	Rates of weight gain* 2 nd & 3 rd Trimester		
	Range in kgs	Range in lbs	Mean (range) in kg/week	Mean (range) in lbs/week
Underweight (< 18.5 kg/m ²)	12.5-18	28-40	0.51 (0.44-0.58)	1 (1-1.3)
Normal weight (18.5-24.9 kg/m ²)	11.5-16	25-35	0.42 (0.35-0.50)	1 (0.8-1)
Overweight (25.0-29.9 kg/m ²)	7-11.5	15-25	0.28 (0.23-0.33)	0.6 (0.5-0.7)
Obese (≥ 30.0 kg/m ²)	5-9	11-20	0.22 (0.17-0.27)	0.5 (0.4-0.6)

*Calculations assume a 0.5-2 kg (1.1-4.4 lbs) weight gain in the first trimester (based on Siega-Riz et al., 1994; Abrams et al., 1995; Carmichael et al., 1997).

It remains a point of controversy whether women should restrict their energy intake during pregnancy. Some evidence suggests that dietary and lifestyle interventions are effective in managing GWG and reducing some adverse maternal health risks associated with a higher BMI, including pre-eclampsia (e.g. Thangaratinam, Rogozinska, Jolly, Glinowski, Roseboom, 2012). Whereas other research reported that a restrictive diet can negatively impact on the growing baby (Wadsworth & Kuh, 1997). However, women in the UK are not routinely weighed nor are they provided with solutions on how to maintain their weight. Excessive GWG for healthy weight, overweight and obese women is a risk factor for negative obstetric outcomes (Melzer & Schutz, 2010). Therefore, healthy weight gain during pregnancy is an issue for all women. However, most women who are overweight

gain excessive amounts of gestational weight compared to healthy weight and obese women (Cun, Callaghan, Bishop, D'Angelo, 2009; Phelan et al., 2011).

Considering excessive GWG is associated adverse outcomes for both mothers and babies, understanding specific issues related to antenatal care and following a healthy lifestyle for these women is crucial. Having insight into this could help determine whether preventative interventions could be developed to manage excessive GWG for women who are overweight during pregnancy.

Managing excessive weight gain during pregnancy is the advice typically provided to women (NICE, 2010), rather than restricting their dietary intake. Addressing this in overweight and obese women is crucial, particularly given that women who are overweight are most likely to exceed the IOM guidelines (2009) for GWG (78%), followed by obese women (65%) and normal weight women (42%) (Kraschnewski, Chuang, Symons Downs, Weisman & McCamant, 2013). A RCT to prevent excessive weight gain in pregnant (normal and overweight) women revealed that women who are overweight gained significantly more GWG than the recommended IOM guidelines (59% in the intervention Vs 32 % in the control) than normal weight women (Kraschnewski et al., 2013). The intervention group received education and behavioural strategies to promote healthy, low fat eating, modest exercise and appropriate weight gained during pregnancy. However, the trial did not produce the expected findings. The authors reported the study was potentially underpowered (n=120) and so detecting why the intervention was not successful with women who are overweight was problematic. Reasons might have been two-fold. Firstly, there might be unidentified factors specifically impacting on women who are overweight gaining excessive weight during pregnancy, or second, the behaviour change techniques were not adequately specified. If the BCTs were not

appropriately specified, the impact of this could have been that the outcomes in place did not adequately capture a change in the behaviours. Other studies have reported similar findings of excessive GWG for women who are overweight with some having greater than 5 times the odds of excessive GWG compared to normal weight women (Kraschnewski et al., 2013). Not only could this potentially compound existing health risks for women who are overweight during pregnancy, but it also draws attention to the possibility there are specific factors impacting on them during this time, compared to normal and obese pregnant women. Some qualitative evidence (e.g. Stengel, Kraschnewski, Hwang, Kjerulff, Chuang, 2012) suggests that the advice provided by healthcare professionals to women during pregnancy is insufficient in helping them shape their weight gain goals. Furthermore, staff do not perceive GWG advice to be effective and will likely only discuss this topic when it is raised by women, owing to fear of offending or causing distress (Stotland, Gilbert, Bogetz, Harper, Abrams et al., 2010).

Linne, Dye, Barkeling, & Rossner (2004) found those who gained excessive weight during pregnancy and had high weight retention up to one year postpartum (>2.2kg), tended to have a higher BMI 15-years later. This suggests weight retention at the end of the postpartum year was a significant predictor of future 'overweight/obesity' 15 years later. A similar 21-year longitudinal study, also reported that weight gain during pregnancy independently predicted long term weight gain and obesity of women, 21-years post birth (Mamun, Kinarivala, O'Callaghan, Williams, Najman, 2010). For women who are overweight, a rise in weight during pregnancy and postpartum weight retention could mean they begin subsequent pregnancies in a higher weight category (Nohr et al., 2005). This is of particular concern given that even a minor increase (1-2 BMI units) can have serious

negative health implications for mothers and their babies (Villamor & Cnattingius, 2006). Using odd ratio calculations and confidence intervals (95%) for all outcomes by categories of interpregnancy changes of BMI, Villamor & Cnattingius (2006) found that for women whose BMI increased by 3 units during pregnancy compared to 1 unit, the odds of stillbirth increased by 63%. A linear relationship was observed between the trajectory of interpregnancy weight gain and risk of stillbirth. The observed effect was present despite controlling for other adverse health complications (e.g. maternal diabetes) (Villamor & Cnattinguis, 2006). This is of particular importance as the rates of BMI of pregnant women at first antenatal visit in England increased by an average of 1.4 units between 1990 and 2002-2004 (Kanagalingam, Forouhi, Greer, Sattar, 2005).

Although women sometimes attribute early adult weight gain to pregnancy (Flegal, Carroll, Ogden & Curtin, 2010), some studies have highlighted relatively little association between the two (American College of Obstetrics and Gynaecologists, 2009). Indeed other factors have been cited as having a marked effect on 10-year weight gain including; getting married, or living with a partner (Brown, Hockey & Hobson, 2010). It is unclear whether a culmination of factors (e.g. getting married and pregnancy) might further increase risk of those women subsequently gaining more weight compared to women not experiencing those milestones. Some have proposed that due to the frequency of contact women have with healthcare professionals during their pregnancy this might be an opportune time to promote a healthy lifestyle (Wilkinson & McIntyre, 2012). Therefore, it might be opportunistic to begin addressing behaviours that might break the cyclical pattern contributing to overweight and obese conditions (Catalano & Ehrenberg, 2006).

Maternal overweight and obesity and mental health symptoms have shown to have a bidirectional relationship, where one is a risk factor for the other (Williams, Pasco, Henry, Jacka, Dodd, et al., 2009; Luppino, de Wit, Bouvy, Stijnen, Cuijpers, 2010; Lykouras & Michopoulos, 2011). As pregnancy progresses, not only does excessive gestational weight gain increase, but so does the risk of depressive and anxiety-related symptoms (Skouteris, Wertheim, Germano, Paxton, Milgrom, 2009). Although there is limited support that anxiety and stress symptoms impact on excessive GWG (Webb, Siega-Riz, Dole, 2009). Evidence suggests that depression during pregnancy increases the risk for post partum depression also (Milgrom, Gemmill, Bilszta, Hayes, Barnett, 2008). Some studies have found that depressive symptoms in early pregnancy (<20 weeks) and mid pregnancy (27-29 weeks) were risk factors for excessive GWG (Webb, Siega-Riz, Dole, 2009). Whereas, other evidence has shown that in overweight and obese women without excessive gestational weight gain, depressive symptoms at 16 weeks gestation positively predicted BMI at 24 weeks gestation (McPhie, Skouteris, Fuller-Tyszkiewicz, Hill, Jacka, 2015). Findings from this study are supported by previous research identifying depression as a (1.7 fold increase) risk for overweight and obese women, and postpartum weight retention (Williams 2009, Pedersen, 2011). This also highlights, in the absence of excessive gestational weight gain, symptoms of depression may be a risk factor for increased BMI in mid-pregnancy for women (McPhie et al., 2015). Body dissatisfaction has also shown to impact on excessive GWG, and one possible reason for this could be that depressive symptoms influence, and are influenced by body dissatisfaction for pregnant women, which in turn might prevent them partaking in healthy behaviour changes that prevent excessive weight gain (Rauff & Downs, 2011; DiPetro, Millet, Costigan, Gurewitsch, Calufield,

2003). However, more research is needed to fully understand the interactions between these symptoms and behaviours for women who gain excessive GWG.

The interplay between risk factors attributed to excessive GWG appear to be complex, and potentially pregnancy complications as a result of being overweight and obese during pregnancy, might result in women being more vulnerable to symptoms of depression (Bodnar, Wisner, Moses-Kolko, Sit, Hanusa, 2009). Screening all women at the beginning of her pregnancy for depressive symptoms might be helpful, and providing weight-related support when mood fluctuates throughout pregnancy, might help to reduce excessive weight gain for these women (Bagheri, Dorosty, Sadrzadeh-Yeganeh, Eshraghian, Amiri et al. (2013).

2.8 Factors influencing lifestyle changes during pregnancy

As discussed, the COM-B model (Michie et al., 2011) helps to understand that behaviour is context dependent and results from an interaction between capability, opportunity and motivation. Given that managing overweight or obesity in the general population can be complex, due to its multifactorial aetiology; this could further be compounded when pregnant. Therefore, employing the COM-B framework might be useful when exploring factors influencing women who are overweight to change their dietary and physical activity behaviours during pregnancy. Currently, little is understood about what hinders and helps women who are overweight to lead a healthier lifestyle during pregnancy, due to the absence of literature available and 'overweight/obese' being reported as one group. Therefore, it is unclear whether women who are overweight experience the same barriers/facilitators to leading a healthy lifestyle as normal weight and obese pregnant women. The factors influencing women's lifestyle choices during pregnancy, discussed below, have been identified from women across all BMI

categories, with particular focus on evidence from obese and ‘overweight/obesity’ studies, as it is not possible to pick apart only women who are overweight from these studies.

Capability Factors

Capability has been defined as the physical and psychological knowledge, skills and abilities to engage in the desired behaviour (Michie et al., 2011).

Strategies to increase an individual’s capability might involve helping them to develop specific skills (e.g. to cook a meal), regulate their own behaviour by helping them learn to self-monitor or set goals and develop specific plans to change (Abraham, Kelly, West, Michie, 2008).

The provision of information alone has little impact on modifying behaviours in pregnant women (Jackson, Stotland, Caughey, Gerbert, 2011). However, providing information can act as the first step to increase awareness of the nature of their behaviour and its impact (Miller & Brown, 1991). Evidence suggests that women do not accurately estimate how much weight to gain (according to IOM guidelines) during pregnancy, particularly women who are overweight. For example, 14% of women who are overweight under-assessed their weight status, which was correlated with a 7-fold increased risk of excessive gestational weight gain, compared with women with a normal weight BMI who accurately assessed their weight gain (Herring et al, 2008). Similar results were also reported by Shub, Huning, Campbell & McCarthy (2013), in which 364 pregnant women were interviewed with the aim of ascertaining their knowledge on their weight category, complications of excessive GWG, and safe weight management strategies in pregnancy. There were 47% of participants who were classed by the obstetric registrar as overweight or obese. Forty percent of pregnant women who are

overweight exceed their recommended GWG, and their knowledge on the risks of excess GWG was limited. Evidence suggests that even minor increments of BMI units have adverse health implications for women and their baby (Villamor & Cnattinguis, 2006). If women are unaware their excessive weight gain is compromising her health and that of her baby; she is unable to effectively address this to make necessary lifestyle changes. Receiving information regarding the positive effect (for both mother and baby) of making healthy dietary choices and increasing their physical activity might prove a useful step in changing their behaviour. Some women are confused about the language associated with advice on healthy lifestyle, for example, what ‘moderate exercise’ meant (Kagan & Kuhn, 2004). Not only have women felt confused, but they have also found the information they received was contradictory (Clark & Gross, 2004). Overweight and obese women have reported feeling confused about the information provided by healthcare professionals during pregnancy (Campbell, Johnson Messina, Guillaume, Goyder, 2011). Further evidence has highlighted that women felt that they did not receive enough information about the appropriate exercise regime and diet to follow throughout their pregnancy (Weir, Bush, Robson, McParlin, Rankin et al., 2010). So in part, women may not resume physical activities or eat a healthier diet in pregnancy due to lack of knowledge. Often women were advised by healthcare professionals what foods to avoid in pregnancy, and advice provided was at times ambiguous. This led women to feel unclear regarding how much weight they should gain throughout pregnancy, and consequently they sought advice elsewhere via family or friends, which may result in misinterpretation of the information (Thornton, Kieffer, Salabarria-Pena, Odoms-Young, Willis, 2006). However, by providing knowledge regarding what a healthy lifestyle is, which exercises are safe and the implication of this for neonatal and maternal health, this can result in

positive lifestyle changes for overweight and obese women (Sui, Turnball & Dodd, 2013).

Maximising the capability of women who are overweight to regulate their own behaviour by developing specific skills, such as goal setting or self-monitoring might further facilitate lifestyle changes. Lifestyle interventions to reduce GWG that utilised goal setting approaches which included personalised goal setting for diet and physical activity, self-monitoring and feedback were more successful compared to those that had not included these components (Brown, Sinclair, Liddle, Hill, Madden, Stockdale, 2012). It was not reported whether these strategies increased women's self-efficacy, but evidence (with non-pregnant participants) indicates utilising these self-regulatory strategies in weight management interventions resulted in higher levels of self-efficacy (Elfhag & Rossner, 2005). A recent meta-analysis identified those behavioural interventions (alongside dietary interventions) to limit GWG, which included information provision, self-monitoring and rewards contingent on success were more effective (Hill, Skouteris, Fuller-Tyszkiewicz, 2013). Huang, Yeh and Tsai (2011) examined the psychosocial aspects of lifestyle behaviours in pregnancy. The educational intervention comprised of six one to one counselling sessions with a trained nurse, followed by five subsequent booster sessions. Results from the intervention arm indicated that as well as a reduced GWG, these women also had increased scores in self-efficacy, health promoting behaviour, attitude towards body image and perceived social support. These counselling sessions involved helping women set personalised goals, feedback of performance, re-evaluation of set goals, along with supporting educational literature. The reduced GWG and increased self-efficacy might have explained why women had more positive views of their body image and consequently experienced less

depressive symptoms. Although the aim of the intervention was not to promote existing social support mechanisms, the authors suggested that the regular meetings with the nurse might have boosted women and reinforced their perception of social support (Huang, Yeh and Tsai, 2011).

In order to enhance behaviour change one must be aware of their actions, the environment in which they occur, and their immediate and long-term impact (Kirschenbaum, 1987). Self-monitoring potentially facilitates this heightened awareness, increasing responsibility and accountability for one's actions (Bandura, 1998). Some evidence does suggest that self-monitoring of dietary intake was positively associated with recommended gestational weight gain (Wolff, Legarth, Vangsgaard, Toubro, Astrup, 2008). In this study, dietary intake was assessed using a 7-day weighed food records, a method of data collection standard rated gold standard (MRC, 2012). It could be, this intensive recording facilitated women in their self-monitoring, regulation and adherence to dietary recommendations (Wolff et al., 2008). Conversely, Polley, Wing, Sims (2002) found no differences with women's physical activity or eating behaviours related to their GWG, as measured through self-report measures. Considerable debate surrounds the use of weighed food records as a form of data collection and indeed there are constraints with the use of self-report measures (Livingstone, Prentice, Coward, Black, Barker, 1990), which was a limitation of Polley, Wing, Sims' study (2002).

Experiencing adverse physiological pregnancy symptoms might potentially compromise women who are overweight's strength or stamina to cook a healthy meal or engage in physical activity. Jelsma et al. (2016) examined the barriers, beliefs and preferences of overweight and obese European women at risk of developing gestational diabetes mellitus (GDM) during pregnancy. The majority of women

(80%) reported an internal barrier to physical activity was physical complaints associated with pregnancy and tiredness (46%). This finding was also reported in a systematic review by Campbell et al., (2011) which assessed the effectiveness of behavioural interventions to prevent excessive GWG. Results indicated that for some pregnant women there is a decline of physical activity during pregnancy due to a range of factors, some of which include pregnancy symptoms. There were a small number of UK based studies included in the review, which have been corroborated by other European studies (Jelsma et al., 2016), which adds strength to the applicability that these barriers impact on all women during pregnancy. However, both studies reported results of 'overweight/obese' women as one group making it difficult not only to distinguish which findings attribute specifically to women who are overweight, but if such a difference exists.

Teaching and/or enhancing a number of physical and psychological skills for overweight pregnant women might help them feel more capable to change aspect of their lifestyle, during pregnancy. Provision of information on what a healthy diet is, and various physical activities to undertake (even when experiencing adverse pregnancy symptoms) might be useful. By teaching these women how to set lifestyle goals and monitor the progress of these could facilitate desired changes, provided they have the appropriate opportunities to implement them.

Opportunity Factors

Opportunity refers to physical and social factors, which make the behaviour possible (Michie et al., 2011). These might include physical opportunities linked to environmental factors such as having adequate time to engage in physical activity and access to resources like fresh food and/or leisure facilities. Social opportunities

include social norms and cues that influence how an individual might think about their lifestyle choices, or enhancing an individual's social support.

Goodrich, Cregger, Wilcox, & Liu, (2013) carried out interviews with 33 African American women to establish barriers to, and enablers of, exercise and healthy eating in pregnancy. Some of the barriers most commonly cited included; lack of childcare, lack of facilities, and work commitments. Although these findings may not be generalisable to other settings, or those of other ethnicities, it provides significant insight into this minority group who are at a higher risk for excessive GWG.

Some evidence also suggests that neighbourhood disadvantage and proximity of supermarkets might influence both inadequate and excessive GWG (Laraia et al., 2004; 2007). It has been recommended (IOM, 2009) to conduct further research to understand the role of environmental, cultural and social contexts on excessive GWG.

A study by Weir et al (2010) reported that women viewed midwives as the most appropriate source of information. Therefore, antenatal appointments might be an opportunity to receive accurate information about the type and duration of physical activity in pregnancy, in order to challenge beliefs women might have. This is particularly relevant given that evidence suggests these beliefs change throughout pregnancy (Duncombe, Wertheim, Skouteris, Paxton, Kelly 2009). As previously discussed, repeated routine weighing is no longer advocated by NICE (2010) as weight gain is not considered to be indicative of SGA or hypertension (Dawes & Grudinskas, 1991). However, at the time of this study (Dawes & Grudinskas, 1991) there was little evidence indicating that excessive GWG was linked to long term obesity, and the prevalence of women beginning their pregnancy overweight or

obese was dramatically less (Heslehurst et al., 2010). Healthcare professionals and women have reported that if regular weighing was reintroduced into routine care, it could facilitate discussion and provide an opportunity for women to control their weight and monitor their weight gain (Olander, Atkinson, Edmunds, French, 2011). Therefore, it might be time to question the discontinuation of routine weighing during pregnancy, particularly in light of recent evidence where women reported being open to having their weight monitored by antenatal staff (Daley, Jolly, Jebb, Roalfe, Mackillop et al., 2016).

Relationship science has provided insight into the benefits of support (partner, family & friends) on maternal wellbeing (Cutrona, Russell & Gardner, 2005). The role of social support has been shown to predict maternal mental and physical health outcomes (Beck, 2001; Robertson, Grace, Wallington, & Stewart, 2004). Furthermore, in the absence of adequate support, intensive provision of this from healthcare professionals has also been shown to improve maternal and child outcomes, particularly for families at risk (Olds, Eckenrode, Henderson, Kitzman, Powers, 1997). Social support has been found to be a mediating factor for women engaging in physical activity in pregnancy (Hinton & Olson, 2001). Campbell et al.'s (2011) systematic review revealed that, interventions which do not educate and inform the wider family and social network of the pregnant woman, may limit the success of preventing weight gain. The qualitative evidence within this review suggested that women gained dietary and PA advice/information from three primary sources; family/friends, the media and healthcare professionals. Women were significantly influenced by the views their peers had regarding diet/PA, highlighting the role of social context for some women during pregnancy. Moreover, strategies that enhance and extend social support to include women's peers, family, and partner

may also increase her likelihood of behaviour change throughout pregnancy and the postpartum period (Clarke & Gross, 2004). Sui, Turnball & Dodd (2013) found the encouragement from family and friends to eat healthy and exercise facilitated positive changes for overweight and obese women and obligation to cook health family meals enabled these changes to be implemented. Women's partners have been found to have an influential role on the lifestyle choices made during pregnancy. Some have found partners support, enhanced motivation to partake in physical activity and follow a healthy diet (Jelsma et al., 2016; Weir et al., 2010).

A number of factors, like work commitment, lack of facilities and access to supermarkets act as barriers, compromising women who are overweight's opportunities to engage in physical activity or have a healthier diet during pregnancy. Conversely, the role of social support positively mediated aspects of healthy diet and physical activity choices. Reconsidering to regularly routinely weigh all pregnant women might provide an opportune time to add clarity and challenge inaccurate views held with regards to leading a healthy lifestyle, particularly given that beliefs change throughout pregnancy.

Motivational Factors

Automatic and reflective motivational processes direct our decisions and behaviour (Michie et al., 2011). For example, automatic processes involve impulses, emotional responses and habitual behaviour, cued by feelings and associations to foods and/or physical activity. Reflective processes are conscious decisions/intentions and evaluation of beliefs, associated with dietary intake and/or physical activity.

Some studies have highlighted that women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby, rather than themselves (Jelsma, van Leeuwen, Oostdam, Bunn & Simmons, 2016; Szwajcer, Hiddink, Koelen, Woerkum, 2005; Szwajcer, Hiddink, Koelen, Van Woerkum, 2007). However, as discussed they might lack the capability or opportunities to change. Therefore, it is important women who are overweight are informed of the health implications their weight can have during pregnancy, as motivation to change behaviour is strongly influenced by risk perception (Schwarzer, 2008). Although providing information of the associated risks might be useful for women, inadvertently it would also emphasise the importance of this issue to them (Jelsma et al., 2016). However, this would not necessarily result in behaviour change. A recent systematic review reported that providing risk information on its own, that is highly personalised to an individual, does not equate to sustained behavioural changes (French, Cameron, Benton, Deaton, Harvie, 2017). This highlights, there might be a small role for supplying this information to women, but not as a standalone intervention.

Some women may be more motivated to change their lifestyle to ensure their unborn infant is healthy (Johnson et al., 2013), but given the complex interplay of determinants resulting in women beginning pregnancy overweight (e.g. obesogenic environment, psychological and social factors), changing behaviour may not be straightforward for some. It has been reported that women's prepregnancy diet does not change significantly when they become pregnant (Crozier, Robinson, Godfrey, Cooper, Inskip, 2009) and eating habits during pregnancy have shown to be related to dietary attitudes and behaviours pre-pregnancy (Warriner, 2000; Campbell's et al., 2011). This potentially adds a further complexity in changing their behaviours,

making it difficult for them to adopt healthier lifestyles (Downs & Ulbrecht, 2006; Rifas-Shiman, Rich-Edwards, Kleinman, Oken & Gillman, 2009).

Contrary to this, a study which followed 622 women who were overweight (average BMI 26.3kg/m²) from early pregnancy to one year postpartum examined the role of socio-demographic, psychosocial characteristics, exercise pre-pregnancy and changes to physical activity during pregnancy (Hinton & Olson, 2001).

Although assessment of physical activity levels were self-reported and relied on women recalling their prepregnancy levels, significant associations were found. Changes to physical activity during pregnancy were linked with levels of exercise pre-pregnancy. Women who exercised often before pregnancy maintained their activity during pregnancy with those women who rarely/never exercise pre-pregnancy tending to slightly increase their activity levels. Self-efficacy was identified as the most important predictor of change in physical activity in pregnant women, irrespective of pre-pregnancy activity levels (Hinton & Olson, 2001).

Numerous studies have found women's interpersonal beliefs about how safe it is to exercise in pregnancy predicts physical activity levels (Duncombe, Wertheim, Skouteris, Paxton, & Kelly, 2009). Women have also reportedly been fearful that physical activity levels may have possible adverse outcomes on their unborn baby, for example, physical development, miscarriage, and premature birth (Johnson et al., 2013). A combination of these beliefs and contradictory advice from healthcare professionals may contribute to women either significantly reducing or ceasing any exercise throughout pregnancy. Duncombe et al. (2009) examined the safety beliefs 158 women had regarding physical activity during pregnancy. Results indicated women had clear beliefs about what exercises were safe (exercise classes specifically for pregnant women) and what were not (running). Those who attributed 'low to

medium exercise' as being unsafe tended to spend less time exercising. Although these findings provide good insight into the safety beliefs women have regarding exercise, they are not necessarily representative of pregnant women, as the majority of the sample was university educated.

Women have also reported a range of incorrect beliefs regarding safe dietary choices during pregnancy, from drinking more fruit juice, choosing full fat dairy products, to not eating after 8pm (Campbell & McCarthy, 2013). These women believed having such foods impacted positively on their baby's health, so increased their motivation to eat them and were unaware of the adverse effects (e.g. excessive GWG) these choices might have. The formation of beliefs regarding what foods to eat were sometimes grounded in the information provided at antenatal appointments (Wiles, 1998).

Some evidence has reported the influence of automatic motivational processes on the dietary and/or physical activity choices made during pregnancy. Women have described their intentions to lead a healthy lifestyle during pregnancy, which has been compromised due to their difficulties to manage cravings (Goodrich, Cregger, Wilcox, Liu, 2013; Paul, Graham, Olson, 2013). When some women experienced these she believed it wasn't just her craving a specific food, rather it was her baby also, and so didn't want to 'deprive' her baby, even if she did not want to eat the food desired (Reyes, Klotz, Herring, 2013). Findings from a recent study reported that when women's bodily sensations guided her to avoid physical activity or eat unhealthy, she did so even when this contradicted healthcare professional's advice (Atkinson, Shaw, French, 2016). Authors explained this behaviour could stem from participant's belief, that every woman, body and pregnancy differs, so compared to their own feelings, general guidance and advice can't be as reliable.

Furthermore, the beliefs to trust and act upon these sensations, was reinforced when the women felt physically better and suffered no negative experiences from following what her body was guiding her to do. Therefore, exploring further the role automatic motivation and unconscious barriers/facilitators (which is limited within maternal literature) plays in dietary and physical activity choices for pregnant women who are overweight might be useful.

Summary of COM-B factors and lifestyle factors for WO

Changing dietary and physical activity behaviours for overweight and obese women during pregnancy is not straightforward. If they perceive there is a risk to their unborn baby they are more likely to make changes. However, avoiding a small number of foods associated with risk of disease in pregnancy appears to be somewhat easily achieved, compared to increasing fruit and vegetable consumption (Crozier et al., 2009) or engaging in or increasing physical activity (Clarke & Gross, 2004). Making extensive behavioural changes to their lifestyle requires women to perceive there is sufficient risk to change, making dietary and physical activity changes will reduce identified risks, and that they have the capabilities to make and maintain such changes and the opportunities. Given the multi-factorial reasons women are beginning pregnancy overweight, changing their lifestyle choices is complex. When women experience perceived physical or psychological barriers, these can negatively impact on their capabilities and opportunities to change. Consequently, they might reduce their effort to make healthy changes and become frustrated, ultimately impacting on their motivation (Mathieu, Tannenbaum, & Salas, 1992). Providing information of the risks of excessive GWG, promoting healthy diets and physical might initially help women who are overweight recognise the associated risks. Teaching them the appropriate strategies and skills (e.g. goal-

setting and self-monitoring) to change their behaviours, might increase their self-efficacy and capability of making changes. Women have more regular contact with healthcare professionals when pregnant, and are motivated to modify their behaviour to ensure their baby is born healthy. Therefore, antenatal appointments might provide opportunities where they could make more permanent lifestyle changes which could then positively impact on choices made in subsequent pregnancies and set patterns of behaviour for the next generation (Phelan et al., 2011). Exploring more fully the role automatic motivational factors have on influencing healthy lifestyle choices in WO might be beneficial, particularly if the advice HCP's are providing contradicts the choices these women are making.

2.9 Lifestyle Interventions During Pregnancy

Campbell et al. (2010) conducted a systematic review of quantitative and qualitative data, which examined the effectiveness of physical activity (PA) and dietary interventions that prevent excessive GWG and attempted to identify factors which influence intervention success. A meta-analysis of five randomised controlled trials (RCT's) (Asbee, Jenkins, Butler, White, Elliot, 2009; Guelinckx, Devlieger, Mullie, Vansant, 2010; Hui, Ludwig, Gardiner, Sevenhuysen, Murray, 2006; Polley et al., 2002; Wolff et al., 2008) were included in the analysis, comprising 390 participants, with a range of pre-pregnancy BMIs (22.6-34.7 kg/m²) with two studies (Guelinckx, Devlieger, Mullie, Vansant, 2010; Wolff et al., 2008) recruiting obese women only (BMI \geq 30 kg/m²). All trials compared the intervention with usual or standard antenatal care and although they were described as randomised, the randomisation method was deemed satisfactory in three studies only (Wolff et al., 2008; Asbee et al., 2009; Polley et al., 2002). However, not all interventions included PA and dietary components, with Wolff et al. (2008) providing dietary

advice only. The provision of expert advice was delivered primarily by a dietician but the frequency of this varied considerably between trials. Asbee et al. (2009) offered one dietician session compared to Wolff et al. (2008) offered 10 one-hour consultations.

There was no clear evidence that the RCT's of dietary interventions with or without additional support to increase PA were effective in preventing excessive GWG (Asbee et al., 2009; Guelinckx, Devlieger, Mullie, Vansant, 2010; Hui et al., 2006; Polley et al., 2002; Wolff et al., 2008). Further analyses were conducted exploring components which may affect the efficacy of the intervention, including pre-pregnancy BMI and socio-economic status (SES). However, not all trials reported SES consistently, so it is unclear the extent this might have impacted on the overall results. No effect was found between pre-pregnancy BMI and dietary and PA interventions for those women with a normal BMI. When data from the two trials which recruited obese women (Guelinckx, Devlieger, Mullie, Vansant, 2010; Wolff et al., 2008) were included in the meta-analysis, no significant effect between the intervention and control groups were observed, but considerable statistical heterogeneity was found. The lack of effectiveness of interventions may be due to a number of factors. For example, there was methodological diversity observed between the studies, such as, how participants were randomised to trials and the risk of potential bias (none of the trials discussed blinding of assessors at outcome evaluations). Campbell et al. (2010) conducted further sensitivity analyses to establish which components of the intervention had an effect on preventing excessive GWG. Regular weight monitoring with feedback and offering exercise classes did not have any significant effect on treatment. The effects of confounding variables may be due to the small sample size included in the analyses, which limited exploration being undertaken. Despite women demonstrating behaviour changes

when they perceived it to positively affect their baby only, the trials did not tackle systemic factors potentially impacting on poor weight management, e.g. easier access to energy dense foods (Campbell et al., 2010). These ultimately affected robust conclusions being made.

Within the qualitative element of the review, nine qualitative papers reporting eight studies (which included 'overweight/obese' women) were analysed thematically (Campbell et al., 2010). Three studies were categorised as very good quality (Gross & Bee, 2004; Fox & Yamaguchi, 1997; Heslehurst et al., 2007), four were of good quality (Levy, 1999; Warriner et al., 2000; Johnson, Burrows, Williamson, 2004; Wiles, 1998) and due to lack of methodology detail one was deemed poor quality (Fairburn & Welch, 1990). Although the data suggested that for some overweight/obese women pregnancy is a time when they experienced greater self-confidence (Fox & Yamguchi, 1997), interventions which failed to educate/inform women's wider social networks (family/friends) did not prevent excessive GWG. Conversely, some normal weight women tended to adopt a negative attitude towards their pregnant shape. Consequently, this limited them to certain normal physical activities (Fox & Yamguchi, 1997). Some viewed pregnancy as a time when weight gain was inevitable, where they had little control and accepted what healthcare professionals said, without questioning it (Warriner, 2000). These women assumed they would resume normal dietary and PA postpartum (Warriner, 2000).

The review overall employed rigorous synthesis methodology as well as including qualitative and controlled trial data. However, the number of quantitative studies included was small and despite the trial data being derived from international studies, the qualitative data was UK based, potentially limiting the influence of cultural factors on women. It is difficult to ascertain whether the effects from the RCTs were so small due to lack of studies included or if no effect was present at all.

Providing information via a range of formats failed to positively impact on participants in the studies. All studies analysed assumed that excessive GWG and being overweight is not good. However, none assessed whether these matched the attitudes adopted by the participants. Some studies observed women experiencing pregnancy as a time of freedom from dietary behaviours (Fox & Yamguchi, 1997). Therefore, without measuring the impact of the health messages being delivered it is difficult to ascertain how influential these were in changing behaviour (Campbell et al., 2011).

Two reviews have used a revised BCT taxonomy (Michie et al., 2013) to code the components of interventions aimed at reducing the decline in physical activity during pregnancy (Currie, Sinclair, Murphy, Madden, Dunwoody, 2013) and assessing techniques used within gestational weight management lifestyle interventions (Soltani, Arden, Duxbury & Fair, 2016). Both reviews found the same techniques within the BCT categories, were included in interventions namely "feedback and monitoring", "shaping knowledge", "goals and planning", "repetition and substitution", "antecedents" and "comparison of behaviours". Both reviews identified common flaws across all the included studies, such as lack of clear and consistent reporting's of BCTs used in interventions and lack of clarity regarding how the techniques were defined. Studies which have used the previous BCT taxonomy (Michie et al., 2011) to identify successful techniques within pregnancy and postpartum lifestyle interventions, found "goals and planning" and "feedback and monitoring" were the most frequently used also. This has potential implications for the role of maternity staff whereby they could support women who are overweight to set lifestyle goals and monitor the implementation and progress of

these throughout pregnancy. Particularly given that women are reportedly receptive to have targets set and monitored during pregnancy (Daley et al., 2016).

2.10 Systematic Review of the Qualitative Literature on Barriers/Facilitators

Pregnant WO face attempting to lead a Healthy Lifestyle

As discussed, it is difficult to extract results on lifestyle factors for WO as studies report 'overweight/obese' pregnant women as one group. Therefore, a systematic review of the relevant literature was conducted to understand factors influencing whether WO lead a healthy lifestyle during pregnancy and the advice HCPs provide to them. Qualitative methodologies have been proposed to help in understanding new or poorly understood experiences or populations, particularly when projects are in the early phases of developing explanatory hypotheses (Choo, Garro, Ranney, Meisel, Morrow-Guthrie, 2015). Given that little is known about what influences weight-related lifestyle decisions in women who are overweight and the advice provided to them, studies retrieved were qualitative only.

2.11 Method

Search strategy

Searches were carried out via relevant databases (Medline, CINAHL, PsychInfo, Mother and Infant Care, and Web of Knowledge). Reference lists of identified papers were also hand searched. Terms were combined using the 'OR' Boolean operator. A number of key researchers exploring the issue of weight management and pregnancy were also emailed to request if they had any unpublished relevant studies. A full list of the search terms is presented in Table 2.3.

Table: 2.3 Metasynthesis Search Terms

Terms combined with 'OR'
Pregnancy
Pregnancy Complications
Pregnancy Complications diagnosis
pregnan*
antenatal
puerper*
prenatal*
overweight
over weight
"body mass index"
BMI
Qualitative
Qualitative Research
Evaluation Studies
Interview*
Experience*
Theme*
Thematic*
"Thematic"
"Audio Recording"
Attitude*

Inclusion/exclusion criteria of papers

Papers, written in English that employed any qualitative design were included in the review. The populations assessed were pregnant women (over 18 years old) beginning pregnancy with BMI 25-29kg/m², and healthcare professionals (HCP's) supporting overweight pregnant/postpartum women. In particular, the focus was views from these women on issues relating to barriers and facilitators to healthy lifestyles (defined as physical activity and dietary behaviour) during pregnancy. Also, what advice HCP's provided and what they perceived these barriers and facilitators to be for overweight pregnant women. Studies conducted within primary care; maternity services and community settings were included. Qualitative studies, written in English, published since 1990, when IOM weight guidelines were published to December 2013 were included.

Data extraction & Quality assessment

Identified papers were screened by JS against the research question and inclusion criteria for the review. The NICE (2009) quality appraisal tool for qualitative studies was used to assess the selected papers. This tool is based on principles commonly accepted as characteristic of qualitative research and is designed to assess factors which might impact on its validity. The checklist involves answering a number of questions within 6 broad areas (theoretical approach; study design; trustworthiness; analysis; findings relevant to the aims of the study and ethics). An overall grade is then applied based on the answers provided with (++) having all or almost all criteria fulfilled, and (+) having some criteria fulfilled. Papers graded (-) fulfilled few of the criteria.

Findings

Initial database searches produced 2809 citations, of which 2731 were rejected at the title stage as not relevant. Seventy-eight abstracts were screened, of which 55 did not meet inclusion criteria. The remaining 23 papers were read in full, and none met the inclusion criteria, primarily because participants were reported as 'overweight/obese'. Reference lists from these 23 were hand searched, but produced no further papers for review (See Figure 2.4). The key researchers within maternal weight management who had been contacted reported having no studies that met the inclusion criterion.

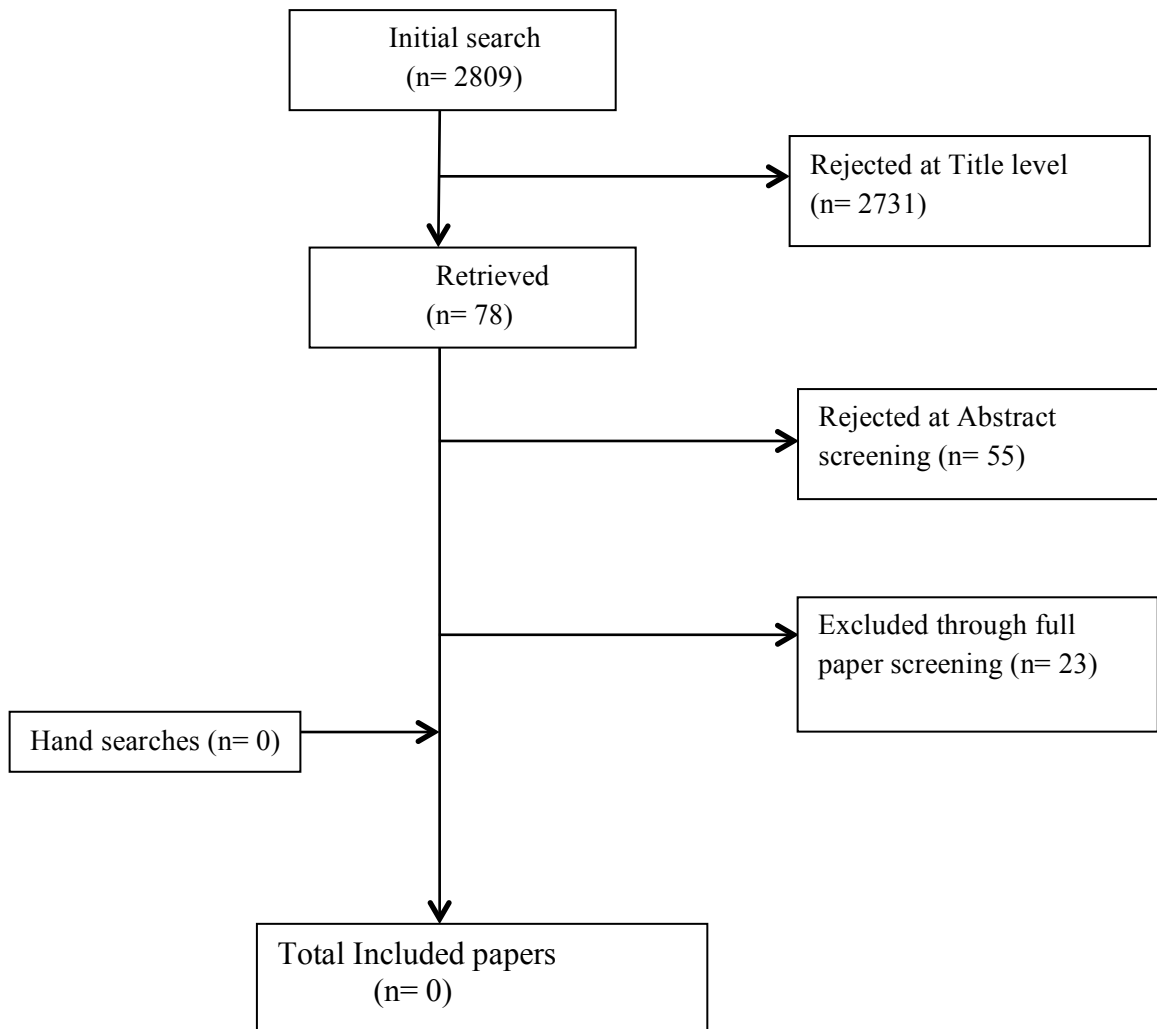


Figure 2.4: Flow chart of study selection

Discussion

Qualitative evidence has been reviewed to establish the barriers and facilitators overweight women face in attempting to lead a healthy lifestyle during pregnancy, and the advice HCP's provide to them. However, the predominant body of research reported 'overweight/obese' as one group, making it difficult to extrapolate which proportion of factors, affect these two different populations. No papers could be identified that met the aims of the review. This highlights the current gap within the existing literature, as well as, the need to examine further the experiences of women who are overweight during pregnancy and what might enable or compromise them leading a healthy lifestyle during pregnancy.

2.11 The Role of Maternity Staff in Supporting Women to lead a Healthy Lifestyle

There is a significant gap in the literature on studies, which explore the role of the healthcare professionals in addressing GWG, and healthy lifestyle choices for overweight pregnant women, as highlighted in section 2.12. The implication of this may be that being overweight in pregnancy may not be being addressed. Healthcare professionals within maternity services potentially have a crucial role to play in influencing behaviour change during pregnancy. For example, patient knowledge and, practitioner advice about GWG have been shown to be two modifiable factors related to excessive GWG (Strychar, Chabot, Champagne, Ghadirian, Leduc, et al., 2000). NICE (2010) stipulated that healthcare professionals should *"have the skills to advise on the health benefits of weight management and risks of being overweight or obese before, during and after pregnancy, or after successive pregnancies (pg 19)." Staff are expected to provide advice to overweight and obese women and although comprehensive guidance is offered to staff on managing women who are*

obese, addressing the issue of overweight in pregnancy is neglected. Although health promotion is a fundamental part of healthcare professionals' role, a number of factors have been found to interfere with maternity staff being able to fully engage in this with overweight and obese women. Again, due to the lack of studies specific to overweight pregnant women, the factors discussed below have been taken from 'overweight/obese' in pregnancy literature.

Lack of GWG Guidelines & Staff Knowledge

Although the IOM (2009) guidelines describe the optimum weight gain in pregnancy for American women based on their BMI, these are not national guidelines implemented in other countries, including the UK. Therefore, there is a widespread variation on the advice women receive from healthcare professionals throughout their pregnancy. This is a complex issue. A number of healthcare professionals lack confidence and knowledge as to what information they should provide women regarding GWG (Olander, Atkinson, Edmunds, French, 2011). This in turn means it is not addressed during consultations and women therefore perceive this as an issue that is unimportant (Thornton, Kieffer, Salabarria-Pena, Odoms-Young, Willis, 2006).

Chang, Llanes, Gold, and Feters (2013) carried out semi-structured interviews with 3 family physicians, 3 obstetricians, and 4 nurse midwives, to understand the perceptions, approach, and challenges involved in managing weight gain during pregnancy. Some providers did not view weight gain in pregnancy as a priority within their consultation and a number of studies reported that HCPs were unfamiliar with established guidelines (Duthie, Drew, Flynn, 2013). In an online survey disseminated to obstetric, midwifery, and allied healthcare professionals working within a maternity hospital in Australia, only 32.1% of respondents were

aware of existing Statewide GWG Guidelines for overweight and obese women in pregnancy (Wilkinson, Poad, Stapleton, 2013).

Phelan et al (2011) asked normal and 'overweight/obese' women what advice their prenatal practitioner had provided regarding weight gain, as stipulated by the IOM guidelines. Compared to normal weight women, 'overweight/obese' women were advised to gain more weight than the guidelines recommend throughout their pregnancy. Furthermore, these women reported that they should and would gain more than the recommended amount. Although it is difficult to corroborate the advice the women reported receiving, the study proposed reasons why practitioners may have advised higher weight gain for women who are overweight. Firstly, staff are uncomfortable raising the issue with obese women (Heslehurst et al., 2007). So this discomfort might be magnified further potentially with women who are overweight, as they might perceive these women to have less difficulty managing their weight. Also, nurses may advise women who are overweight less accurately as they tended to apply the higher weight goal for normal weight women to women who are overweight. However, without universal guidelines, it is unclear how much gestational weight gain results in positive obstetric outcomes (Amorim et al., 2007). Therefore, this makes it very difficult for healthcare professionals to provide consistent weight gain goals to pregnant women.

The NICE guidelines (NICE, 2010) suggest advice will benefit all women and to provide advice at the earliest opportunity (booking appointment) encouraging healthcare professionals to discuss women's eating habits and physical activity (see section 2.2.2 for further guideline content). However, some healthcare professionals feel that providing weight management advice when women are pregnant is too late and advice needs to be provided pre-pregnancy (Heslehurst et al., 2007). The

guidelines also encourage healthcare professionals to dispel myths about what to eat and how much. Adverse risks to mother and baby should also be explained but that these risks will be managed by the staff caring for them during pregnancy. This message may further compound the belief for some women who feel they lack control to effectively manage their weight during pregnancy (Warriner, 2000). Furthermore, some research has indicated that healthcare professionals in the UK do not routinely provide women with information about the risks of obesity and the importance of weight management before or during pregnancy (Heslehurst et al., 2007). Therefore unsurprisingly some women are unaware of the effects of being obese during pregnancy (Wiles et al., 1998; Heslehurst et al., 2007). If staff are not applying this to obese women during pregnancy (where a number of guidelines, policies and care pathways exist), it seems unlikely that women who are overweight's needs are being addressed.

A systematic review identified the barriers and facilitators of healthcare professionals' behaviours towards maternal obesity and weight management in their practice, using the TDF (see section 2.4 where the TDF is discussed in greater detail) (Heslehurst et al., 2014). Results indicated that the majority of domains related to barriers rather than facilitators. 'Knowledge', 'beliefs about consequences' and 'environmental context and resources' were the most common domains recognised. For example, in relation to weight identification and communication a number of domains were highlighted as barriers impacting on staff raising the issue of weight status with women, influencing the beliefs about consequences domain (Heslehurst et al., 2014). Having these beliefs subsequently affected other domains, ranging from their 'beliefs in capabilities' (confidence), 'emotion' (anxiety related to having the discussion), and their 'motivation and goals' (reduced motivation due to wanting to preserve their relationship with the women) (Heslehurst et al., 2014). In turn,

healthcare professionals wanted resources to assist them communicating with women ('environmental context and resources' domain) as well as receive feedback from women regarding weight-related communication ('social influences' domain) (Heslehurst et al., 2014). The aim of this was to limit the negative impact of having weight-related discussions with women. Having a lack of knowledge of the evidence-base and determinants of obesity and weight gain impacted on staff 'emotion', 'motivation and goals' (unwilling to provide support), 'beliefs about capabilities'/'skills' (they lack confidence in their own abilities to change behaviour, and it has a limited effect on changing behaviour with these women) (Heslehurst et al., 2014). However, when healthcare professionals felt they had knowledge this positively influenced their 'motivation and goals' to support women, and they also were confident that pregnancy was an opportune time to intervene to change behaviour ('belief about consequences' domain).

There appears to be a rippling effect, in that an absence of guidelines demonstrates to staff addressing overweight in pregnancy is less of a priority, which results in staff not raising the issue during consultations, and women minimising its importance. Staff knowledge and lack of guidelines may also provide a barrier to the information provided to women who are overweight. This is potentially where the role of staff education and training may be beneficial.

Staff Confidence

How HCPs deliver information and use language may be instrumental in determining women's engagement with the practitioner and the intervention (Raine, Cartwright, Richens, Mahamed & Smith, 2009). Effective communication with women during pregnancy has shown to positively affect their anxiety levels relating to antenatal testing and pain control during labour (Rowe, Garcia, Macfarlane,

Davidson, 2002). However, there are a number of barriers for staff which could impact on these discussions happening freely during consultations (Campbell et al., 2011). Some studies have reported the difficulties healthcare professionals face when discussing the issue of weight with pregnant women (Levy et al., 1999; Heslehurst et al., 2007). Many have felt embarrassed initiating weight-related conversations with overweight or obese pregnant women, due to the sensitivity of the issue and worry it may cause undue concern to women (Stewart, Wallace, Allan, 2012). Therefore, health messages conveyed may not be consistent (Campbell et al., 2011). In addition, staff question the impact their prenatal advice and counselling has upon women who are overweight. Some argued that their advice was ineffective, because women were influenced more by other systemic factors, like culture, lifestyle habits, and family (Chang, Llanes, Gold, Fetters, 2013). If staff do not feel confident raising the issue of weight and that their advice will have success in changing behaviour this will impact negatively on their confidence (Stotland et al, 2010).

There are barriers prenatal care providers encounter when attempting to raise the issue of weight to pregnant women. These factors range from, lack of staff training on weight in pregnancy; perception that an overweight condition is a low priority; concern regarding sensitivity of the topic; and that the information provided to women is potentially ineffective. Staff training and clear guidelines may go some way to increase staff confidence to address the issue, but further research might also help to understand the complexities of these issues further.

2.12 Why focus research on overweight pregnant women

In order to have a successful pregnancy with reduced physical and mental health risks, having a healthy weight and a healthy lifestyle are considered important

(Aviram, Hod, Yogev, 2011; Zhang & Ning, 2011). Being overweight (BMI 25-29 kg/m²) in pregnancy is associated with increased conditions such as hypertension, gestational diabetes, and pre-eclampsia (Nuthalapaty & Rouse, 2004; Scott-Pillai et al., 2013). Also, these women have a 50% increased risk of having a caesarean delivery, with reduced positive outcomes (Poobalan et al., 2009). Overweight women are more likely to gain excessive gestational weight (compared to normal weight and obese women, which not only results in negative physical health outcomes, but all mental health difficulties (Skouteris et al., 2009). Some of these health implications associated with being overweight, have been identified by CEMACH (2007) and NICE (2010). It is important that these reports have raised awareness of these health risks, but unfortunately that is where the management of overweight during pregnancy stops. There is an obvious absence of recommendations in any documents to reform practice either nationally or locally. It is not addressed at policy level nor within maternal care services, which results in anomalies in care. For example, some antenatal screening (i.e. gestational diabetes) is not offered to women who are overweight, they are not as closely monitoring for conditions they are at risk of developing (i.e. pre-eclampsia) or conditions that are specific to this group (i.e. thrombosis). It is currently unclear whether specialist obstetric input would result in the identified risks and mortality rates being reduced for women who are overweight.

Healthcare professional's duty of care is to treat and manage the serious health implications associated with pregnant women who are obese and guidelines, policies and care pathways are in place to support this. However, what is strikingly evident is that despite 'overweight/obesity' in pregnancy being highlighted in key government documents, reports, and research, the predominant focus is often on

obesity, i.e. $\text{BMI} \geq 30\text{kg/m}^2$. NICE (2010) suggests a series of recommendations on what advice healthcare professionals should implement, and pathways to follow for obese pregnant women, but women who are overweight receive little or no attention.

Undoubtedly, there are higher risks associated with beginning pregnancy obese. However, at present it is difficult to clearly identify the barriers and facilitators women who are overweight experience in helping them lead a healthy lifestyle during pregnancy. This is primarily because the research focussing on this exclusively is scant. Extrapolating the relevant findings from barrier/facilitator identification studies is almost impossible, given the reporting of 'overweight/obese' is often as one group. In the non-pregnant population, the primarily goal of leading a healthy lifestyle for overweight and obese adults is weight loss, and combination interventions (that include dietary and physical activity components) tend to be most successful (Greaves et al., 2011) as previously discussed (see section 2.5). Like maternity literature, often results for overweight and obese participants are reported as one group. Intervention studies have reported barriers such as lack of time, physical problems, and limited support, as impacting on successful management of weight, and positive psychological effect (early weight loss) as enabling continued participation in programmes (Abolhassani, Irani, Sarrafzadegan, Rabiei, Shahrokhi, 2012). Currently, the NHS has suggested behavioural and practical strategies to prevent overweight adults gaining excessive weight, which might include reducing snacks between meals, and sugary drinks (see section 2.2). Therefore, part of this thesis will aim to understand whether barriers and facilitators to leading a healthy lifestyle, applicable to overweight individuals in the non-pregnant population, are comparable to women who are overweight during pregnancy.

In addition to having common features with the obese groups particularly in terms of adverse pregnancy and birth outcomes, another reason why 'overweight/obese' are reported as one group, may be due to recruitment issues. Recruiting pregnant women who have BMIs ≥ 30 have shown to be problematic (Furber & McGowan, 2010). This in part may be due to the stigma associated with being overweight or obese, or a fear of being judged by staff (Puhl & Heuer, 2009). Therefore, to overcome these obstacles faced by researchers, having a wider BMI ($\geq 25\text{kg/m}^2$) inclusion criterion may enhance recruitment. However, it relies on the assumption that women who are overweight experience similar care and advice as obese women during pregnancy and fails to highlight the disparity in the provision of guidelines, policies or resources to address it. In the non-pregnant population recommendations are in place to prevent overweight adults gaining excessive weight. Whether these strategies could apply to overweight pregnant women, in helping to manage excessive GWG is unclear. Understanding whether there are specific factors impacting on overweight women during pregnancy, compared to normal weight and obese women, is the first step in clarifying whether differences exist.

Although NICE (2010) reports that effective weight-loss programmes should *"identify and address barriers to change"* (pg 8), there is an incomplete guidance for healthcare professionals on how to assess and address these barriers effectively. There are reasons, which interfere with staff effectively addressing overweight during pregnancy including the lack of guidelines, knowledge, confidence and beliefs about capabilities and skills (Heslehurst et al., 2014). No advice being provided, may result in women not monitoring their GWG or downplaying the role of GWG (Thornton et al., 2006; Arden, Duxbury, Soltani, 2014); whereas, incorrect

advice may result in women who are overweight expecting that they should gain excessive GWG and intending accordingly (Phelan et al., 2011). Therefore, by having a fuller understanding on what advice women who are overweight receive and how to overcome the barriers identified might not only help HCP's to feel supported but also mean that WO receive clear, consistent, and accurate advice. The lack of attention given to the barriers and facilitators specific to women who are overweight attempting to lead a healthy lifestyle in pregnancy represents a significant gap in the literature.

2.13 Chapter summary

The prevalence of women beginning pregnancy overweight and obese is continuing to rise (Heslehurst et al., 2010). Adverse physical and mental health risks (short and longer term) are present for pregnant women who are overweight (CEMACH 2007; 2011; Ovesen, Rasmussen & Kesmodel, 2011), but a glaring absence of management of these risks in current guidelines and resource provisions exists. Within the maternal literature reporting of 'overweight/obese' as one group makes it impossible to distinguish whether there are factors impacting specifically on WO. It remains unclear what are the barriers and facilitators overweight women face when attempting to follow a healthy lifestyle and the support maternity staff provide to them. To date, no study (to the author's knowledge) has explored the extent of this relationship. Investigating this further with staff and WO, using in-depth qualitative research will enable this to be addressed more fully. This methodology and the philosophical framework of pragmatism will be discussed in the next chapter (chapter 3).

CHAPTER 3

Philosophical Underpinnings: Pragmatism and Mixed Methods Methodology

3.0 Introduction

The literature and systematic review in chapter 2 identified that further research was needed, to investigate barriers and facilitators overweight pregnant women face when attempting to follow a healthy lifestyle, views of healthcare professionals on this issue, and what advice they provide to these women. Previous health research has combined both qualitative and quantitative methodologies to deepen our understanding of complex health issues (Farmer, Robinson, Elliott, Eyles, 2006). Given that limited research has explored exclusively the experiences of WO during pregnancy, utilising a mixed methodology might be advantageous in realising the project aims. This chapter will also discuss the most suitable methodologies to meet the aims of the thesis, which are to understand the barriers and facilitators pregnant WO face when attempting to lead a healthy lifestyle, and understand the advice HCP's professionals provide to these women about healthy lifestyle throughout pregnancy.

3.1 Epistemology & Ontology

Broadly speaking, epistemology is the philosophy of knowledge or how we come to know (Trochim, 2000). Epistemological assumptions state the nature, possibility and scope of knowledge (Crotty, 1998). Whereas, Crotty (1998) defined ontology as *“the study of being [...] concerned with ‘what is’, with the nature of existence, [and] with the structure of reality as such”* (p.10). Therefore, both are interconnected as ontology involves the philosophy of reality while epistemology explores the knowledge of that reality. Methodology uses a range of strategies,

plans, processes or designs to identify the practices used to attain the knowledge (Crotty, 1998). Morgan (2007) proposed a definition of paradigms as epistemological positions that direct how questions should be asked and answered. For example, how do we know what we know? What is classed as knowledge? What is the relationship between the knower and what is known? are questions posed by epistemology (Krauss, 2005).

In the current thesis, ontology would be concerned with attempting to obtain an objective reality to the proposed phenomena being explored or whether women's/healthcare professionals' realities are subjective and contextual. The epistemological stance would focus on what knowledge can be gained about staff/women's experiences and whether there is one knowable reality or multiple realities of which some individual knowledge can be obtained (Olson, 1995). Focus groups, interviews and questionnaires are all defined as methods (Creswell & Plano-Clark, 2007) adopted to attain this knowledge.

3.2 Controversy with using mixed methods

The varied ontological and epistemological paradigms and assumptions linked with qualitative and quantitative research has largely led the debate on whether the two can be integrated (Sale, Lohfield, Brazil, 2002). However, the crux of this debate lies in the difference between the philosophies of each approach, rather than their methodologies. A paradigm can be defined as the *“basic belief system or world view that guides the investigation”* (Guba & Lincoln, 1994, p.105).

Quantitative methods lie within the positivist or post-positivist paradigm. The objective of the research is independent of the researcher, in that through the use of observations or measurements of phenomena knowledge can be discovered and

verified. Conversely, qualitative approaches lie within interpretivist or constructionist paradigms. This proposes that knowledge is obtained through understanding the meanings linked to the phenomena studied, whereby researchers interact with participants to obtain data. The knowledge is not only context and time dependent but the researcher will both influence and be influenced by the research activity (Livesey, 2006; Cousins, 2002; Krauss, 2005; Coll & Chapman, 2000). Therefore, there can be no objective reality and as such the research is potentially biased by individual's perceptions (Lythcott & Duschl, 1990). In contrast, positivism proposes that science quantitatively measures information and analyses this in a way that is value-free and as such the data does not alter because the researcher is viewing the world through a 'one-way mirror' (Healy & Perry, 2000). Therefore, by adhering to what can be observed and measured the primary objective of knowledge is to describe the phenomena being experienced, so the researcher is detached from the reality studied (Trochim, 2000; Al Zeera, 2001). Positivist epistemology "*seeks to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements*" (Burrell & Morgan, 1979; in Hirschheim, 1985, Positivist Science section, para. 1). Although differences between the two methodologies exist, there are a number of similarities also. For example, both methodologies "*describe their data, construct explanatory arguments from their data, and speculate about why the outcomes they observed happened as they did*" (Sechrest & Sidani, 1995, p. 78). Both also incorporate techniques to verify data, include observations into studies to address research questions, address issues of bias and attempt to explore complex relationships within social sciences (Elmore & Woehlke, 1998). Choosing a particular methodology will be dependent on what the study is attempting to achieve, as opposed to being aligned to a particular paradigm (Cavaye, 1996).

Some take the view that merging both methodologies potentially compromises scientific advancement, and that relying on just numbers (quantitative) or words (qualitative) methods is more advantageous (Onwuegbuzie & Leech, 2005). Others argue that drawing on mixed methods enables researchers to utilise the strengths and perspective of different methodologies to provide a deeper understanding on the topic of focus (Johnson & Onwuegbuzie, 2004). Mixed methods research might be particularly complimentary in capturing the complexity of human responses to various health care situations, as demonstrated in a number of areas, for example, nursing (Foss & Ellefsen, 2002).

Central to the mixed methods debate is the paradigm stance. Due to the fundamental epistemological differences with qualitative and quantitative methods they are said to be 'incommensurable' (Kuhn, 1996) in that they represent different viewpoints of the world and how to collect information regarding it (Murphy, Dingwall, Greatbatch, Parker, Watson, 1998). So, to employ the paradigm stance for this current project would be somewhat restrictive, as using interviews and questionnaires would be to violate the philosophical underpinnings of each paradigm. Therefore, the complex topic of understanding overweight pregnant women's experiences when attempting to follow a healthy lifestyle might not be fully realised. However, there has been an increasing shift away from epistemological defined paradigms and a move towards adopting a pragmatic approach, which sanctions the use of mixed methods research (Morgan, 2007; Creswell & Plano-Clark, 2007).

3.3 The Pragmatic Approach

Pragmatism has been proposed as an alternative paradigm in social scientific inquiry (Morgan, 2014). The existence of numerous types of ontologies (e.g. realism and dualism) and epistemologies (e.g. interpretive, constructivist and subjectivist) is

evidence that they are ideals rather than empirically true phenomena according to pragmatists (Scott & Briggs, 2009). Pragmatism claims that paradigms are not seen as “*abstract entities with timeless characteristics*” (Morgan, 2007, p.61) like epistemology and ontology, but are ever-changing belief systems. Critics argue that qualitative and quantitative paradigms differ epistemologically and ontologically, but the counterargument posits that both paradigms have commonality to “*understand and explain behaviour and events, their components, antecedents, corollaries, and consequences*” (Dzurec & Abraham, 1993, p.76). By employing a pragmatic approach the researcher is able to focus on the research question, which consequently drives the choice of method (Greene, 2007). The use of mixed methods studies has grown largely due to pragmatic issues, namely cost effective research, competition for research funding and an ever increasing need to address the needs of practitioners and policymakers (Brannen, 2009). By utilising mixed methods pragmatists are able to explore datasets in more depth to understand meaning and use one method to validate results from the other method (Onwuegbuzie & Leech, 2005). Therefore, there is less constraint on which methodologies (qualitative, quantitative or mixed methods) to choose as they are not being led by any particular epistemology or ontology, but rather which is most suitable to answer the research question. However, the practical 'how to' aspects of research captures only part of the pragmatism philosophy. Increasingly, 'why to' conduct research in a particular way is gaining momentum (Morgan, 2014).

Some criticism of pragmatism has been its lack of philosophical underpinnings compared to purist qualitative and quantitative methods (Onwuegbuzie & Leech, 2005). It is recognised that mixed methods research, albeit has taken pragmatism into the social research paradigm debate, has overshadowed discussions regarding the philosophical foundations of pragmatism (Morgan, 2014).

In recent times, there has been a shift away from which methodology a pragmatic researcher chooses, towards understanding research as a process to answer a question. Denzen (2012) surmises, that "*classic pragmatism is not a methodology per se. It is a doctrine of meaning, a theory of truth*" (p 82). Pragmatism as a philosophy therefore is not merely a problem solving activity, as is so often the case in research, but focussed on individual's experience (Dewey, 1933). Pragmatists claim that true objectivity and certainty cannot be acquired through research but 'truth' about the topic of investigation is what is obtained at the time of investigation, which could, with further evidence, become flawed at a later time (Scott & Briggs, 2009). Each situation encountered by an individual brings forth potentially an unconscious set of beliefs and consequently results in them behaving within some definition of the circumstance (Morgan, 2014). For example, in order for an individual to form meaning they attempt to impose some order of their world; this meaning is based in cognition (their thoughts/beliefs) not in external elements; information influencing cognitive systems are screened, altered or translated by the preexisting knowledge within that system; a decisively constructed knowledge is the outcome (Lythcott & Duschl, 1990). A criticism of pragmatism is that an individual cannot distinguish beliefs that are useful but true compared to those that are useful but false, as there is no definitive way of knowing absolute truth. However, whether something is true or false is immaterial because if an individual believes it to be 'true', this will dictate their behaviour irrespective of whether an objective truth is present (Scott & Briggs, 2009).

The concept of inquiry is proposed in pragmatism as a basis for research, in that, pragmatists are acting within a mind-set which leads them to choose one research topic rather than another as well as one method as opposed to another (Morgan, 2014). However, they are free of the mental and practical constraints

imposed by the *"forced choice dichotomy between postpositivism and constructivism"* (Creswell & Plan Clark, 2007, p. 27). Pragmatism aims to investigate a specific question, theory or phenomenon using the most suitable research method (Feilzer, 2010). And so, a pragmatic approach to this current project allows for the potential complexity of establishing which barriers/facilitators overweight pregnant women experience, to be unlocked. In an attempt to understand more fully this complex topic triangulation was used.

3.4 Rationale: using a mixed methods approach

To understand more fully the views of staff, focus groups were conducted with obstetricians/GP's (Group 1) and midwives (Group 2). Focus groups enable attitudes, experiences and behavioural patterns to be drawn from the group and explored in a way that differs from observational and interview methodologies (Pramualratana, Havanon, & Knodel, 1985). Staff experiences and views were central to the research question and exploring this through quantitative methods was not amenable. Focus groups were chosen as they have been used with staff within healthcare settings to establish whether existing knowledge of a subject is inadequate and if elaboration of key issues is necessary to explore before a valid questionnaire can be constructed (Powell, Single, Lloyd, 1996). Within focus groups participants are able to clarify/expand on their viewpoints in light of points raised by other participants, which might remain unexplored in other methodologies (Powell, Single, Lloyd 1996). Although focus groups often elicit spontaneous responses, compared with carefully considered answers to interview questions, one drawback is the impact of the moderator and "group effect" on these viewpoints (Smithson, 2000). Consequentially, one downfall of focus group discussions is that they can result in 'surface' information from individuals (Myers, 1998). However, it has also been

viewed as being sensitive enough to address personal agenda's from individual respondents, so is an ideal method to explore uncharted areas of interest (Smithson & Diaz, 1996), namely women who are overweight's lifestyle experiences during pregnancy.

The aim of the staff focus groups was twofold, firstly to explore raising the issue of being overweight during pregnancy and staff confidence. Secondly, what healthcare professionals interpreted by the term overweight and what information they provided to these women during pregnancy. Qualitative research has the advantage of exploring the 'why' and 'how' of phenomena compared to quantitative methods (Green & Thorogood, 2010). Focus groups have been described as being a *"unique and independent source of qualitative data which can add to other qualitative or quantitative data collection strategies"* (Morgan & Spanish, 1984 p. 253) thus making them useful in a variety of areas of exploration. The method, findings and discussion from this phase of the project are presented in chapter 4.

A sequential exploratory approach was employed to design the questionnaire. Once themes were generated from the focus group data, relevant literature was examined to establish how questions could best capture obstetrician and midwives experiences, thoughts and beliefs regarding perceived barriers/facilitators and advice provided, on a much larger scale. The results also allowed the focus group data to be clarified, developed and expanded upon, and the generalisability of the findings to be determined. The method, findings and discussion of the questionnaire are presented in chapter 5. Some research (e.g. Mc Neill, Doran, Lynn, Anderson, Alderdice, 2012) investigating the roles of midwives delivering public health interventions (i.e. healthy lifestyle and physical activity advice) have also implemented a mixed methods approach. This study involved a qualitative (focus groups) and quantitative phase (questionnaire). Comparing results from both phases of this study resulted in

clear themes emerging, which clarified the issues to address with public health education within pre-registration midwifery (McNeill et al., 2012).

Examining the barriers/facilitators to healthy lifestyle choices for overweight pregnant women is an under-researched area. As each individual experience's from their own view, each person has a different reality (Trochim, 2000). From a pragmatist perspective, by employing a qualitative approach (using interviews) was required to understand these women's experiences, attitudes and beliefs more fully (chapter 6). Qualitative research involves "*getting out into the field and seeing what people are doing and thinking*" (Strauss & Corbin, 1998, p.11). Using this approach would capture overweight pregnant women's views regarding their lifestyle choices and experiences with healthcare professionals during pregnancy. The method, findings and discussion from this study are presented in chapter 6.

Focussing exclusively on the views of overweight pregnant women did not necessarily address whether these views were specific to them or whether there were barriers/facilitators that were shared across the three weight categories. Again, by adopting a pragmatic perspective, gaining a deeper insight into whether differences exist between the groups, was the felt to be the most appropriate methodology, to gain a subjective interpretation of the area of interest, for the final study (chapter 7). Although other methods might have also been appropriate to understand this subject, interviews enable respondents to have liberty in considering their responses and discuss areas not raised by the researcher (Powell & Single, 1996), which might have been particularly relevant. In chapter 7, the method, findings and discussion from this study are presented.

In the context of health research some have identified the significant benefits of combining qualitative and quantitative methodologies to expand and broaden our understanding of complex health issues (Farmer, Robinson, Elliott, Eyles, 2006).

"The underlying assumption is that the validity of research results is enhanced if the different methodological approaches produce convergent findings about the same empirical domain" (Erzerberger & Prein, 1997, p. 144). Results from both methodologies in this study could be compared and contrasted, and potentially provide a framework of barriers and facilitators specific to overweight pregnant women when attempting to choose a healthy lifestyle, which is presented in chapter 7. Consequentially, data interpretation was enhanced, enabling the findings to inform future research and potentially policy and practice (Creswell, 2009). Where a qualitative phase leads into a quantitative phase this has been defined as a sequential exploratory design; one in which qualitative outcomes guide succeeding quantitative studies (Creswell & Plano-Clark, 2007). Therefore, because overweight pregnant women's views are currently under-researched, implementing an exploratory design is particularly advantageous. Sui and Dodd (2012) incorporated a triangulation protocol to combine qualitative (interviews) and quantitative data (questionnaires) to evaluate overweight and obese women's perceptions of behaviour change during pregnancy. This approach enabled the psychological mechanisms, which helped or hindered women to make healthy lifestyle changes during pregnancy to be highlighted. Although no specific details regarding the steps taken to complete triangulation were provided, the authors reported this approach enabled *"corroboration of findings from the two sets of data provided stronger evidence of the validity of our findings"* (Sui & Dodd; 2012, p. 1886). Considering the pragmatist philosophy, it was decided that adopting a similar approach to Sui and Dodd (2012), using focus groups and a survey, would facilitate exploration of the experiences of maternity staff when supporting overweight women during pregnancy (chapter 4-5).

The current thesis has used an established method for research with this population. Furthermore, using a methodological triangulation approach has potentially enhanced the validity of the research whereby the findings and interpretations are credible and dependable (Lincoln & Guba, 1985). Although there are benefits of mixed methods, controversy surrounds the validity of mixing qualitative and quantitative methodologies.

3.5 Triangulation

Denzin (1978) defined the term triangulation as *"the combination of methodologies in the study of the same phenomenon"* (p. 291). Four types of triangulation have been defined: data triangulation (i.e. use of a variety of sources in a study), investigator triangulation (i.e. use of several different researchers), theory triangulation (i.e. use of multiple perspectives and theories to interpret the research results) and method triangulation (i.e. multiple methods to study the research question). For the purposes of the current study, data, method and theory triangulation were chosen to address what staff and women felt were the barriers and facilitators faced when attempting to follow a healthy lifestyle during pregnancy.

Morse (1991) further outlined two types of methodological triangulation. Firstly, simultaneous triangulation is the concurrent use of qualitative and quantitative methods in which there is limited interaction between the two sources of data when data is being collated. Secondly, sequential triangulation is required when the results of one approach are required for planning the next method. In this study focus groups with staff were necessary to understand what their experiences were of women who are overweight's barriers/facilitators to healthy lifestyle choices during pregnancy (discussed further in chapter 4). The results of this assisted in the design stage of the proceeding study, which was a questionnaire with staff on a much larger scale, examining similar constructs featured from the focus groups findings

(discussed in chapter 5). Overweight pregnant women were interviewed examining their perspective on what helps/hinders healthy lifestyle choices during pregnancy (discussed in chapter 6).

The qualitative data informing the design of the quantitative component of a research project has been promoted as one of the benefits of triangulation (Denzin, 1978). It has been shown to not only validate findings but also enable real world issues to be further explored and increase knowledge (Olsen, 2004). In the realm of health research there has been a surge of interest in the use of triangulation as it has been demonstrated to lead to a multifaceted understanding of complex health issues (Nakkash, Soweid, Nehlawi, Shediach-Rizkallah, Hajjar, 2003; Tones, 2000; Aung, Zhang, Farhat, Gan, Salameh, 2001). However, its application has been criticised, as there might be discordancy between the units of analysis and theoretical paradigms. Consequently, the process of triangulation could potentially magnify errors and biases (Sim & Sharp, 1998). A common flaw of triangulation has been the difficulty with implementing it during the research process, which is congruent with all its aims (i.e., to explore levels of convergence, complementarity and dissonance) (Farmer, Robinson, Elliott, Eyles, 2006). A significant number of researchers focus solely on one aspect (e.g. complementarity) rather than attempt to fully triangulate at the design, data collection and analyses phases of the investigation. This might dilute the potential credibility of study findings (Fielding & Fielding, 1986; Knafl & Breitmayer, 1991). In order to overcome this some studies have developed and implemented a triangulation protocol. For example, the Canadian Heart Health Initiative (CHHI) was a 15 year program designed to address the epidemic of cardiovascular disease in Canada. The researchers in this project applied a triangulation protocol to examine the contextual factors affecting health promotion dissemination, capacity building, and related research processes. The triangulation

protocol involved multiple investigators, methodological (key informant interviews and project reports) and data sources (a range of perspectives provided by different participants). This multiple triangulation approach resulted in a more complete and robust representation of the context relating to dissemination and capacity building to heart health programs across different provinces. After an initial literature review was conducted, given the lack of studies which focussed exclusively on overweight pregnant women, implementing a triangulation strategy was essential to address the objective of the overall thesis.

"Triangulation itself is not necessarily a methodological virtue" (Sharp, 1943, p.30) but is only as strong as the study's underlying theoretical, methodological and analytical approaches, as well as the researchers' skills (Mays & Pope, 2002). Accordingly, methodologic triangulation has the possibility of highlighting unique differences or meaningful information that may have remained concealed if only a single approach or data collection technique was implemented in the study (Thurmond, 2001). A number of difficulties have been proposed which might deter the use of methodologic triangulation, some of which include the lack of researcher expertise to use either method and/or problems with merging numerical and narrative data to understand the phenomenon (Polit & Hungler, 1995). Some researchers might combine qualitative and quantitative methods in the same investigation, with the expectation that the strength of one might offset the weakness of the other. The erroneousness of data from one method however, might not reduce the erroneousness of the other (Fielding & Fielding, 1986). Morse (1991) emphasised that the dominant method chosen must be rigorous enough to sustain the study by itself, and the secondary method should enhance the strength of the research, in methods triangulation.

Although the primary purpose of theoretical triangulation is to strengthen the confidence of the accepted hypotheses/theory (Mitchell, 1986), if the concepts within the framework are poorly defined, this type of triangulation can potentially cause confusion (Banik, 1993). Researchers have been advised to exercise caution, in that findings do not become more credible and valid because they have been supported by similar theories (Lincoln & Guba, 1985).

3.6 Ethical considerations

According to Miles and Huberman (1994) specific ethical issues reside in much broader values of how we decide if an act is right, correct or appropriate. In order to guide researchers to behave ethically when conducting research a number of key guidelines have been written. Two key documents (BPS, 2009; 2010) were considered when addressing potential ethical issues and management of these across each study.

Given there is more than one participant in a focus group particular consideration needs to be given to the role of sensitively handling data and confidentiality (Gibbs, 1997). Furthermore, the participants might experience undue pressure to disclose information due to the intensity of the group setting (Morgan, 1993). For a participant who overly discloses, the potential stress of this might be more difficult to manage within a group situation, as opposed to an interview (Smith, 1995).

In order to manage some of these potential issues from the outset it was clarified that each participant's contributions would be shared with the others in the group as well as with the moderator. However, as recommended by previous studies that utilized focus groups as part of their research, what participants shared within the group should not be shared outside the group setting (Carey & Smith, 1992). A research participant may feel safer in a one-to-one interview and so tend to disclose

more than was intended, but might withhold sharing of this information in a group setting (Smith, 1995). However, managing the stress of this disclosure might be easier in an interview than a focus group. All information that participants provided was treated in confidence to comply with UK Data Protection Laws (Data Protection Act, 1998). Each participant was provided with an information sheet, which explained ethical issues as well as the purpose of the related study, the advantages/disadvantages with taking part and how results would be disseminated. They were all provided with an identification code in the form of a number and initials. Participants were informed that in the event results from the study are published, their identity would remain confidential. Any direct quotes that would be used from the focus group/interview however, would be assigned a pseudonym to maintain their anonymity. All participants were reassured that members of the research team may look at the information that has been provided to check that the study is being carried out correctly. However, these members would also have a duty of confidentiality to the research participant and we will do our best to meet this duty. Furthermore, they were informed that only members of the research team would have access to their personal information and data relating to the study. The principle of consent is closely in keeping with the principle of autonomy, affirmation of human dignity and human rights, which are integral parts of the principles of Nuremberg Code, The Declaration of Helsinki and The Belmont Report (Mandal, Acharya, & Parija, 2011; Council for International Organisation of Medical Sciences, 2002), which fundamentally advocates for individuals to be free to make decisions. In line with BPS guidelines on Code of Ethics and Conduct (2009) it is the researchers responsibility to ensure that each individual partaking in research consents freely on the basis of adequate information. *“Participants in psychological research should have confidence in the investigators”* (BPS, 2010, p. 4) and so

documents were written in an informative and clear manner. It was reinforced to participants their participation was on a voluntary basis and they were free to withdraw from the study at any time, without giving a reason. When the data from each study was transcribed participants were sent their contribution only, if they had indicated on their consent form this is what they wanted. They were provided with a date (two-week period) to read through this data and make any amendments. Again, it was reinforced they could completely withdraw their data at this point. However, if they had not contacted the researcher for withdrawal of data by the date provided, they were informed they were agreeing for their data to be part of the study. For staff involved in the questionnaire study (which was anonymised-at-source) consent was considered to have been given by ticking a box agreeing to participate in the study.

A number of materials including information sheets, consent forms and debrief sheets (along with appropriate resources) were created for each study.

3.7 Analyses

A mixed methods approach to this project involved a number of data sources. Two focus groups with maternity staff (analysed thematically) subsequently informed the design of a questionnaire with maternity staff on a much larger scale (quantitatively analysed). Interviews were initially conducted with overweight pregnant women and thematically analysed. These results were considered when designing the final study, which involved conducting interviews, using the TDF, with women across three weight categories (normal, overweight and obese). The data collated was analysed using framework analysis. The analyses are reported in greater detail in each study chapter.

3.8 Chapter summary

This chapter has explained the philosophical framework, pragmatism, and mixed methods used for the current project. As the aim of pragmatism is to answer the question using the most efficient method possible, the epistemological and ontological paradigms are not a priority in comparison (Creswell and Plano-Clark, 2007). This is largely because the concepts of epistemology and ontology have been proposed as being empirically constructed therefore; the 'epistemological stance' has been rejected. Truth, certainty and objectivity (also empirically constructed notions) have also been abandoned. Consequently, a pragmatic approach, which permits the most suitable methodology to answer the research question, was adopted. For this study, a mixed methods methodology was deemed most appropriate. In order to provide a multidimensional perspective on what factors hinder/help women who are overweight follow a healthy lifestyle during pregnancy, triangulation was used. The methods chosen (focus groups, interviews, and questionnaire) were with the aim of providing rich, unbiased data enabling it to be interpreted with a confident level of assurance.

The systematic review in chapter 2 highlighted the need for qualitative exploration of overweight pregnant women's views on barriers/facilitators they experience which impact on them following a healthy lifestyle. Additionally, quantitative investigation would assist with generating findings to address what their views of the barriers/facilitators women who are overweight face when attempting to follow a healthy lifestyle during pregnancy are, as well as the advice they provide to these women.

CHAPTER 4

"Opening Pandora's box" A qualitative investigation examining whether staff have weight-related discussions with overweight pregnant women.

4.0 Introduction

Healthcare professionals (HCPs) face a number of barriers in their attempt to address healthy lifestyle and excessive GWG in general, but particularly for those who are overweight (see chapter 2). Moreover, this review reinforced that the predominant focus within maternal health studies is on obese (BMI 30-35kg/m²) women, and exploration of overweight (BMI 25-29kg/m²) women's experiences (and those of HCPs supporting them) of leading a healthy lifestyle during pregnancy has been neglected. Using a qualitative methodology to capture this data will help give these healthcare professionals a 'voice' and contribute to a sparse literature exploring these issues for overweight pregnant women. Given the integral role maternal staff could play in providing weight management support for women, exploring whether they do this, and what advice they provide is a useful first step in considering the information that women who are overweight (WO) receive. Compared to quantitative methods, qualitative research has the advantage of exploring such a phenomena (Green & Thorogood, 2010), so focus groups were used.

4.1 Background

Providing information alone will not change pregnant women's behaviours, but it can act as a first step in helping to increase awareness of their behaviour and its potential impact (Miller & Brown, 1991). Given there is evidence that WO tend to gain excessive GWG during pregnancy (Kraschnewski et al., 2013), compared to

normal weight and obese women, HCP's potentially have a role in influencing changes in their behaviour (Strychar et al., 2000). However, the interplay of complex factors are significantly compromising their ability to have weight-related discussions (Phelan et al., 2011; Chang et al., 2013). 'Overweight/obese' is reported as one group in many maternity studies (see chapter 2). Therefore, there is a significant gap in the maternity literature exploring the role of the HCP in addressing GWG, and healthy lifestyle choices for pregnant women who are overweight. In an attempt to contribute to an understudied area of maternal health, this study aimed to explore, from staff perspectives:

1. Factors influencing weight-related discussions with women who are overweight during pregnancy occur;
2. Factors influencing whether and how lifestyle advice is provided specifically to overweight pregnant women.

4.2 Method

Design

This was a qualitative study involving focus groups, with healthcare professional's working within maternity services.

Ethics

Ethical approval was granted by Sheffield Hallam University, the NHS Proportionate Review- North of Scotland (13/NS/0171) and the local NHS Trust R&D Departments. Barnsley Hospital NHS Foundation Trust (BHFT) also issued JS with a research passport to complete the current study (until September 2016).

Participants

A purposive sampling procedure was followed. Having met and discussed the study with both gatekeepers (Public Health Midwife (PHM) & Consultant Obstetrician), their role within the recruitment process was agreed, and that participants would be invited to participate if they provided support to pregnant women who are overweight (BMI 25-29 kg/m²).

From the outset, it was clarified that each participant's contributions would be shared with the others in the group as well as with the moderator, to manage some of these potential issues. However, as recommended by previous studies that utilized focus groups as part of their research, what participants shared within the group should not be shared outside the group setting (Carey & Smith, 1992).

Procedure

Midwives were invited to participate from Barnsley Hospital NHS Foundation Trust via an email from the PHM. Obstetricians/GPs were attending a research seminar at the Royal Bolton Hospital NHS Foundation Trust, so were emailed in advance, by the gatekeeper, asking whether they wanted to participate in the study after the seminar was finished. Those who responded were emailed an executive summary of the study. The purpose of this document was to provide information about the study, and how this related to the aims of the PhD project overall. Initially, at the planning stage of the PhD, conducting a longitudinal study (which is referred to in as Study Three in this document) was thought useful. However, as the PhD progressed, it was decided to study 4 (chapter 7) was a better 'fit' to addressing the aim of the PhD. The executive summary provided background

information on health issues impacting on women who are overweight during pregnancy, the potential role for staff to help change the lifestyle behaviours for this BMI group, as well as the aim and methodology of the proposed study and possible implication of results. When participants arrived to take part in the focus group, they were provided with an information sheet (See Appendix 2) and were asked to complete a consent form (See Appendix 3) consenting to: their participation being voluntary, maintaining the confidentiality of other group members, having the discussion recorded, and issues regarding data management. Those who had provisionally agreed to participate via email all attended the focus group, consented and participated. Two focus groups were formed (FG1 10 obstetricians and 2 GPs; FG2 8 MWs). FG1 was conducted at the Royal Bolton Hospital NHS Foundation Trust, and FG2 at Barnsley Hospital NHS Foundation Trust.

A semi-structured interview schedule was devised after consulting relevant literature (Appendix 4) and considering findings from the systematic review. Broad topics from the focus group included: understanding what information staff gathered regarding women's weight and any signposting on to other services; what they observed were barriers/facilitators women who are overweight faced to lead a healthy lifestyle during pregnancy; and the advice they provided to them. Each participant was provided with an information sheet, consent form and the opportunity to raise any questions relating to the study before the focus group commenced. The focus groups were audio recorded. Focus group 1 (Obstetrician's/GPs) lasted 36 minutes, and focus group 2 (Midwives) lasted 43 minutes.

Audio recordings were all transcribed verbatim (See Appendix 5 for a sample). All participants were assigned a pseudonym, which was stored separately to their transcribed data. Transcripts were sent to participants for their confirmation.

Analysis

Data was analysed thematically using Braun & Clarke's (2006) six-stage process. This involved initially becoming familiar and immersed with the data, by repeatedly reading the data, searching for meaning and patterns, and making some notes on what the data was about and general observations. After becoming familiarised with the data and making notes, the second phase involved producing initial codes, which were features of the data. This process was beginning the analysis as it involved organising the data in a meaningful way (Tuckett, 2005) and systematically addressing each data item, identifying the repetition of patterns (themes). Phase three required organising and combining the different codes into possible overarching themes. Creating a thematic-map using post-it notes helped to provide a visual representation and to think through the relationship between the codes and themes. Once overarching themes and subthemes were collated and extracts of data linked to each of them, phase four began. This involved reviewing and refining the themes, which consisted of two stages. First, reading all data collated for each theme, deciding whether they formed a coherent pattern. Secondly, for extracts that did not fit as well into a theme, this required reviewing and reworking the theme, creating a new theme which represented the extracts more accurately or discarded them from the analysis. Next, the data set as a whole was reviewed deciding whether the extracts accurately reflected a 'thematic map'. If some extracts need to be reworked, the second stage of this phase was implemented again until themes fitted well together and told an overall story about the data. In

phase 5 themes were defined and refined further with the primary aim of conveying the ‘essence’ of what each overall themes and subthemes were about and which data each theme captured. This penultimate phase also involved naming the themes. The final phase, involved telling the story of the data in a clear and concise way that addressed the research question by providing sufficient evidence of the themes using extracts from the data.

4.3 Results

Analysis generated two key thematic categories: ‘Decisions Influencing Communication’ and ‘No Special Advice for Women Who Are Overweight’. The first theme (‘Decisions Influencing Communication’) described factors influencing whether health professionals had weight-related discussions with pregnant women who are overweight. ‘No Special Advice for Women Who Are Overweight’ described how most staff tended to offer standard care to WO as recommended by national guidelines. Whereas many healthcare professionals felt tailoring support with a particular focus on baby was the only way to motivate women to change their weight-related lifestyle behaviours. These themes and subthemes are set out in Table 4.1. The midwife focus group was analysed first and ‘loose’ themes were formed (See appendix 6 for sample of coded data). Following analysis of the obstetrician/GP focus group, only one new theme was created emerged from this data; ‘Overweight’ Is Normal So Not a Priority’. The remaining data fitted the themes created from the midwifery focus group.

Table 4.1: Thematic Findings

Themes	Sub-Themes
Decisions Influencing Communication	'Overweight' Is Normal So Not a Priority
	Balancing Risks and Priorities
	Maintaining the Relationship
No Special Advice for Women Who Are Overweight	

4.3.1 Decisions Influencing Communication

This theme captured the decisions that influenced whether staff had weight-related discussions with WO. The majority of staff did not raise the issue of weight with overweight pregnant women. Three subthemes, which determined this are:

'Overweight' Is Normal So Not a Priority; Balancing Risks and Priorities; Maintaining the Relationship.

'Overweight' Is Normal So Not a Priority

This subtheme discusses how 'overweight' is normalised and the sparse resources to address this during consultations, given the prevalence of obesity within maternity care.

Participants felt that there is an acceptance within society that being overweight is 'normal'. This normalisation was observed amongst pregnant women.

"... the more people see everyone else in the waiting room looking that size or bigger then it almost is normal" (Pt 1, CO/G)

One midwife discussed how overweight in pregnancy restricts women's lives less than obesity (e.g. in mobility), and therefore had fewer personal and social impacts reducing the perceived need to change their lifestyles. Some practitioners perceived that overweight among healthcare professionals also contributed to a BMI of 25-29 kg/m² being defined as 'normal'. Which may in part explain why some participants often reverted back to discussing 'overweight' as BMI 30-35kg/m², and were reminded the focus of the discussion was on pregnant women who were overweight (BMI of 25-29 kg/m²). Normalising their own weight meant staff might do the same when faced with overweight patients, and therefore do not feel there is a need to raise weight as an issue during consultations. Raising the issue of weight with WO is a complex issue, particularly given the perceived normalisation of being overweight, and the lack of capacity and resources to address it, for example,

"...services are commissioned differently, they only have so much time. At one time before we got the Change for life service, we couldn't even refer to a dietician, so we didn't even have a dietetic service" (Pt 6, Midwife)

Participants reported a dramatic increase in prevalence of obese women attending obstetric clinics, particularly over the past 15 years. Staff reported being expected to care for women with BMIs >40kg/m², which would previously have been rare.

"The prevalence of obesity and super obesity in pregnancy has just rocketed and it would be very, very unusual to see a woman with a BMI of 40 in those days [15 years ago] and now you see them every week." (Pt 1, CO/G)

At one time having weight-related discussions with women who are overweight might have happened, but there is more focus on obese pregnant women, due to their increased prominence. Some discussed how their service had set a BMI ≥ 30 kg/m²

as the minimum inclusion criteria for referral, which had resulted in an abundance of referrals. Unable to meet the demand and in an attempt to manage the influx, the criterion BMI was raised to $>35 \text{ kg/m}^2$.

“The prevalence of obesity and super obesity in pregnant women has just rocketed and it would be very, very unusual to see a woman with a BMI of 40 in those days [when first qualifying]. Now we see them every week. One woman I seen had a BMI of 60, so there’s a massive problem for the service”. (Pt 1, CO/G)

Thus, pregnant women with elevated BMIs who once were deemed 'high risk', no longer qualified for specialist input. The increased prevalence of obese pregnant women has meant that addressing overweight in pregnancy is not a priority, nor is the need to have weight-related discussions with WO.

Balancing Risks and Priorities

Many participants discussed how overweight was low risk and of low priority for them compared to supporting those with higher BMIs, which impacted on their motivation to have weight-related discussions with WO. Practitioners in both groups varied in their perception of health risks associated with being overweight, which might have compounded their normalisation of WO further. Some felt there were no health risks for pregnant women who are overweight or their babies, whereas others perceived risks to be high:

“...some recent data we've done locally about our stillbirths showed that, when you look at the women that had stillbirths, the number of women in the BMI group 25 to 30, that was the biggest category” (Pt 3, Midwife)

Staff perceiving there was no health risks associated with WO might have reinforced their view that being overweight and pregnant was 'normal'. Although midwives were familiar with this data, it did not appear to alter their perception that being overweight during pregnancy could be high risk. Some obstetricians and GPs were unsure whether overweight resulted in negative obstetric outcomes, whereas others identified 'moderate risks'. One obstetrician identified numerous potential problems, including genetically pre-programming their children to being overweight, and having higher risk labours, resulting in complications.

"It [being overweight] affects the baby by causing macrosomia and sort of genetically pre-programming it for later problems, so that's a huge problem for the future". (Pt 3, O/G)

Some participants discussed how risks of pregnancy BMI differs between ethnic groups:

"for women from South Asia, perhaps a BMI of 29 would be enough to tip her over into diabetes, whereas for a Caucasian woman it wouldn't" (Pt 1, CO/G).

Although there was acknowledgement that being overweight BMI (25-29kg/m²) might pose greater risks to some ethnic groups during pregnancy, there was no acknowledgement that this potential increased risks would result in more weight-related discussions with these women of different ethnicities, compared to Caucasian women.

If staff perceive associated health risks with WO, to what degree this influences them to have weight-related discussions is not clear; however, it seems likely that if staff do not identify overweight as being risky in pregnancy, then they may be less

inclined to discuss it with women. Even where participants had data demonstrating a potential link between overweight and adverse health effects, this did not necessarily result in weight-related discussions. There were a number of competing risks that staff felt were more important to address with women than weight management such as substance misuse, safeguarding and social issues.

"You're opening up pandora's box as well, because the time it takes to have the conversation about that one sole thing [weight], when you see the list of things we have to get through at each appointment" (Pt 2, Community Midwife).

Focusing on other high-risk issues limited discussions about weight, particularly when staff were under pressure due to time restrictions and lack of resources (for example, some services being commissioned differently, so could not offer other specialist dietetic input, as previously discussed). Time pressures impacted all staff. They felt that weight-related discussions needed to be addressed sensitively, which required time that staff did not feel they had.

"...there are practical difficulties, because it is obviously very time consuming when you have limited time in clinic and to focus on a practical area where it could be difficult to know what to suggest to address it, and it [discussing weight] can be a very, very touchy area" (Pt 2, O/G)

Some obstetricians felt that lifestyle issues such as weight could be addressed more effectively by midwives, and that hospital appointments with them should focus on obstetric/medical issues.

...so maybe it's [addressing weight] something more that should be addressed by community midwives. I know that they're also under a lot of

time pressures as well, but the hospital appointments should be a lot more focussed on obstetric and medical issues.” (Pt 1, CO/G)

Although time pressures impacted on staff raising the issue of weight, midwives identified booking appointments, health checks (e.g. urine screening) and weighing (although the latter was no longer routinely carried out) as the primary opportunities to raise the issue with women who are overweight. When midwives initiated lifestyle discussions early in the relationship, how engaged women were in these dialogues contributed to whether weight was openly discussed in future appointments.

“...if she’s engaged in the process, and is, how can I put it, she’s questioning, and she’s taking an interest and a lead in her own care. I think that often bodes well that she shows interest in her own health and the health of her baby” (Pt 4, Community Midwife)

Furthermore, as the quote below highlights the lack of continuity from the same midwife through a woman's pregnancy meant, that both monitoring her weight and raising the issue effectively were difficult.

“...if you had continuity of a midwife who was looking after someone all the way through your pregnancy, then you would be able to, you would know that woman, and you would be able to have confidence to have the conversation” (Pt 1, Midwife)

Maintaining the Relationship

A number of midwives stressed the importance of having a good relationship with the woman. Some were concerned that discussing weight early in the relationship, i.e. the booking appointment, risked losing the health message, damaging the relationship and affecting the woman’s willingness to attend future

appointments. For some, this reinforced that weight-related discussions needed to be broached in an empathic and tactful manner, to preserve the relationship with women. Some felt that personally identifying with women was one way to achieve this.

"You know if people identify and you can identify with some of those things they may say, and sometimes it's those things when you're giving a little bit more of yourself that then you break down that bit of a barrier" (Pt 2, Community Midwife)

Practitioners had experience of women taking offence when the issue of weight was raised with them, making them reticent about discussing it with others. Participants from both groups perceived that talking about weight might make some women feel alienated or stigmatised, which they wanted to avoid. Some discussed how

"...you could scupper everything else you're trying to get over, and you'll not see her again. It's how you approach it in the first place". (Pt 2, Midwife)

As part of their service, midwives routinely provided women with a leaflet, which contained information about managing weight during pregnancy. This acted to facilitate discussions about managing GWG, in a more structured way. However, staff observed that women were sometimes offended by the use of the word 'weight' in the title of the leaflet.

"...sometimes when you get the leaflet out they're offended right away- about 'weight', it's the weight thing" (Pt 1, Midwife)

Therefore, some were reluctant to use this as a resource to guide having weight-related discussions. Terminology was highlighted as important when communicating with women who are overweight. One midwife discussed her experience of working with women who are overweight in maternity services in Australia.

"...overweight you were to refer to it as a woman 'above their most healthy weight', so that was the terminology that was used ...so there was no connotation with fat" (Pt 6, Midwife)

Maternity literature (Olander, Atkinson, Edmunds, French, 2011) has highlighted the need for healthcare professionals to raise the issue of weight sensitively with pregnant women who are obese. However, this study suggested that despite pregnant women who are overweight being perceived as 'normal', low risk and low priority, there is a perception that any weight-related discussions need to be sensitively approached with them also.

As the prevalence of maternal obesity rates continues to rise, resources are more focussed on managing this demand. Comparatively, there are less adverse health implications with being overweight during pregnancy and consequently, these women were perceived by staff as being 'low risk', despite some staff having data that reflects something different i.e. high rates of women who are overweight having stillbirths. Competing factors, such as safeguarding issues, are more of a priority to address during time-restricted consultations, rather than having weight-related discussions. Although there are opportunities to have such discussions, staff question whether the key messages would 'drown' in the density of information women receive. If an overweight woman has engaged with her healthcare professional, broaching the issue of weight with sensitivity is essential to preserve the relationship, and so the role of communication and terminology becomes an

integral part of this. Having a better understanding of the factors influencing whether staff have weight-related discussions with women who are overweight is clearly a complex issue.

4.3.2 No Special Advice for Women who are Overweight

This theme explores the advice that staff provided to WO during pregnancy and factors that influenced the type of advice offered. Advice offered to pregnant women who are overweight was reported to vary considerably, from no advice to tailored advice.

Some staff had observed there is a 'type' of woman who seeks advice during pregnancy. For example, midwives identified that women with healthy weight BMIs were more likely to seek advice about maintaining a healthy lifestyle during pregnancy, compared to overweight or obese women. Staff found that women who are overweight often had existing memberships with groups, like Slimming World, and so tended to ask questions about continuing with this during pregnancy. Others perceived that older women, compared to those who are younger, were more likely to have reflected on her lifestyle choices, so perhaps are more open to having/initiating lifestyle discussions.

"They've maybe never been asked the question before, you know they're young, about their diet or their lifestyle before. It's only what they've seen in the media" (Pt 3, Midwife).

Therefore, age, BMI and lifestyle choices potentially influences whether women initiate discussions with their midwife, which in turn make it easier for them to discuss the issue of weight.

Participants in both groups tended to provide the same advice as for normal weight women.

"We don't counsel them any differently they [overweight women] are just considered normal" (Pt 4, O/G)

Some GPs and obstetricians followed NICE guidance and advised in areas of healthy eating; exercise; alcohol consumption and smoking cessation. Some midwives offered information on local services available (e.g. 'Fit Mums'), but did not impart healthy lifestyle advice simply because it was suggested by NICE, rather it was because they had a duty of care to all women:

"It's standard care that's done for every single person whatever weight they be at all. So it's a standard programme, so it's not uncomfortable because you're doing it to everybody" (Pt 1, Midwife)

These midwives who observed excessive weight gain among women who are overweight in pregnancy, reported offering advice about weight loss postpartum. However, ensuring consistent advice was provided was difficult when women saw different midwives at each appointment. Apart from not being able to establish a trusting relationship with her midwife (due to the lack of continuity of provider care), women might feel less inclined to discuss sensitive issues, like weight management, plan and/or monitor healthy lifestyle choices.

Practitioners highlighted the absence of an evidence-base on the implications of being overweight and pregnant. Although persuasive research exists, one obstetrician commented that, *"if it's not gone into the recommendations [NICE], we are not supposed to be following it"*. This highlights the importance of evidence based policy/guidelines and practice, and how an absence of overweight pregnant women in the existing literature and recommendations for this group potentially results in them receiving suboptimal care.

In terms of tailored advice, some staff only offered this if the woman was undertaking specific physical/sporting activities, whereas others believed advice had to be individualised to have any impact on health behaviour.

"If you focus or you include discussions about how it's going to affect 'your' baby in the womb in the future, how it's going to change the pattern of growth for the baby and also stress later in life, then they listen to you" (Pt 3, O/G)

This further highlighted the impact of language when having such discussions, and the importance of an evidence-base:

...that the current research shows that it has an impact on the baby and the baby can be damaged from hypertension, they [women] don't like that (Pt 3, O/G))

Staff felt that women are more motivated to change if the negative implications were focussed particularly on her baby. As women who are overweight were not regularly routinely weighed, staff were unclear whether generic or tailored advice was more effective in changing their behaviour. Some were unsure whether their advice had any effect, but others were more optimistic. Sometimes when presenting with a subsequent pregnancy she may have adopted one aspect of the advice, so *"may be having porridge instead of pain au chocolat"* (Pt 2, Midwife). Alternatively, they perceived that some women gained excessive weight in first pregnancies and were unable to lose this weight postpartum. In subsequent pregnancies midwives observed these women had higher BMIs, making their pregnancy now 'high risk'.

Participants across both groups discussed that pre-pregnancy or the postpartum period could be more appropriate times to address weight with women who are overweight.

...they [women] seem more open to trying to manage their weight postpartum, and you can see them trying to make changes to prevent starting their next pregnancy overweight. (Pt 2, Midwife)

Both times were seen as opportunities to implement preventative interventions to: prevent excessive GWG (in the pre-pregnancy period) and minimise women who are overweight beginning subsequent pregnancies obese.

It was unclear whether staff felt women who are overweight had knowledge and skills to make lifestyle changes obtained from attendance at slimming groups. Generic healthy eating advice, as recommended from NICE guidance, was applied to normal weight women and WO. Unlike obese women, an evidence base for overweight pregnant women is absent, so staff tended not to tailor their advice for these women. Some participants reported a clear relationship between being overweight and adverse health implications during pregnancy. These staff felt that discussions which placed the baby at the centre, was more likely to motivate women who are overweight to change her lifestyle, rather than highlighting the health implications for the woman. Many were unsure whether their advice positively impacted on changing women who are overweight's behaviour and monitoring this was difficult in the absence of regular routine weighing. Developing preventative interventions in the pre-pregnancy and postpartum phases were proposed as potentially benefitting women who are overweight.

“...your group (BMI 25-29kg/m²) falls more into the preventative area. I think that's where it's going to make more of a difference...Whenever they come to it's too late. Especially when they're pregnant, we wouldn't ask them to cut down to weigh less than [a BMI of] 29.” (Pt 7, O/G)

4.4 Discussion

This is one of the first studies to explore the factors influencing whether staff raise the issue of weight with pregnant women who are overweight. It also offers some insight into the advice provided by healthcare professionals to these women. Most staff did not report having weight-related discussions with women who are overweight during pregnancy. As maternal obesity rates continue to rise, overstretched resources were in place to support obese women, with WO being classed as being low risk and low priority. Therefore, it was unlikely staff would have weight-related discussions with women who are overweight during time-restricted consultations. In the absence of an overweight evidence base/policy, staff tended to apply the NICE recommendations offering the same healthy lifestyle and physical activity advice to normal and women who are overweight. Tailoring advice, and focussing on the impact of being overweight on their baby, rather than highlighting the impact on her alone, was perceived by some to motivate women more to make lifestyle changes.

There undoubtedly has been a rise in the prevalence of overweight and obesity amongst women of childbearing age (Heslehurst et al., 2010), resulting in an influx of women with higher BMIs ($>30\text{kg/m}^2$) attending maternity services. A general societal shift to overweight (BMI 25-29 kg/m) being normalised (Davies, 2014) has meant when women present to maternity services, their BMIs are not necessarily seen as problematic, with resources focused on managing elevated levels of obesity. Evidence suggests this surge of increased obesity rates has left maternity services and staff inadequately prepared to meet the demands of the affected women (Schmied, Duff, Dahlen, Mills & Colt, 2011). The increased trend of overweight and obesity in the general population (HSCIC, 2012) might also result in overweight

staff normalising their own weight and not raising it as an issue during consultations with women. Wilkinson, Poad, and Stapleton (2013) highlighted that healthcare professionals' BMI status and other personal characteristics (e.g. physical activity levels) impacted on their knowledge and willingness to have weight-related discussions to address GWG with 'overweight/obese' pregnant women. Therefore, understanding further practitioner's own BMI status and how influential this is when initiating weight-related discussions with WO might be useful.

Key documents (NICE, 2010; CMACE, 2007) highlighted the risks/implications overweight during pregnancy can have, and some participants discussed the data from their own services potentially linking overweight with stillbirths. However, this evidence did not alter staff perception, nor motivate them to have weight-related discussions with overweight pregnant women. Although some staff discussed NICE (2010) guidance in relation to the advice they provided to women who are overweight, it was not clear whether all staff are aware of these guidelines/documents and if having awareness would change their perception/behaviour. It is unclear whether perceiving risks as low equated to overweight being classed as low priority to address during consultations, particularly when there were competing factors, such as "*safeguarding issues*" (Pt 4, Community Midwife). A similar finding was also reported where addressing weight during pregnancy was not a priority for GP's, obstetricians and midwives (Chang, Llanes, Gold and Fetters, 2013). Although increased knowledge of the risks alone will not impact on staff decision to raise the issue with women, some evidence suggests it might go some way to raising their confidence when they do provide advice (Heslehurst et al., 2014). As previously discussed in chapter 2, in order for staff to be motivated to change their behaviour, they must have the appropriate skills and opportunities to do so (COM-B, Michie et al., 2011). Staff proposed opportunities

(e.g. health checks) where they could have weight-related discussions with women who are overweight. Currently, some staff are reporting they don't have the capabilities and opportunities to intervene which are impacting on their motivation to have weight-related discussions. Therefore, how these are addressed needs careful consideration, particularly when resources are stretched in the current NHS climate.

The importance of terminology when having such dialogues was highlighted, reinforcing the assertion that "words matter" and that terminology routinely used by staff might differ to that accepted by patients (Gray, Hunt, Lorimer, Anderson, Benzeval, 2011). Participants were tentative about raising the issue of weight with women who are overweight, through fears of compromising their relationship and jeopardising future attendance, which is also a finding reported elsewhere in the maternal obesity literature (e.g. Furness et al., 2015). McCourt (2006) found that midwives have tended to adopt hierarchical and conventional styles of communication at the booking appointment (Mccourt, 2006). Although this style was characterised as being formal but friendly, it focussed more on the midwife as the 'expert' and imparting information, which may impede women's engagement; particularly if the sensitive issue of weight is being raised. However, Heslehurst et al., (2013) have attempted to address some of these barriers to communication through their online guide for maternity staff to discuss weight with women. They propose that staff gradually address the issue of weight throughout women's pregnancy's enabling time for trust to form and for women to process the information. In this current study, the lack of continuity of provider care potentially hampers a trusting relationship to be formed and acts a barrier to effective communication for some HCPs.

Participants were mindful when talking to some women who are overweight that weight-related discussions might compound their feelings of stigma further and

so they avoided raising the subject. Previous studies have also reported these difficulties (Schmied et al., 2010; Heslehurst et al., 2012). Some felt unsure about what to say to women, and others had previous experiences of women who are overweight responding negatively, which again resulted in apprehension when raising the issue with future patients, a finding demonstrated elsewhere (e.g. Olander, Atkinson, Edmunds, & French, 2011). However, evidence indicates that women interpret this as their healthcare provider viewing weight as unimportant, and subsequently they did not monitor their GWG (Thornton et al., 2006; Arden et al., 2014). Heslehurst et al's., (2013) guide emphasises to staff there are numerous reasons why women might react negatively to discussing weight, therefore having a standardised response is difficult. However, there are some examples of responses staff could use when a patient initiates or says certain weight related comments. These might help to open the conversation and discuss weight in a more positive way.

Staff provided women who are overweight with generic lifestyle advice regarding diet and physical activity, as recommended by NICE (2010). The obvious lack of evidence base for women who are overweight during pregnancy potentially reinforced the idea that addressing this is not a priority for this group of women. Furthermore, for staff who attempted to help women change lifestyle behaviours, providing tailored advice, specifically focussing on the implications for her baby was perceived to have most impact. Numerous studies have provided evidence demonstrating that women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby, rather than themselves (Jelsma, van Leeuwen, Oostdam, Bunn & Simmons, 2016; Szwajcer, Hiddink, Koelen, Woerkum, 2005; Szwajcer, Hiddink, Koelen, Van Woerkum, 2007).

Anecdotally, staff reported that women are bombarded with information at their booking appointment, which made them question the impact their advice had on changing weight-related behaviours. This is an important consideration given that if healthcare professionals do not perceive their advice to have an effect, this will likely predict whether they provide information (Rogers, 1975) and also the type of information offered (Weinstein, 1993). Lack of regular routine weighing meant it was difficult to monitor whether staff advice positively impacted on behaviour change and this meant that health professionals did not receive any feedback about their intervention. Only when women presented in subsequent pregnancies were they able to assess any affect, primarily by her dietary choices. Many questioned whether pregnancy was the time to intervene with changing women who are overweight's behaviour. GP participants felt there was an opportunity pre-pregnancy to intervene and potentially prevent those beginning pregnancy overweight gaining excessively throughout. Although it is recognised pre-pregnancy is an ideal time for interventions to establish a healthy weight, it is often not practical as a high percentage (45%) of pregnancies are unplanned (Wellings, Jones, Mercer, Tanton, Clifton, et al., 2013). Many HCPs were aware that women who are overweight gained excessively during pregnancy. Therefore, some felt the postpartum period might be an opportune time to support women who are overweight to make lifestyle changes, so they did not begin subsequent pregnancies obese. Many women have reported their motivation to address their weight does not begin until the postpartum period (Brown et al., 2012; Furness et al., 2015). Also, some evidence suggests that women are receptive to engaging in support post birth to address their dietary and physical activity behaviours, as well as have their weight regularly monitored by a HCP (Atkinson, Olander & French, 2016). Understanding further when the most

appropriate time to intervene with advice for women who are overweight might prove beneficial.

4.5 Strengths & Limitations

To the author's knowledge this is one of the first studies exploring the role of staff in supporting women who are overweight rather than obese during pregnancy and also what advice they provide to this group. The design elicited a breadth of opinions relating to discussing weight with overweight pregnant women. Despite this being a small-scale study, it is comparable with other studies examining the perceptions, approach and challenges of obstetricians, GPs and midwives involved in managing weight during pregnancy (e.g. Olander, Atkinson, Edmunds & French, 2011; Chang, Llanes, Gold & Fetters, 2013). Participants often confused overweight with obesity and so on occasions needed redirecting throughout the focus group. This could have resulted in some staff sharing their views, which related to obesity in pregnancy rather than women who are overweight. Although all coding and analysis was conducted by JS, member validation was applied, whereby transcripts were sent to participants for their confirmation, thus strengthening the trustworthiness of the findings.

4.6 Implications

There are different implications for the different groups in this study. It is unlikely, as highlighted by one of the GP participants they would come into regular contact with women who are overweight, as they are generally leading healthy lifestyles. Also, if women who are obese are in contact with their GP to address fertility issues, some GP's in this study reported they do advise these patients to lose weight. This advice focuses on making healthy dietary choices and increasing their physical activity, which would result in weight loss and place them in the overweight

category. Like, GP's in the study, obstetricians tended not to have regular contact with women who are overweight, so there was less opportunities for them to discuss healthy lifestyle with these women. One participant from the obstetrician/GP focus group was of the opinion that addressing lifestyle issues could be the role of the midwife predominantly, and the focus of hospital appointments should be to treat medical and obstetric issues. Therefore, the theme 'Maintaining the Relationship' relates more to midwives as they are the staff group in most regular contact with WO throughout her pregnancy, thus having the opportunities to address healthy lifestyle.

However, the majority of participants struggled to raise the issue of weight with women who are overweight and were often unsure about what to say. Staff could be provided with scripted dialogues, which would facilitate rapport with women and lessen potential anxiety when talking about sensitive issues, like weight. Both women and staff have discussed the importance of using appropriate language when eliciting weight-related discussions. A script avoids the need to memorise words and standardises the approach used, particularly if women see a number of different midwives throughout their pregnancy. The use of scripts has been used effectively when conducting invasive procedures with patients, and can be implemented relatively quickly (60 seconds) (Lang, 2011). Furthermore, providing training on general strategies how to diffuse negative responses might go some way to help staff feel more confident discussing weight with women and raising the issue.

It is strikingly evident that, despite overweight in pregnancy being highlighted in key government documents, reports, and research, the predominant focus is often on obesity, i.e. $BMI \geq 30 \text{ kg/m}^2$. NICE (2010) suggests a series of recommendations on the advice that healthcare professionals should implement, and pathways to follow for obese pregnant women, but women who are overweight

receive little attention. This is despite overweight in pregnancy being highlighted as a health risk to the mother and baby (NICE, 2010). There clearly are competing demands on staff time, and overstretched resources compound pregnant WO as a low priority to address.

4.7 Chapter summary

This study makes an original contribution to knowledge as it is beginning to shed light on the support provided specifically to women who are overweight during their pregnancy. Barriers interfering with staff having effective weight-related discussions draw parallel with findings on staff communication within maternal obesity literature. Some midwives were able to identify opportunities to have such dialogues with women who are overweight and had found approaches (e.g. focussing on baby) that successfully engaged these women to change her lifestyle behaviours. However, measuring these changes was difficult, particularly since regularly routine weighing was not recommended. Many staff relied heavily on the 'evidence base' and the lack of NICE guidelines to inform their practice on the advice to provide to women who are overweight was a problem. Existing resources are already overstretched in trying to tackle increasing rates of women beginning their pregnancy obese and as such little priority is placed on addressing pregnant WO. NICE have taken the first step by highlighting the issue of being overweight during pregnancy. However, much more is needed to translate these concerns into recommendations for policy and practice. Training staff to feel more confident to have weight-related discussions would be useful. Supporting this with a change of practice and policy where there is an expectation these discussions happen during consultations might reinforce the importance of addressing the issue, to reduce related health risks and prevent excessive GWG for women who are overweight.

This is the first study to provide some insight into the factors influencing whether weight is discussed specifically with overweight pregnant women. Having a more in-depth knowledge whether the factors identified here are experienced by maternity staff, on a larger scale, will not only deepen our understanding of staff experiences with women who are overweight, but also add to a developing evidence base. This will be the focus of the next study (chapter 5).

Chapter 5

Are staff offering ‘NICE’ advice to pregnant women who are overweight? A survey exploring the support provided.

5.0 Introduction

The findings from chapter 4 provided insight into some of the factors influencing whether staff raise the issue of weight with overweight pregnant women. Most staff provided advice as per recommendations from national guidelines. Although the focus group study was small-scale, it was the first to explore staff experiences and the information provided, specifically related to women who are overweight. Whether the identified factors were relevant just to the groups participating in the study, or could be representative of maternity staff on a much larger scale, remains unclear. In an attempt to address these issues, this exploratory survey of midwifery and obstetric staff was conducted which aimed to investigate the advice staff provided to women who are overweight, and the factors influencing their decision to raise weight as an issue with WO.

5.1 Background

Key government documents (NICE, 2010; CEMACE, 2007) have repeatedly highlighted the adverse health implications associated with being overweight during pregnancy, for a mother and her baby. However, no parallel has been observed in recommendations made to reduce these risks in national/local policies and practice. A higher proportion of women who are overweight tend to gain excessive gestational weight, according to the IOM guidelines (2009), compared to obese and normal weight women (Kraschnewski et al., 2013). Considering that patient knowledge and practitioner advice about GWG have been shown to be two modifiable factors related to excessive GWG (Strychar et al., 2000), maternity staff have a crucial role

in supporting women who are overweight to change their behaviour. As previously discussed (chapter 2), to increase an individual's motivation to engage in the desired behaviour, they must have the relevant skills and opportunities to perform the behaviour (COM-B, Michie et al., 2011). Therefore, for staff to have weight-related discussions with WO, they needed to have the relevant knowledge, skills, and confidence to initiate such discussions. Response efficacy is theoretically linked to beliefs about their own outcomes (Protection Motivation Theory, Rogers, 1975). Evidence suggests that staff having a belief their advice will change pregnant women's behaviour will facilitate such discussions to happen (Heslehurst et al., 2014; Stotland et al, 2010). So, including questions to capture this in the survey was important. Findings from chapter 4 have highlighted that for various reasons' staff tended to 'shy away' from the issue of discussing weight with pregnant women who are overweight, and instead provided them with general lifestyle advice. These findings also indicated that 'overweight/obese' staff might normalise their own BMIs, as well as higher BMIs of pregnant women, and the extent this impacted on weight-related discussion's with WO was unclear. Additionally, previous literature has reported that personal characteristics of staff, including their BMI, impact on their interactions with 'overweight/obese' women during pregnancy (Wilkinson, Poad, & Stapleton, 2013; Herring et al., 2010). Specifically, evidence links a relationship between healthcare professionals own BMI and health promoting behaviours (Sutton, 1994; Hoppe & Ogden, 1997). Therefore, this was considered an important factor to examine in the current survey.

The terms overweight and obesity are sometimes used interchangeably within research and the specific impact of having a BMI of 25-29 kg/m² during pregnancy has received minimal attention in the literature. Studies often group all women with a

BMI above 25 kg/m² together, so separating findings related to different subgroups of 'overweight' and obese women is not feasible or is challenging. There are currently no known studies, which have captured the views of maternity staff supporting women who are overweight. Furthermore, little is known about the content of advice that is provided to these women, and factors influencing whether or not staff raise the issue of weight with overweight pregnant women. Therefore, this survey with midwives and obstetricians aimed to address the following questions:

1. When and why do staff use the term overweight with women during pregnancy?
2. How confident are staff raising the issue of weight with WO, and factors influencing the type of advice provided?
3. Which factors influence the frequency and situations under which healthcare professionals raise the issue of weight with women who are overweight?

5.2 Method

Ethics

Ethical approval was obtained from Sheffield Hallam University Human Research Ethics Committee and in line with NHS Research guidance all relevant NHS Trusts Research and Development Departments were informed that the survey was taking place.

Participants

All participants were recruited through convenience sampling. Heads of Midwifery and senior midwifery staff across twenty-two NHS Trusts were initially emailed with a brief summary of the aim of the research and asked if staff within

their maternity departments would like to take part in the research. Twelve Trusts responded and were invited to complete an online survey, sent to individual employees by their managers via an email. All were asked to indicate how many staff the email would be sent to. Six Trusts responded and only one provided information about the amount of obstetricians the email was sent to (2,849 midwives; 10 obstetricians). The Royal College of Obstetricians and Gynaecologists included a short summary of the research aims and a link of the survey in their monthly newsletter posted to its 12,000 members. The Royal College of General Practitioners were concerned that uptake of the survey would be low (due to other research currently being undertaken) and so this was not sent out to members. The survey was available for 4 weeks and completion time took approximately 20 minutes. An information sheet was attached to the survey (See Appendix 7) and two reminders, which included the survey link, were sent to managers to prompt staff to complete the survey, with a third email sent reiterating the closing date for completion. Participation in the survey was voluntary and all responses were anonymous. Some of the maternity units participating in the survey were running campaigns targeting health in pregnancy, for example increased promotion to take multivitamins during pregnancy, which were also active when the survey was rolled out.

The survey tool

The survey was divided into sections ‘Health in Pregnancy’, ‘Knowledge’, ‘Advice’, ‘Intervention’, ‘Your Characteristics’ (See Appendix 8). Before completing the main survey, participants were requested to provide professional information (occupation, age, ethnicity and years of practice in maternity care).

'Health in Pregnancy'

Participants were asked to rate (1 being very important, 7 being not as important) the importance of a number of health/social issues during pregnancy, which were identified as influencing health outcomes in pregnancy (NICE, 2010). An open question was used to understand how staff defined the term 'overweight' and follow-up questions were asked whether they used the term 'overweight' when discussing BMI $>29\text{kg/m}^2$ and alternative terms used. Following these questions, a statement defining overweight as a BMI 25-29kg/m² was presented reminding staff to answer remaining questions using this definition.

'Knowledge'

Participants were asked open questions to identify barriers and facilitators to a healthy lifestyle during pregnancy. Some participants in chapter 5 had discussed aspects of NICE (2010) and IOM guidelines. Therefore, four statements extracted from maternal guidelines (IOM, 2009 and NICE, 2010) was used to measure participant knowledge, as were obstetric risks associated with being overweight during pregnancy. A four-point Likert scale measured whether staff felt there were any obstetric risks associated with being overweight in pregnancy. A follow-up open question asked staff to list what these risks were if they had identified any.

'Advice'

Four-point Likert scales measured the frequency staff provided advice to overweight pregnant women (never, occasionally, often, all of the time), and how confident they were advice changed their behaviour (not confident, somewhat confident, confident, very confident). Open-ended questions tried to identify the factors that influenced healthcare professional's level of confidence raising weight as

an issue, and also their previous experiences of women responding positively/negatively to the issue of weight being raised. A follow-up open question identified factors that potentially influenced whether their advice has an effect on changing behaviour. Questions were asked relating to which healthcare professional was best placed to offer healthy lifestyle advice to women who are overweight (e.g. midwives, obstetrician's, dieticians), and why the professional selected was best placed to do so.

'Intervention'

A closed question asked which stage of pregnancy (pre-pregnancy, 1st, 2nd, 3rd trimester, postpartum) was the most opportune time to intervene to support lifestyle change in pregnant women who were overweight. Next, an open-ended question asked what an effective intervention to support behaviour change could include. Also, participants were asked where this potential intervention was best placed to be delivered (e.g. Primary Care, Community based, Hospital, Other).

'Your Characteristics'

Participants were asked to provide their BMI or their height and weight (so that BMI could be calculated). Whether their BMI influences the advice they provided to patients was asked using a closed question, and if staff indicated 'yes', an open question followed to establish how staff felt it influenced the advice they provided. If practitioners were aware of their BMI when speaking with patients, and whether a patient has commented on their BMI (when the issue of weight was raised) was asked using closed questions, and an open question followed on what these comments were.

Analysis

Data were analysed using SPSS for Windows version 22 (SPSS). Closed (quantitative) questions were entered into SPSS and the remaining open (qualitative) questions were analysed using a qualitative content analysis, as defined by Elo and Kyngas' (2008) three stages of analysis, prior to entry into SPSS. The analysis began with reading and re-reading the data, selecting the unit of analysis and deciding on latent content (developing themes). The questionnaire was divided into a number of sections and so questions focussed on specific views of staff within each part, therefore, latent content analysis made it more expedient to translate into a variable within SPSS. The next phase of organisation involved collecting codes under possible subcategories, grouping them together and naming them. This name then became the variable code entered into SPSS. Six staff from the maternity unit at Barnsley Hospital NHS Trust piloted the survey before it was formally rolled out to all Trusts. No major changes were made to the survey, so their completed surveys were included into the main dataset.

Frequencies and percentages were used to summarise categorical data. To investigate whether there were associations between staff characteristics and use of the term overweight. Pearson correlations were conducted, and also between numbers of variables e.g. awareness of guidelines, obstetric risks, and the frequency advice was provided to WO. Multiple regression requires that the assumptions of linearity, normality, independence, and homoscedasticity are met (Tabachnick & Fidell, 2007). The data was examined by a visual examination of histograms of the standardized residuals, plots of standardized residuals and predicted values, and by the Durbin Watson statistic, before analysis was undertaken.

5.3 Results

Participants

Eighty-one staff (74 midwives; 7 obstetricians) completed the survey. Calculating the overall response rate was difficult, as some managers could not report the numbers of staff they distributed the survey to and others did not respond to the request for this information. However, response rate was low, as is common with online surveys (Petchenik & Watermolen, 2011). Descriptive statistics were used to summarise staff characteristics and for all normally distributed continuous data means and standard deviations were calculated. Table 5.1 below is a summary of participant characteristics, including the age range of staff, the average time worked in antenatal care, and BMI.

Table 5.1: Participant Characteristics

			Provider type	
Staff characteristics	Total*	Response frequency (%)	Midwife (n)	Obstetrician (n)
Responses from eligible staff	81		74	7
Age range of staff (years)	24 - 63		24 - 60	32 - 65
Av. length of time working in antenatal care (years)	26.5		19	15
BMI (kg/m²)	75	92%		
Underweight	1	1%	1	0
Healthy Weight (BMI 18.9-24.9 kg/m ²)	37	49%	32	5
Overweight (BMI 25-29 kg/m ²)	30	40%	30	0
Obese (BMI >30 kg/m ²)	8	10%	7	1
Missing	5		4	1

* the number of participants who provided this information

Healthcare professionals' use of the term overweight during pregnancy

Overweight was most commonly defined as a BMI above 25kg/m² (n = 29), although others (n = 24) used it to describe a BMI above 30kg/m². Although none of the participants stated using the term overweight interchangeably with obese women, those who did use it during consultations with women (BMI >30kg/m²) did so as they felt it was a more sensitive approach, than using terms like obese. A minority of staff (n = 4) reported 'overweight' as a BMI 25-29kg/m².

Alternative terms were used by over half of the participants (n = 49) when discussing weight with women. Most (n = 53) used generic descriptions of weight, discussing BMI as being 'high/raised' or they used the BMI calculation to facilitate a weight-related discussion. Staff responses indicated that 47% (n= 38) felt their own BMI influenced the advice provided to women who are overweight while 53% did not feel it had an impact. Furthermore, many of the participants (n = 54) reported feeling aware of their own BMI when speaking with women. There were mixed responses as to why staff were aware of their BMIs. Some women (normal weight) discussed how they wanted to be a positive role model for women, whereas others felt having a healthy BMI might make women feel patronised or judged. Staff with higher BMIs felt women might be more receptive to advice provided by them as they could relate to the difficulties with losing weight. Other participants with high BMIs thought women might perceive them to be hypocritical, in that the healthcare professional wasn't following the healthy lifestyle advice being provided. No significant correlation was found between staff using the term overweight with women and being aware of their own BMI during consultations ($r = .17$, $p = .05$, $n = 78$), although it is approaching significance and this finding could be as a result of the study being underpowered ($1 - \beta = .33$).

Risks Associated with Overweight During Pregnancy

The majority of healthcare professionals (n = 78) reported that there were high obstetric risks associated with being overweight during pregnancy. Some staff (n = 37) provided the same healthy lifestyle advice to women who are overweight as they did to obese women. However, no statistically significant correlation was found between perceived obstetric risks with mothers' overweight status and the frequency with which staff provided advice ($r = -.05$, $p = 0.66$, $n = 71$). Staff were

asked to rate health and social issues, in order of importance (1(very important) - 7 (not as important)) to discuss during an appointment. Staff responses (n=72) rated gestational weight gain being less important to discuss during a consultation, compared to smoking, domestic abuse and alcohol intake (See Table 5.2 below).

Table 5.2: Social & Health Issues Rated in Order of Importance to Discuss During Consultations with Pregnant Women

Welfare Issue	Means & SD
Smoking (n = 63)	2.32 (1.85)
Domestic Abuse (n = 62)	2.68 (1.81)
Alcohol (n = 68)	3.59 (1.70)
Gestational Weight Gain (n = 72)	4.21 (1.63)
Taking Vitamin Supplements (n = 67)	4.91 (1.63)
Stress (n = 75)	4.40 (1.54)
Relaxation (n = 66)	5.67 (1.82)

Advice provided to overweight pregnant women by staff

Staff were asked if they were aware of any guidelines for managing overweight during pregnancy. All responded, with the majority (n = 71) reporting

having an awareness of NICE and their local Trust guidelines. Participants reported their knowledge about the content of the guidelines, with some feeling knowledgeable (24%) or very knowledgeable (5%), and others somewhat knowledgeable (52%) or not knowledgeable (12%). No correlation was found between an awareness of guidelines and the frequency staff provided advice to women who are overweight ($r = -0.036$, $p = 0.74$, $n = 80$).

The average response rate to questions measuring knowledge on NICE (2010) and IOM (2009) guidelines was 71% ($n = 58$) as summarised in table 5.3 below.

Table 5.3: Responses To Guideline Knowledge In Maternity Staff

Extracts participants were asked to identify	Responses (n =58) to what participants identified were the document the statements were extracted from		
Many pregnant women ask health professionals for advice on what constitutes appropriate weight gain during pregnancy.	NICE (47%)	NICE- weight management before, during and after pregnancy (8%)	Other (44%)
Women who are a normal weight for their height (BMI 18.5–24.9) should gain 11.5–16 kg (25–35 pounds) during pregnancy. Overweight women (BMI 25–29.9) should gain 7–11.5 kg (15–25 pounds) and obese women (BMI greater than 30) should only put on 5–9 kg (11–20 pounds).	American guidelines (5%)	NICE (38.9)	Other (56%)
At the earliest opportunity, for example, during a pregnant woman's first visit to a health professional, discuss her eating habits and how physically active she is. Find out if she has any concerns about diet and the amount of physical activity she does and try to address them.	NICE (56%)	NICE- weight management before, during and after pregnancy (5%)	Other (38%)
Do not weigh women repeatedly during pregnancy as a matter of routine. Only weigh again if clinical management can be influenced or if nutrition is a concern.	NICE (50%)	NICE- weight management before, during and after pregnancy (5%)	Other (43%)

From the total response rate, the majority of staff ($n = 54$) completed questions relating to the content of healthy lifestyle advice they provided to women who are overweight (See Table 5.4). The advice ranged from physical activity and diet, advice on diet only or physical activity only, the health risks associated with being overweight and managing women's weight during pregnancy. Reasons that advice were not offered to women included; a lack of knowledge and confidence, fear of upsetting women, time restraints, and staff who were overweight not feeling comfortable providing advice to WO. Having had weight-related discussions with women who are overweight in the past, which resulted in her reacting negatively, were proposed as the primary reason staff did not provide WO with healthy lifestyle advice.

When healthy lifestyle advice was provided the majority 45% of staff ($n = 37$) were not confident that it changed women's behaviour, whereas 16% were confident, with 38% feeling somewhat confident. Staff proposed a range of factors (e.g. approach taken, women's attitude, and therapeutic relationship) that might influence whether their information/advice was effective in changing behaviour. There was a strong positive correlation between the frequency of providing that healthy lifestyle advice and response efficacy i.e. how confident staff felt that their advice changed women who are overweight's behaviour ($n = 79$, $r = .61$, $p = .01$).

The frequency that staff provided healthy lifestyle advice to overweight pregnant women varied with some reporting never providing advice, that they occasionally did, did so often and felt they provided advice to these women all of the time (See Table 5.4). The majority of staff advised women during her booking appointment only but some did so at every appointment. Others used antenatal checks and antenatal classes as opportunities to provide healthy lifestyle advice. If

women requested information staff offered healthy lifestyle advice, whereas others did so on an ad hoc basis or during postnatal visits. These staff felt they had more time to discuss changing lifestyle behaviour with women in the postnatal period and that women were more receptive to having discussions about the implications of caring for their baby whilst having a raised BMI.

Table 5.4: What, When & Where Advice is Provided to Overweight Pregnant Women by Staff

Advice Provided							
<i>What advice is provided (n=39)</i>		<i>When it is provided (n=80)</i>		<i>Where it is provided (n=51)</i>		<i>Why advice is not offered (n=62)</i>	
PA & diet	16	Never	2	Every appointment	18	Lack of knowledge & confidence	17
Diet only	13	Occasionally	32	Booking appointment only	19	Fear of causing upset	4
PA only	1	Often	19	Antenatal classes	3	Time restraints	12
Health risks	5	All of the time	27	Antenatal checks e.g. scans	3	Staff's own BMI (>25kg/m ²)	4
Managing GWG	4			If women ask for advice	4	WO negative reaction when advice was provided previously	25
				Postnatal visits	2		
				Ad hoc	2		

Factors influencing whether staff raise the issue of weight with women who are overweight

Staff identified factors which impacted on whether they had weight-related discussions with overweight pregnant women.

No significant association was observed between occupation and how confident staff felt raising the issue of weight ($r = .159$, $p = .158$, $n = 81$). This finding might in part be due to the small sample of obstetrician/GP participants, whose contact with pregnant women who are overweight might be relatively low. However, women's positive response when the issue of weight was raised had an effect on staff confidence ($r = .28$, $p = .03$, $n = 44$).

Correlational analysis was conducted between the frequency staff provide advice to overweight pregnant women and staff being aware of their own BMI during consultations with women, previous experience of women's negative response when the issue of weight was raised, **time worked in antenatal care, confidence raising weight as an issue, and confidence that advice can change behaviour** (See Table 5.5). These latter three variables were statistically significant. Given the small sample size, three variables were the maximum number of predictor variables in such analysis (Tabachnick & Fidell, 2007) and so the significantly correlated variables were chosen for further analysis (using a multiple regression) to explore whether they predicted the frequency staff provided healthy lifestyle advice to WO.

Table 5.5: Correlation Matrix of Variables with Frequency Staff Provide Advice to Women who are Overweight

	1	2	3	4	5	6
1 Frequency healthy lifestyle advice is provided to WO		.37**	.61**	.20	.14	.27*
2 Confidence raising the issue of weight with WO		-	.40**	.13	.28*	.19
3 Confident the information and/or advice you provide can change WO behaviour			-	.16	.09	.30**
4 Staff awareness of their own BMI when speaking with				-	.19	-.08
5 Experience of women's negative response when the issue of weight was raised					-	-.10
6 Time worked in antenatal care						-

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

The amount of variation in frequency healthy lifestyle advice is provided to overweight women was explained by time worked in antenatal care, confident that advice can change behaviour, and confidence raising weight as an issue, using multiple regression analysis. In this analysis frequency staff provided advice to overweight pregnant women was inputted as the criterion variable whilst skills and beliefs about capabilities were inputted as predictors. In order to establish the amount of variation in frequency advice was provided, the three variables were forced into the Enter method for multiple regression. The analysis showed that the amount of variation for frequency advice was provided explained by the three predictors was significant ($F(3, 75) = 16.73, p = 0.01$). The correlation between the predictors and frequency advice was provided was 0.63 with an adjusted multiple R^2

of .37, indicating that 37% of the variation in frequency advice was provided was explained by the three variables. Inspection of the regression coefficient and associated t values suggested that of the three predictors, confident that advice can change behaviour was significant ($t = 4.98$, $p = .01$). Neither of the remaining variables was significant.

Suggestions made by staff to enhance their skills and opportunities to confidently have weight-related discussions with women who are overweight are summarised in Table 5.6. The majority of staff (73%) felt training would increase their confidence to have weight-related discussions with women who are overweight, but did not specify what would this training would entail. However, most of the participant's ($n = 73$) felt pre-pregnancy was the most opportune time to intervene to change WO lifestyle behaviours.

National guidelines specifically to support women who are overweight during pregnancy were proposed by participants as being of benefit. The content of these would include: a clear understanding of the risks associated with excessive GWG, parameters for GWG, and how to support women who are overweight to have a healthy lifestyle, through diet and physical activity. Women raising the issue of weight or the reintroduction of routine weighing were also proposed as potentially facilitating weight-related discussions. Although participants did not specify what was meant by 'staff BMI', in 'other' suggestions, healthcare professionals examining their own weight issues was proposed.

Table 5.6: Staff Suggestions To Increase Their Confidence To Discuss Weight With WO (n=80)

#	Suggestion	Frequency of Staff Suggestions
1	Training	72%
2	National Guidelines	67%
3	Women raising the issue of weight	60%
4	Policies	45%
5	Routine weighing	33%
6	Staff BMI	17%
7	Other	8%

5.4 Discussion

To the author's knowledge, this is the first study providing insight into healthcare professionals' use of the term overweight, advice provided and factors influencing whether they have weight-related discussions, specifically for pregnant women who are overweight (rather than 'overweight' and obese).

Exploring how staff defined the term overweight and the context in which this was used was helpful to understand whether it was applied in its strict medical definition (BMI 25-29kg/m²), or interchangeably when describing obese mothers also. Results indicated there was ambiguity with the definition, and it was perceived as a more sensitive term when having weight-related discussions. Others made use of more generic terms ('heavy' or 'raised BMI') to facilitate such discussions. Previous studies (e.g. Schmied et al., 2011) have recognised that the terminology and language used by staff with these women can often cause offence or compound feelings of alienation. Staff in the current study tried to reduce these feelings by

using alternative language/terms. Aligning the term 'overweight' to women with predominantly higher BMIs ($\geq 30\text{kg/m}^2$) that would be medically classified as obese potentially highlights the societal shift that being overweight is now normalised (Johnson et al., 2008).

Communicating effectively with women is an integral part of establishing rapport and developing trust, which is central to providing effective care (Brown & Thompson, 2007). Women have suggested they want to be provided with accurate information about their risks, without proportioning blame, in an honest and respectful manner (Fuber & McGowan, 2011). Furthermore, women want staff to have open and honest discussions regarding their weight, despite the potential discomfort caused (Mills et al., 2013). However some staff, in this study had reservations about discussing weight using defined terminology, which might ultimately impact on women's engagement with maternity staff to make dietary and physical activity changes (Carr, 2015). The importance of developing a 'shared terminology' when health professional's discuss weight with patients has been suggested (Dutton et al., 2010). Having a consensus between staff on what terminology to use during consultations with women across all weight categories might be one factor that empowers staff to have more open discussions about weight-related issues.

Providing gestational weight gain advice was not deemed as high a priority to discuss, compared to other factors like alcohol use. Although staff were aware that there were numerous obstetric risks associated with being overweight during pregnancy, this did not impact on the frequency they provided advice to these women. However, some healthcare professionals reported providing the same advice to overweight and obese women. Results from a number of systematic

reviews investigating what advice staff provide to ‘overweight/obese’ women during pregnancy, suggests the content predominantly focusses on dietary and physical activity (Birdsall, Vyas, Khazaezadeh, Oteng-Ntim, 2009; Streuling, Beyerlein, von Kries, 2010; Dodd, Grivell, Crowther, Robinson, 2010). Similarly, in this current study the content of this advice focussed on dietary and physical activity primarily or diet only.

An awareness of guidelines did not correspond with the frequency advice was provided, although this may in part be due to the quite small sample size in this study. The majority of staff indicated an awareness of NICE (2010) guidelines, within which dietary and physical activity advice is suggested. However, many reported not feeling knowledgeable on local or national guidelines.

Knowledge of the guidelines alone did not increase staff confidence to raise the issue of weight, nor did it impact positively on the frequency that they provided advice to overweight pregnant women. Although knowledge alone cannot change behaviour, some research has indicated that it can impact on whether staff adhere to clinical guidelines when supporting overweight and obese patients (Herring et al., 2010). Furthermore, a systematic review of the determinants of staff behaviours towards maternal obesity and weight management, using the TDF, reported that the domain ‘knowledge’ appeared to significantly impact on the relationships with other domains (Heslehurst et al., 2014). In particular, ‘beliefs about consequences’ (benefits of capitalising on pregnancy to intervene) domain and ‘motivation and goals’ (motivation to intervene and support women). This potentially highlights the complex relationship between ‘knowledge’ and other drivers of behaviours aimed at changing ‘overweight/obese’ lifestyle during pregnancy. Despite the risks associated with beginning pregnancy overweight being commented on in NICE (2010)

guidelines, extending this information further into local policy and practice might emphasise the importance for staff to address this with women who are overweight during consultations.

Reasons why some staff did not provide advice to overweight pregnant women, draws parallels with findings from the maternal obesity literature. Compared to other lifestyle factors addressing overweight during pregnancy was not as high a priority. Some of the maternity units participating in the survey had various health campaigns targeting health in pregnancy, for example increased promotion to take multivitamins during pregnancy. These campaigns and perceptions that overweight is normalised, might have further compounded and reinforced the view of weight-related discussions being of less importance to staff. However, some women have expressed an interest in wanting to have these discussions. For example, a survey by Netmums and RCM (Russell, Fyle, Da Costa-Fernandes, Stockdale, 2010) of more than 6000 women's views on weight in pregnancy found that only 37% reported weight issues being discussed by their midwives at booking, suggesting that midwives do not always place emphasis on the subject. Half of the women were not aware if their BMI was calculated but 60% of women would have liked more time to discuss nutrition and weight management (Russell, Fyle, Da Costa-Fernandes, Stockdale, 2010). Findings from interviews with physicians and midwives have also found that managing weight effectively for women during pregnancy was not a priority for them (Chang et al, 2013). When staff, in this current study, previously experienced women who were overweight reacting negatively to the issue of weight being raised, this acted as a future barrier to them providing advice to these women, a finding confirmed in similar studies. The views of 241 midwives were sought to understand their current practice in

providing weight management advice to obese women (MacLeod, Gregor, Barnett, Magee & Thompson, 2012). Results indicated midwives were often reluctant to provide advice to these women, as they were fearful this would cause offence and consequently they might be reprimanded for this (MacLeod et al., 2012). Previous studies (Chang et al., 2013; Timmerman et al., 2010; Oteng-Ntim et al., 2012) have also reported similar findings to the barriers staff identified in this current study that; limited time during consultations, lack of confidence and issues regarding BMI of staff influenced whether advice was provided to overweight pregnant women. Given the role maternity staff have in changing lifestyle behaviours of women who are overweight, supporting healthcare professionals better could positively help in reducing the excess gestational weight women who are overweight gain during pregnancy.

Having the appropriate skills and confidence to communicate effectively with women who are overweight, can result in a positive relationship with her during pregnancy, birth and the postpartum period (Schmied et al., 2011). Staff experience has been shown in previous studies to reflect the level of comfort experienced when discussing weight with overweight pregnant women (Schmied et al., 2011). In this current study, staff experience with having weight-related dialogues was measured as the length of time they had worked in antenatal care. However, length of time staff worked in antenatal care did not positively result in the frequency participants engaged in weight-related dialogues within this study. This potentially highlights two issues, firstly length of time worked does not accurately measure experience, and also that a number of factors contribute to feeling confident to have such sensitive discussions.

Staff believing their advice changed the behaviours of WO, was most likely to influence whether they discussed weight with pregnant women who are overweight. The finding also aligns with the response-efficacy component from the Protection Motivation Theory (Rogers, 1983). In that if staff do not perceive their advice will impact on behaviour change they are less motivated to offer it, and having this belief also influences the type of information provided (Weinstein, 1993). However, what also contributed to this perception was that the same staff did not consistently provide care to the same women during her pregnancy, so there was a lack of opportunity to observe when their advice had changed weight-related behaviours. Furthermore, as regular routine weighing is no longer in place, this poses a missed opportunity to compare if any potential changes have taken place.

Most respondents proposed the pre-pregnancy period as the most opportune time to change the lifestyle behaviours of WO. This might also have impacted on their motivation to address lifestyle changes in these women, perhaps believing it was 'too late'. A finding supported elsewhere where staff discussed that pregnancy was not the most opportune time to change women's lifestyle behaviours (Heslehurst et al., 2014). Those who perceived their advice had little impact on changing women's behaviour gave little or no advice to their clients. For example, Lavender, Bennett, Blundell, Malpass (2001) found that midwives had low confidence about their capacity to make a difference to addressing obesity and Chang et al. (2013) reported maternity providers also believed that their counselling had low impact on patients. Consequentially, the issue of weight was not raised.

It has been proposed that the 'normalisation' of obesity in society, resulted in women lacking awareness of their weight status and so subsequently this acceptability made them less likely to change behaviours (Heslehurst et al., 2014).

Therefore, women might not initiate weight-related discussions independently. This might also explain why staff lacked confidence they were able to change pregnant women's behaviour, particularly given healthcare professionals had a propensity to view overweight as 'normal' (as discussed in chapter 4). Midwives own BMI could also have affected levels of confidence to discuss weight with pregnant WO, a finding supported elsewhere. Results from Wilkinson, Poad, Stapleton's (2013) study found an association between staff BMI and their knowledge and motivation to discuss strategies to address GWG in 'overweight/obese' women. It would appear there is a complex relationship between staff BMI and the advice provided to women during pregnancy, therefore understanding this requires further investigation.

5.5 Strengths & Limitations

This is the first study that provides some understanding on the advice provided to women who are overweight and the factors influencing the issue of weight being raised with them. Due to the resource limitations and timeframe to conduct this study, the sampling strategy was not a random selection. The study was an exploratory investigation (so no power calculations were conducted), which enabled a greater understanding on how staff perceived overweight during pregnancy, and the factors influencing them to have weight-related discussions with WO. However, as it did not incorporate a theoretical framework, some drivers of behaviour were potentially missed. The sample size is comparable with similar studies within maternity research (e.g. Wilkinson & Stapleton 2012, Herring, Platek, & Elliott, 2010). One strength of the study is that we understand views of midwives more, but all were self-selecting, so those who participated might have had an existing interest in research topic, and potentially more knowledge compared to staff less interested in this area. The narrative data from qualitative questions were largely

one-word answers or short sentences, making it relatively straightforward to convert into quantitative data. Many of the barriers influencing staff to have weight-related discussions with women who are overweight, draw parallel to those reported within maternal obesity literature. This potentially reinforces that the issues of raising and discussing weight is similar for both groups.

5.6 Implications

Skills-based training to help healthcare professionals feel more confident to have weight-related discussions with women, that are evidence-based would be useful in helping them feel more confident to have weight-related discussions. Having a 'common language' that all antenatal staff adopt when having such dialogues might go some way to also increase their confidence. Staff have made suggestions that potentially optimise them feeling more confident to have weight-related discussions, through training national guidelines/policies, regular routine weighing. Michie, van Stralen, West (2011) posits behaviour change occurs through an interaction of an individual's capabilities, opportunities and motivation. In the context of maternity staff having the skills and knowledge to have weight-related discussions, opportunities to have these interactions, and observe change occurring, might help them feel more motivated and confident their support influences lifestyle changes in pregnant WO. Therefore, interventions aimed at increasing staff response-efficacy might be advantageous. In hindsight, relying on one recruitment strategy (email) to encourage participants to partake in the survey could have contributed to a small sample size. It could have been advantageous to promote the study in maternity staff areas, obstetrician/GP forums, and on maternity wards and units. This might have yielded a greater and varied response rate.

5.7 Chapter Summary

Findings from this survey indicate that staff do not typically use the term overweight to exclusively describe women who have a BMI of 25-29 kg/m². The content of advice provided to these women ranged from diet only to discussing risks associated with GWG and there were a number of reasons why some staff provided no advice. Length of time staff have worked in antenatal care and feeling confident raising weight as an issue impacted on how often they gave advice to overweight pregnant women. However, believing their advice changed women's behaviour was the best predictor the frequency of providing healthy lifestyle advice to the women under their care. This could be due to a number of factors, including staff perceiving that pre-pregnancy was a more optimal time to intervene, and the complex relationship between their own BMI status and advice offered. Understanding the views of healthcare professionals is useful as it potentially identifies gaps where interventions can be implemented to support overweight pregnant women, which this study has done. What women who are overweight feel are the barriers and facilitators that impact on them leading a healthy lifestyle during pregnancy remains unexplored. This will be the focus of the study in the proceeding chapter 6.

CHAPTER 6

What influences women who are overweight to follow a healthy lifestyle during pregnancy? An exploratory study.

6.0 Introduction

Findings from the previous two studies (chapters 4 & 5) have highlighted the role that healthcare professionals have when supporting overweight pregnant women, and the advice they provide to them. However, there is an underrepresentation within maternity literature on what women who are overweight feel influences their dietary and physical lifestyle choices during pregnancy. It is less clear what advice they receive from healthcare professionals regarding these choices.

6.1 Background

As with obesity, trends of a pre-pregnancy BMI of 25 kg/m² have also continued to rise steadily since the 1990s (Heslehurst et al, 2010) with little attention given to addressing the health implications of being overweight during pregnancy. As previously discussed (in Chapter 2) beginning pregnancy overweight (BMI 25-29 kg/m²) is associated with increased risk of morbidities, specifically hypertension, gestational diabetes, and pre-eclampsia (Nuthalapaty & Rouse, 2004; Scott-Pillai, Spence, Cardwell, Hunter & Holmes, 2013). Women who are overweight are most likely to exceed the IOM guidelines (2009) for GWG (78%), followed by obese women (65%) and normal weight women (42%) (Kraschnewski et al., 2013). A small gain of 1-2 BMI units (kg/m²) between pregnancies for women who are overweight, may result in some of them beginning subsequent pregnancies obese, increasing the incidence of its related adverse outcomes (Villamor & Cnattingius,

2006). Therefore, devising preventative interventions to manage gestational weight gain effectively may potentially have a significant impact on the health of the mother and baby in future pregnancies. However, little is understood about what hinders and helps women who are overweight to lead a healthier lifestyle during pregnancy, due to the absence of literature available and 'overweight/obese' usually being reported as one group. The identification of barriers and facilitators that influence healthy behaviour change can lead to more well-designed effective lifestyle interventions (Davies, Walker, Grimshaw, 2010). Therefore, by understanding the barriers and facilitators impacting on dietary and physical activity choices this might lead to the development of interventions to prevent excess GWG for women who are overweight. The previous two studies (chapters 4 & 5) provided some insight into the advice provided by healthcare professionals. However, less is understood about the impact weight-related discussions might have on women who are overweight and whether they facilitate any behaviour change.

There are three aims to this study. Firstly, to explore what barriers/facilitators influence women who are overweight to lead a healthy lifestyle during their pregnancy. Secondly, what lifestyle advice do women who are overweight receive during pregnancy, and lastly what impact does the issue of weight being raised have on WO.

6.2 Method

Design

This was a qualitative study involving semi-structured interviews with pregnant women who are overweight. Before the interview schedule was designed, the PHM provided the researcher with the booking appointment assessment tool used

with all women. Observing a booking appointment assessment taking place, enabled the researcher to experience the wording and approach used to help engage some women during pregnancy, which helped when devising the interview schedule. The PHM was sent a draft of the interview schedule to comment on before the first participant was recruited. No amendments were made to the schedule from the PHM.

Ethics

Ethical approval was granted by the Sheffield Hallam University Human Research Ethics Committee, NHS REC Proportionate Review (13/NS/0171) and NHS Barnsley Foundation Hospital R&D Department.

Participants

All participants for this study and those in chapter 7 were recruited at Barnsley Hospital NHS Foundation Trust. Barnsley's maternal obesity rate (10.1%) is double the rate for England (5.0%) (Barnsley Council, 2016). Specifically, the rates of females who are overweight or obese in this area continues to rise with 45% of 16-24 year olds, 56% of 25-34 year olds, and 64% of 35-44 year olds who are either overweight or obese. Data collated by the National Pregnancy in Diabetes audit during January 2016-December 2016, showed that from 51 completed pregnancies reported by Barnsley maternity unit during this period, 24 women had Type 1 diabetes (median BMI 26 kg/m²) and 25 women had Type 2 diabetes (median BMI 35 kg/m²). Barnsley Hospital Maternity Unit delivers approximately 2,800 babies per year.

Originally, it was planned to hold a focus group for pregnant WO to explore their experiences. However, there had been a number of challenges to recruit

pregnant women into focus groups previously at the Barnsley Hospital NHS Foundation Trust. Due to the barriers with recruiting these women into previous studies, it was decided to have a broader inclusion criterion, and not specify demographics, to increase the range of WO suitable to participate. Therefore, with the support from the PHM, a purposive sampling strategy was used based on the following inclusion criteria: over 18 years old, singleton pregnancy/within one year postpartum, 1st/2nd pregnancy and BMI 25-29kg/m². It was agreed the PHM would initially contact women who met the criteria as it was more likely to optimise recruitment. A weekly maternity clinic was held at the hospital. Women who attended this clinic were often in their second trimester of pregnancy, so their BMIs had been calculated at their booking appointment, typically before 12 weeks of pregnancy. The PHM accessed the booking system and identified which women attending the clinic met the criteria. She telephoned them, provided a short summary about the purpose of the research, informed prospective participants they would receive a £10 gift voucher for their time and asked if they would like to participate. A time, either before or after their appointment at the clinic, was made for those women who agreed to participate. Seven women were contacted and all agreed to participate in the study. All interviews were held in an unused office at the maternity clinic in Barnsley Hospital NHS Foundation Trust.

Materials

A semi-structured interview schedule (Appendix 9) was devised after consulting relevant literature and considering findings from the literature and systematic review (see chapter 2). The interview focussed broadly on how women defined a healthy lifestyle, what their health behaviours were pre-pregnancy, changes made since becoming pregnant, barriers and facilitators impacting on these changes

and information they have received regarding healthy lifestyle throughout their pregnancy. They were asked to discuss how they would feel if maternity staff raised their weight as an issue during pregnancy, what their preferred approach to this might be and the content of advice/information provided.

Procedure

Participants were provided with an information sheet when they arrived for the interview (See Appendix 10), and provided informed consent to participate (See Appendix 11). On the consent sheet participants were asked to provide their email address if they wanted to review their data before being analysed. Participants who requested this were asked to inform the researcher whether they wanted to withdraw their data by a specified date. If the participant did not contact the researcher they were advised their data would be included in the analysis, at which point it could not be withdrawn. All participants were assigned a pseudonym, which was stored separately to their transcribed data. No participant withdrew their participation or data from the study and all data was transcribed verbatim (See Appendix 12 for sample of transcribed data). The interviews typically lasted between 30-50 minutes.

Analysis

All data was analysed thematically using Braun & Clarke's (2006) six stage process (detailed in chapter 4: Section 4.2 'Method'). See appendix 13 for a sample of initial coding and themes. Once 5 interviews were conducted, transcribed and analysed, saturation was reached whereby similar themes were apparent across interviews. Data from the two subsequent interviews did not generate any new themes, but were added to the dataset.

6.3 Results

Two themes were identified during analysis: Are Healthy Choices Possible? and Talking About Weight: Who and How? The diagram below (Figure 6.1) illustrates an overview of the themes and subthemes.

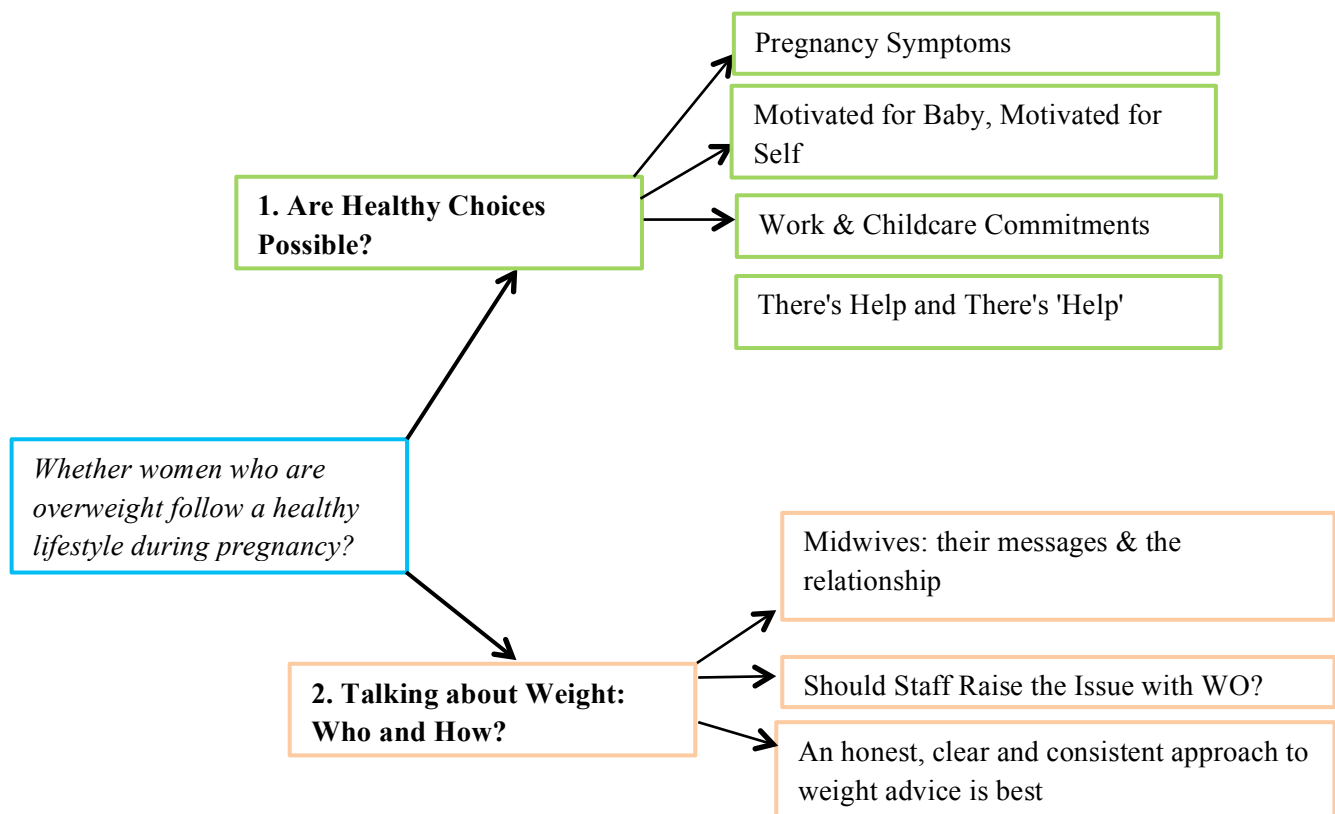


Figure 6.1: Thematic Diagram Exploring Whether Overweight Pregnant Women Follow A Healthy Lifestyle

6.3.1. Are Healthy Choices Possible?

This theme focuses on what might hinder or enable women who are overweight to maintain healthy behaviours/choices to their diet and physical activity during pregnancy. Most of the barriers reported for some were facilitators to change for others. Women cited more barriers than enablers to healthy eating and physical activity choices. Four subthemes were identified which affected women who are

overweight's dietary choices and/or engagement in physical activity. These included, 'Pregnancy Symptoms', 'Motivated for Baby, Motivated for Self', 'Work & Childcare Commitments', and 'There's Help and There's 'Help'.

Pregnancy Symptoms

This subtheme explores some of the pregnancy symptoms experienced by women and the impact of these on existing dietary choices and the uptake of new activities.

Difficulty managing pregnancy symptoms (cravings, tiredness and morning sickness) resulted in some women choosing foods they typically would not have eaten pre-pregnancy, like crisps and chocolate. Monica described how a combination of cravings and morning sickness resulted in her eating "*crisps basically all the way through [pregnancy]*". Some participants discussed how their morning sickness compounded feelings of tiredness, reducing their motivation to cook healthy meals. Pregnancy symptoms, particularly tiredness also affected women's motivation to continue pre-pregnancy activities. One woman described:

I did mostly cycling beforehand, and I kind of did it a little at the beginning but kinda got, I can't be bothered you know (Nicola)

Feeling tired also reduced some women's willingness to engage in new activities, like swimming:

I think maybe when you are tired that bit of exercise can wake you up a bit. I wish I'd just gone. I'd gone and bought meself a maternity swimming costume, and I've never been (Naomi)

Having an awareness of some of the benefits of physical activity during pregnancy (*“exercise can wake you up a bit”*, Naomi), did not result in changing behaviour; however, Naomi also inferred that if her midwife encouraged her to continue swimming she would have *“definitely, definitely kept up that [swimming]”* (Naomi). Experiencing adverse pregnancy symptoms, particularly tiredness, appeared to influence the dietary choices of some women. Furthermore, not only did it impact on their motivation to engage in physical activity but it impacted on them engaging in new activities, like swimming.

Motivated for Baby, Motivated for Self

This subtheme explores how women who are overweight were motivated to make healthy lifestyle changes for themselves or to ensure their baby was healthy.

Women were motivated to make healthy choices during pregnancy to ensure their baby was healthy. However, as her pregnancy progressed and they were assured from scans and the midwife their baby was healthy, they felt able to have crisps each day or chocolate

...I'm getting closer to the end, and it sounds a bit awful in some ways, but what difference does it make now because the baby is healthy (Nicola)

Nicola felt that she had gave her baby a good start and although she didn't have

McDonalds every day for dinner or gone out and bought a Gregg's sausage roll, it's not overly bad. It might not be 100% healthy but it's a middle way
(Nicola)

Her initial motivation to make dietary changes so her baby was healthy meant she ate healthier foods. As her pregnancy progressed her attitude changed to one of

confidently knowing she had a healthy baby and so it was less relevant the choices she made. She was aware her attitude had changed and appeared to justify this by comparing herself to others and accepting that "*a middle way*" of being healthy was better presumably than not being healthy at all. Others described how they felt less healthy during their pregnancy because they weren't regularly exercising.

... I don't feel healthy at the moment 'cause I'm not exercising at the rate and the amount that I was doing [pre-pregnancy]. So that bothers me, and it kind of affects me (Debbie)

They were able to make comparisons to their last pregnancy or pre-pregnancy, when they felt better because they were more physically active. Therefore, they tried to manage these feelings by making healthier dietary choices, when possible.

Women tried to make healthy food choices, as they were mindful they wanted their baby to have

...as much goodness and be able to have the healthiest, if I can try my best to do that then hopefully I've got a good baby when it comes out (Nicola)

Whereas, feeling healthy during pregnancy and being able to care for their baby motivated some to eat healthier and exercise regularly. Other women discussed their difficulties losing weight pre-pregnancy and these experiences meant they were motivated to exercise and eat healthy foods throughout pregnancy. However, some were aware they had not always chosen healthier options whilst pregnant and were contemplating how to lose weight post-partum.

...if I didn't lose weight in the first 12 months then I think I would really struggle to lose it (Debbie)

Before becoming pregnant the majority of participants had actively followed a 'diet' by eating healthily, reducing portion sizes, monitoring their weight and exercising regularly. There was a consensus that during pregnancy they were "*allowed to put weight on*" (Monica) and could indulge in "*treats*".

An acceptance by some women of inevitable weight gain was reported.

you don't seem to be bothered when you're eating chocolate and pregnant 'cause you're gonna get fat anyway. (Vicky)

It is unclear whether this acceptance meant that some women justified their gestational weight gain because "*it's only when baby comes you realise how much weight you've put on*" (Vicky). While regularly attending Slimming World, exercising and eating healthily Vicky experienced a tangible loss in weight pre-pregnancy, and therefore was motivated to adhere to these strategies. During pregnancy however there was no obvious weight loss, which might have impacted on her motivation to continue implementing these strategies. Naomi discussed that following some conversations with friends she expected to gain weight in different areas of her body.

Me other friend said, oh I've got loads of back fat, have you got it yet?

Therefore, when Naomi became aware she had gained weight on her back she didn't question it, but accepted this was supposed to happen in pregnancy.

As the participants were regular dieters before becoming pregnant they were knowledgeable about the foods to eat, portion sizes and frequency to exercise to lose weight or maintain their weight loss. Therefore, they accepted they would need to revert back to this lifestyle after their pregnancy was over. Some who gained

excessive weight felt apprehensive in the postpartum period thinking “*oh my god, I’ve got to get it all off*” (Naomi). Other women were aware their choices during pregnancy might impact on them postpartum,

For some reason I just had it in my head that if I stayed active during my pregnancy I would have an easier labour, and then I’d recover quicker afterwards (Debbie)

Debbie engaged in regular physical activity pre-pregnancy, but this reduced when she became pregnant as her tiredness levels increased. Being less active impacted on her feeling more negative towards herself.

Some women accepted they would gain excessive GWG during pregnancy, and others expected this after discussions with their peers. Therefore, when this happened there was an attitude almost like it was inevitable to happen. Many women dieted pre-pregnancy and had knowledge and skills how to lose weight, which they knew they would need to revert back to postpartum. Some however, continued to implement the skills learned from slimming clubs, throughout their pregnancy.

Work & childcare commitments

Women in this subtheme discuss the impact of work commitments (shift patterns) and childcare responsibilities on their engagement in physical activities, and the impact on their motivation to make healthy dietary choices.

Some typically worked 12-13 hour shifts, which might have compounded existing feelings of pregnancy-related tiredness. Therefore, preparing food for work

and meals could have felt laborious, affecting some women's motivation to make healthier choices. For example,

...we were mainly all having fast food. Someone would just go out of the office and get a KFC. (Naomi)

Whether women had work or childcare commitments during daytime hours, participants discussed that often physical activity classes for pregnant women were held during this time, making attendance difficult. This was frustrating for some as they had experienced the benefits of attending some of these classes (yoga) particularly for managing previous labours. Class attendance in the evening for many was also problematic as their partner often worked late, so they were looking after their children or for others being:

up early for work, I leave at 7, so I'm up. So by half past eight I'm ready for bed. (Debbie)

Working long hours, managing childcare responsibilities and being pregnant were difficult to balance for some women.

...last week we had a busy weekend and I didn't have time to go [shopping] so that's why this weeks just been, gone to pot really. (Debbie)

Being organised and having a set routine, usually resulted in planned grocery shops and purchasing healthy foods. However, this appears to become compromised at busier times for some women, resulting in less healthy food choices.

There's help and there's 'help'

Women discussed the role their family and friends had influencing some of their dietary and physical activity choices in this subtheme.

Some tried to feel motivated to eat healthier or be more physically active, but when faced with an ‘easier’ option, they would often choose the latter, influenced by others. For example, Monica described how her mum and partner wanted to make life easier for her when she became pregnant, and although her mum lived close by “*she’ll say ‘I’ll come and pick you up’ or my partner would say, ‘I’ll drop you off’*”. Monica reported experiencing significant bouts of morning sickness and had childcare responsibilities, which contributed to her experiencing pregnancy as “*difficult*”.

...It were basically just up, school run, home, bed, school run, home. I couldn’t leave the house until about 5, for the first 22 weeks. So I were just housebound, because basically I had been throwing up all day and I was really tired.

In the moment, when presented with an option where she did not have to exert herself physically (by walking somewhere), this might have been an opportunity to ease the difficult pregnancy she was experiencing. The person (woman or her partner) who cooked household meals was a barrier to healthy eating, for different reasons.

...it depends who cooks really. If it’s my husband [cooking] he always makes us healthy meals, and I try to most of the time but sometimes I’m just too tired. (Debbie)

For women who were tired and feeling unmotivated to cook healthy meals, their partners accepted the food offered and did not challenge or promote alternative healthier options.

My boyfriend put on 3 stone as well...yeah cause I probably did most of the cooking, and with him he's just gone along with me eating the same. (Naomi)

Women discussed that if her partner had also been committed to making healthier food changes, it would have been easier for her to change, even when she was feeling tired. So, rather than coming home after work and not having had "time to get shopping in, so it was a case of, right we'll just have a chippy" (Debbie), partners might encourage a healthier option to eat. If men typically made family meals, he might serve his partner larger portion sizes.

...I think he tries to put more on my plate because I'm eating for two (Nicola)

Others tried to make healthier choices by refraining from purchasing unhealthy foods, which was difficult to maintain when "my husband will come back with some mini eggs" (Maria). Some participants were aware they had gained excessive weight during their pregnancy and knew it would be difficult to lose after giving birth. Naomi discussed how her mum "had already made a little plan" where they would go for regular walks each week. As Naomi was part of Slimming World before becoming pregnant she

...went to see the lady I normally see, Christine, and I got me books and everything. I had already set me mind to do it straight away [postnatally].

Naomi had been managing her weight before becoming pregnant by attending Slimming World and exercising regularly. However, she felt pregnancy was a time when she was exempt from dieting and was feeling less motivated to be as physically active. Through the support from her mum and a plan on how to lose the 5 stone she had gained during pregnancy, she was motivated to make healthier lifestyle choices in the post-partum period.

She (mum) had made me a little rota yesterday to get me back into a programme (healthy eating and exercise). So every Wednesday we're gonna go walking, and she lives near a gym which has a pool, so we're gonna go every Saturday morning. She's even arranged for my boyfriend to have the baby, so it's written out on a little rota with everything we're going to do.

(Naomi)

This was a similar feeling shared by Vicky who struggled to manage cravings during her pregnancy, so stopped attending Slimming World, because she couldn't stick to the healthy eating plan: *"you're not meant to eat ice cream when you're in Slimming World, are you, so I stopped going"*. She too was planning to restart attending Slimming World after giving birth and was grateful this support network was available for her.

Sometimes the information participants received from family/friends conflicted with the information received from their healthcare professionals. Karen's peers said to her *"oh now you can eat for two"*, which she knew was not the case. However, she felt she might have done, if she hadn't experienced morning sickness throughout her first trimester of pregnancy, which helped her to avoid forming unhealthy eating habits. Some participants' mums advised their daughters to monitor their diet more effectively to manage their weight gain, warning them it would be difficult to lose their excess weight postpartum. However, this advice was ignored and often friends' advice/information was more influential, particularly if it was women's first pregnancy. Naomi discussed continuing to monitor her weight each month when she became pregnant, and so was aware she was gaining excessive weight. Speaking with friends normalised excessive weight gain during pregnancy. For example,

...people tell you stuff, I mean your legs have got to double because it has to carry the weight of your baby, and I believed that (Naomi)

Some women discussed with their mums the information they were reading about what to eat and drink during pregnancy. Nicola discussed her thoughts and conflicting feelings regarding drinking caffeinated tea.

Sometimes I think, I'll stick with this way. It was like the tea, you know my mum will have drank tea when she was expecting the three of us, my grandma will have done it when she was expecting her kids. You know what did they do before decaff you know everybody just got on with it.

Nicola admitted that refraining from caffeinated tea for nine months would be difficult for her.

I did try to stay off the tea, cause they say the caffeine, and I only lasted so long, cause I thought, I can't cope with for nine months just drinking fruit tea. Our parents managed and there's nothing wrong with them.

The information relating to drinking caffeinated tea that she had received via her family culture is an example of confirmatory bias (Kosnik, 2007) (affirming what she would like to do - drink caffeinated tea).

There is a lack of consensus on the most opportune time to intervene in order to change and promote weight-related lifestyle factors for pregnant women (Bick, 2015). Some of the views in this study suggest that women are more motivated in the postpartum period to lose their GWG, highlighting this as a time when interventions may be effective. More targeted support for women who are overweight and her family might be useful in helping make healthier choices and

manage the challenges some face during pregnancy. Ultimately, this might reduce the amount of work required to lose weight postpartum.

6.4.2 Talking about Weight: Who and How?

In this theme women discussed the content of the advice they received from their midwife, other sources of information they sought and whether the advice provided to them by midwives had any impact on changing their dietary and physical activity behaviours. Also, the role of the relationship with their midwife had in facilitating possible changes. WO responses to staff if their weight was raised as an issue, the role of monitoring gestational weight gain, and their preferred approach to having weight-related discussions was also identified.

Midwives: their messages and the relationship

In this subtheme women discussed the advice offered by their midwife and the role of the 'midwife-patient' relationship in facilitating change.

Foods to avoid during pregnancy was the content of dietary advice most commonly received by women from their midwife so

Be careful of your milk, your cheeses, and eggs, not to have like your runny egg, stuff like that (Karen)

Although the majority of women were told to avoid these foods, most were not aware why they needed to. Maria discussed that she had received a healthy eating leaflet from her midwife that was interesting. However, she felt because

I'm not in a high-risk group, the focus the resources aren't there for everybody.

Receiving information about what is a healthy diet and types of foods to eat was suggested as something that might have been more useful for all women during pregnancy. One participant, who walked most places pre-pregnancy was advised by her midwife that *“going up different hills can get your baby healthy”* so she incorporated this advice into her daily routine and tried to walk different routes. However, none of the remaining women had received advice about being physically active during pregnancy. For those who had engaged in some activities this was because they had done so in their previous pregnancies or had sought information elsewhere. In the absence of advice from midwives, many women relied on pregnancy books and their family/peers for information about what foods to eat and what activities to do.

There was a general consensus that the information provided by midwives had little impact on changing participant's behaviour. Karen described the supportive relationship she had with her midwife, *“she were like me friend”* which facilitated her to make changes. Karen felt she advised her, rather than told her what to do, so she tended to walk more and tried to make healthier food choices *“because you know it's for your baby's health as well”*. Most women felt that their midwife would have more influence to help her make lifestyle changes, compared to other healthcare professionals. Others discussed not having a relationship with their midwife because a different one seen them at each appointment and there were less frequent consultations after the first pregnancy. However, for those who initially had different midwives but then received consistent input from the same midwife, they were able to draw comparisons between the interactions.

I got to know her, speak to her, she would ask how I was getting on... And the others, they were just giving you the papers, and you were going. There was no, how do you feel, do you know about this or that (Naomi)

Some women attended the maternity hospital clinic and also their community midwife. For these women they found the environment in which they were seen impacted differently on them. Some felt their community midwife knew them better and would see them after their baby was born, so engaged with her better. Whereas another participant found midwifery staff at the hospital clinic tended to see all *"the full extreme of what comes into hospital"* (Maria) so she felt more reassurance from these staff.

Overall, women perceived that their midwife would have more influence to change her behaviour compared to other maternity healthcare professionals. However, the frequency of appointments, where these took place and seeing the same midwife consistently throughout pregnancy potentially impacted on the uptake of advice provided. The quality of the relationship between the midwife and mum-to-be appeared to influence, not only how receptive the women were to receiving information but also whether this facilitated lifestyle changes.

Should staff raise the issue of weight with WO?

In this subtheme women's responses to their weight being raised as an issue is explored, as well as, the approach staff should take when having such discussions.

Most women were aware that before they became pregnant they were classed as medically overweight (i.e. BMI 25-29kg/m²), presumably because many had monitored their weight and attended a slimming club. They knew some risks associated with excessive GWG during pregnancy (pre-eclampsia, difficulties

birthing), although it was less clear where they had sourced this information. There was a mix of responses from women to staff if their weight was raised as an issue during pregnancy. Some felt that it would have a positive impact on changing their behaviour, acting as motivator to *"make me more determined to do it, you know changes"* (Karen). Other women felt it would have been an emotionally charged discussion

...you know you're fat. And you get to this stage [last trimester of pregnancy] and you just think, aw I've had enough, I just feel like a beached whale. You just want it over with. (Nicola)

Some women, like Nicola admitted that weight-related discussions were emotive pre-pregnancy but because of how they were currently feeling (tired, wanting *"it [pregnancy] over with"*) this would have made weight-related dialogues harder. Another participant described that she would feel *"mortified"*, because

Not so much that I were getting fat. But you know I wouldn't want to be putting too much weight on, you know, put the baby in danger or whatever (Debbie)

It is unclear that if midwifery staff informed these women of the health implications of excessive GWG on their own health and their babies, they might be more likely to change their dietary and physical activity choices. Other women said they would feel *"gutted"*. Exploring this further one participant reported her efforts to lose weight before becoming pregnant and that *"she had tried her hardest to stick to all healthy options [during pregnancy]"* (Vicky). All participants had been trying to manage their weight pre-pregnancy. It might be that for those who had continued to do this during pregnancy, if their weight was raised as an issue they might interpret

this as a failure at not managing their weight effectively. Despite some women discussing how it might have been an emotionally difficult conversation to have, all agreed they would want their midwife to inform her whether she was gaining too much weight. There was also agreement this information should be delivered in a way that was sensitive but also supportive.

Asking for, but not getting, weight advice

In this subtheme women reported they predominantly monitored their own BMI during pregnancy. The advice women received from their midwife focussed predominantly on dietary and physical activity information. The majority of women didn't receive guidance on how much GWG they should gain during their pregnancy.

Most participants reported their midwife didn't provide specific information about how much weight to gain during pregnancy, which would have been useful. For those who expressed concerns to their midwife about how much weight they were gaining, she responded that *"I didn't look big"* despite women perceiving her weight gain to be excessive. Some mums attended their daughter's antenatal appointments with them or had commented on her gaining significant weight. During an appointment one mum commented to her daughter's midwife

...about how much weight I had put on and was there anything they were going to say to me or go through any plan with me. She [the midwife] said well we can talk about a diet with her if she wants (Naomi)

When another participant discussed the weight she was gaining, the feedback she received from her midwife was *"oh no that's fine"* which wasn't interpreted as reassurance, rather that her excessive weight gain wasn't an issue to be concerned

about. Similarly, others had observed their weight rising, and in the absence of advice about potentially why this was happening, some women interpreted this gain as *"just the baby"* (Naomi) who was a first time mum. Assurances had been provided to others, by midwives, their weight gain was not an issue. Some women knew they were gaining excessive amounts of weight and were apprehensive about the impact of this in the later stages of their pregnancy and labour.

Although none of the participants were regularly weighed during their pregnancy, some felt this monitoring would have been useful and would have potentially influenced the decisions they made regarding dietary choices and physical activity. This was particularly the case for those women who gained excessive weight throughout their pregnancy. Monica discussed how *"if it were a must that you had to get on your scales at each appointment"* and she seen her weight was increasing significantly, she might have *"thought more about what I put into my mouth"*.

Some women suggested being weighed regularly during pregnancy might be useful in making women aware they are gaining excessive weight,

You get the blood pressure, but you don't get the weighing. I know you're not supposed to diet when you're pregnant but at least the midwife could turn to you and say, I think you should start eating a bit more healthy because you're putting too much weight on (Nicola)

For those participants who gained excessive weight during their pregnancy, they voiced that if their midwife had informed them of this, they would have been more likely to make changes to their diet and levels of activity. Whereas others felt that if

there was an expectation they were going to be weighed at each appointment, then *"I might have thought more about what I put into my mouth"* (Monica).

Maria actively monitored her weight regularly, not only to track her weight gain but she believed that a significant leap in her weight might indicate there was a problem with her baby. She knew she had gained more weight than she should have but had some degree of insight

I probably would've liked to have put less on but I can see where I'm putting it on so it's kind of. The thing is you can't not eat so it's kind of trying to eat healthy, but it's trying to get the balance (Maria)

Most women in this study had regularly monitored their weight gain pre-pregnancy. Some continued doing this during pregnancy, so were aware they were gaining excessive weight. Their midwife might have had more impact to influence dietary and physical activity changes than their family. Women appeared receptive to receiving information from their midwife on how much weight they should gain, and their potential role in facilitating this.

An honest, clear and consistent approach to weight advice is best

In this subtheme participants were clear about the preferred language they wanted their midwife to use when raising their weight as an issue. Some made suggestions on what they favoured to happen following weight-related discussions.

Each participant voiced they wouldn't want their midwife to say *"you're fat"*, but hoped a tactful and sensitive approach to the topic would be adopted. Women either explicitly stated or inferred they would want to know their weight was an issue and

for their midwife to be honest with them and not *"to try and be politically correct"* (Maria).

If I'm overweight then you should tell me anyway, then I can sort it. 'Cause even if you're pregnant there's things you can do anyway to change (Vicky)

Furthermore, rather than simply being informed their weight was an issue, women wanted to receive advice on what they could do to manage it. Some women discussed how they would like to know the health implications not only for their baby but also to their own health. It was acknowledged the difficulty with raising the issue, *"there's no nice way of putting it"* (Debbie) and possibly using resources and guidelines to help staff facilitate these discussions. Again, adopting an advisory role was preferable rather than one of a dictatorial,

I'd rather them advise me, I'd like you to follow this, or do you think you could do this, and I'd rather them do that than say, oh you're overweight in your pregnancy, and you need to do this (Karen)

Women discussed wanting practical dietary advice on what they could do to manage their weight, rather than being told their weight was a problem. Also that the information was provided early in pregnancy because,

...your weight is not just going to come off, the way you expect. You need to still control your eating habits, because the weight is not just going to fall off like you think (Naomi)

The role of women's midwife was highlighted as being instrumental in influencing them to change their dietary behaviours during pregnancy, with less focus on their physical activity. Participants wanted their midwife to approach the issue of weight

with openness and honesty. However, they then wanted staff to be proactive and provide practical advice and information on what they could do to manage their weight gain during pregnancy. Some already monitored their weight, but could often justify their weight gain as being exclusively related to their baby, as opposed to themselves, therefore this had a limited effect on changing their food and activity choices. However, if women were routinely weighed during pregnancy by their midwife this might help to facilitate discussing weight and also provide opportunities where they can receive advice to change their behaviour.

6.4 Discussion

No study has exclusively reported factors impacting on dietary and physical activity choices for women who are overweight and the advice they receive from healthcare professionals. A number of barriers and facilitators were proposed by participants that influenced whether they followed a healthy lifestyle during pregnancy, which have also been reported in maternity literature for obese pregnant women. All of the women in this study had knowledge and experience of the strategies they implemented to achieve/maintain weight loss pre-pregnancy. The focus of the advice received from healthcare professionals related to dietary intake predominantly, and had little effect on changing women's behaviour. Participants wanted their midwife to inform them whether she was gaining excessive weight, the health implications of this, as well as practical strategies on how to manage this throughout pregnancy. Routine weighing was suggested as one way to initiate weight-related discussions as well as provide an opportunity to reflect on dietary choices being made.

Results suggest that physiological symptoms relating to pregnancy can act as a barrier influencing dietary and physical activity choices. This finding has been

supported by a number of studies. 'Overweight/obese' women reported that predominantly tiredness hindered them engaging in physical activities during pregnancy (Jelsma et al., 2016; Campbell et al., 2011). Partner involvement appeared to have a significant impact on whether women made healthy dietary choices or engaged in physical activities. Sui, Turnbull & Dodd (2013) found that women who received encouragement from family and friends to eat healthy and exercise facilitated positive changes and an obligation to cook healthy family meals enabled these changes to be implemented. The person making family meals also influenced the choices made. Sometimes women's partner served her larger portion sizes because he thought she was eating for two. Pregnant women with supportive partners have shown to make lifestyle changes (reduce cigarette smoking, alcohol intake) and receive early prenatal care (Martin, McNamara, Milot, Halle, Hair, 2007; Teitler, 2001). The role of fathers in the care of pregnant women has shown to influence maternal behaviour and reduce her stress. However, there remains limited understanding on how the relationship dynamics influences maternal change and subsequent development of interventions to increase father's involvement during pregnancy (Alio, Kornosky, Mbah, Marty, Salihu, 2013).

Women in this study reported that making changes alongside their partner would be more achievable, rather than doing it alone. Campbell et al.'s (2011) systematic review revealed that interventions which do not educate and inform the wider family and social network of the pregnant woman, may limit the success of preventing weight gain.

Consistent with other findings (e.g. Pereira, Rifas-Shiman, Kleinman, 2007), women reported a reduction in their physical activity levels during pregnancy. For some this was due to work commitments and childcare responsibilities. Participants

worked long hours and were unmotivated to exercise as they were tired or were unable to access facilities after work as they were looking after their other children.

Most of the women implemented successful strategies pre-pregnancy to manage their weight through eating healthily, self-monitoring, managing portion sizes and exercising regularly. These are known to be some successful components of weight-related behaviour change interventions (Burke, Wang, Sevvick, 2011). However, some viewed pregnancy as a time when they did not have to follow a dietary regime. A number of other studies (e.g. Riles, 1993) have also reported a similar finding, whereby some women who are overweight feel 'exempt' from dieting during pregnancy. An explanation for this could be their pregnancy 'allows' them to be overweight and have a more relaxed attitude to their body image, rather than succumbing to the societal pressures to be slim (Fox & Yamaguchi, 1997; Loth, Bauer, Wall, Berge, Neumark-Sztainer, 2011). Similar to other studies (Goodrich, Cregger, Wilcox, Liu, 2013) women were motivated to eat a healthy diet and exercise to ensure the health of their baby. Some viewed there was little harm inflicted on their baby by not continuing to follow a healthy lifestyle until the end of their pregnancy. When women experience perceived barriers, they reduce their effort to make healthy changes and become frustrated ultimately impacting on their motivation (Mathieu, Tannenbaum, & Salas, 1992). Therefore, finding ways to overcome the barriers women who are overweight have cited might be useful in developing interventions to enhance the factors that facilitate physical activity and a healthy diet. Some studies have highlighted that women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby (Jelsma et al., 2016; Szwajcer, Hiddink, Koelen, Woerkum, 2005; Szwajcer, Hiddink, Koelen, Van Woerkum, 2007). As motivation to change

behaviour is strongly influenced by risk perception (Schwarzer, 2008) providing information of the associated risks would be useful for women who are overweight, and inadvertently it would also emphasise the importance of this issue for women (Jelsma et al., 2016). Therefore, maternity staff have a key role in drawing attention to this with women who are overweight.

Participants received information from their midwife which related to food intake and some aspects of physical activity, a finding reported by a number of systematic reviews investigating what advice staff provide to overweight and obese women during pregnancy (Birdsall, Vyas, Khazaezadeh, Oteng-Ntim, 2009; Streuling, Beyerlein, von Kries, 2010; Dodd, Grivell, Crowther, Robinson, 2010). This finding might also be explained as current guidelines to managing weight during pregnancy, suggest healthcare professionals advise on issues relating to dietary and physical activity (NICE, 2010). Women suggested it might have been more useful for them to receive information relating to what types of foods they should eat, as well as what it means to lead a healthy diet during pregnancy. Women sourced their information from books or family/friends. However, sometimes the information received from family/friends conflicted with the advice provided by their healthcare professional. Rather than receive information (regarding physical activity) some evidence suggests that women respond to this advice from their family/friends, and that the information is often inaccurate and discourages them from exercising during pregnancy (Leiferman, Swibas, Koiness, Marshall, Dunn, 2011) A recent systematic review reported that most women used the internet to source information on foetal development and maternal nutrition each month (Sayakhot & Carolan-Olah, 2016). Women tended not to discuss the information retrieved with their healthcare provider. It is unclear when participants in this study

felt conflicted with the information received from family/friends whether they discussed this with their healthcare provider and sought clarification. This highlights the need for healthcare providers to be aware that women might hold inaccurate information, and their role in potentially addressing this (Sayakhot & Carolan-Olah, 2016).

Some participants were aware they were gaining excessive weight during their pregnancy, and raised this with their midwife. How this was managed by the midwife reinforced to the participant that her excessive weight gain was not an issue and consequently she didn't change her behaviour. Recommendations for staff (NICE, 2010) on the advice to provide to pregnant women who are overweight is vague, and does not provide them with the necessary information to guide women on managing excessive GWG. There was widespread variation on the advice overweight participants received from staff throughout their pregnancy. This is a complex issue. Some research has indicated (Olander, Atkinson, Edmunds, French, 2011) that a number of healthcare professionals lack confidence and knowledge as to what information they should provide women regarding GWG. Subsequently, women who are overweight did not receive GWG focussed advice. Pregnant women perceived this absence of GWG advice as something that was not a priority for their midwife, minimising its importance to them. This resulted in a lack of monitoring of weight, or addressing weight management throughout their pregnancy (Thornton et al., 2006). As most women had monitored their weight pre-pregnancy some continued with this during pregnancy. One reason proposed routine weighing in pregnancy was stopped was that it caused unnecessary anxiety to women (Dawes & Grudzinskas, 1991). However, this was not the feeling of women in this study. Participants felt it might be beneficial to be routinely weighed at each antenatal

appointment, like their blood pressure was checked. This finding is similar to others (Allen-Walker, Mullaney, Turner, Woodside, Holmes et al., 2017; Brownfoot, Davey, Kornman, 2016; Daley et al., 2015) and highlights that women do not feel anxious about being weighed, and so it could potentially be considered to reintroduce it back into practice. However, regular routine weighing, in the absence of the appropriate support (and training for HCPs), might be anxiety-provoking for some. Weighing alone is not being branded as the panoply to resolve excessive gestational weight gain (Fealy, Taylor, Foureur, Attia, Ebert, et al., 2017) rather it is proposed as a useful tool that might help: facilitate weight-related discussions, provide an opportunity to reflect on dietary/physical activity choices, and set/monitor weight gain targets during pregnancy. Evidence of this has been reported elsewhere, in that women were open to receiving weight targets, goal setting and monitoring of these by their midwife, throughout pregnancy (Daley, et al., 2016).

Women in this study felt the information their midwife provided had relatively little impact on changing her behaviour. The frequency that women had antenatal appointments and whether she seen the same midwife was also proposed as reasons the advice received had little impact. However, they did report it would be their midwife who would have most influence to change their behaviour, compared to other maternity healthcare professionals. Continuity of care from the same midwife and a professional relationship is more likely to result in fewer interventions during labour and enhance women's experiences during pregnancy and postbirth, according to a recent systematic review (Sandall, Soltani, Gates, Shennan, Devane, 2016). However, continuity of care from the same midwife was not the experience for some of the women in this study, which impacted on some of the weight-related lifestyle choices made. A study by Weir et al (2010) reported that women viewed

midwives as the most appropriate source of information. Given women's beliefs surrounding physical activity change throughout pregnancy therefore there may be a number of opportunities to address beliefs in antenatal appointments (Duncombe et al., 2009).

Women discussed that although it would be somewhat difficult to accept being told by their midwife they had gained excessive weight, they all were clear they would want to be informed. A finding supported by Mills et al. (2013) reported that women wanted staff to have open and honest discussions regarding their weight, despite the potential discomfort caused. Participants discussed that they wanted staff to adopt an advisory role and provide them with practical strategies to manage their weight effectively. Some studies have suggested women want to be provided with accurate information about their risks, without proportioning blame, in an honest and respectful manner (Fuber & McGowan, 2011).

6.5 Strengths & Limitations

A major strength of this study is that it is the first to specifically focus on the views of women who are overweight on what they feel influences their choices to leading a healthy lifestyle during pregnancy, as well as the information they receive and the impact of raising their weight as an issue. It was advantageous having the experience of the PHM to facilitate relatively quick recruitment of pregnant WO into the study. However, because it was the PHM recruiting the women they might have felt unduly pressurised to participate, even though it was reinforced (by the PHM and the researcher) their participation was voluntary and leaving the study at any time would not affect their current or future maternal care. This study provides information from Caucasian women's perspectives due to the study setting and PhD programme time frames, views from women from other ethnic backgrounds requires

further exploration. Although this study did not collate specific demographic information from participants, through discussions with some women they disclosed level of education and employment status, which subjectively, placed some of them in lower socio-economic status. Some women had discussed previous attendance at slimming groups, where they had learned skills of self-monitoring (of their weight), which continued during pregnancy. Women who had such skills were potentially more capable of making changes during pregnancy, compared to women who had not. Therefore, in retrospect this could have been something to consider including in the inclusion criterion. As discussed, this study originally was designed as a focus group, but changed to interviews due to previous lack of recruitment success with focus groups, so it was intended that 7 participants would be in this group.

6.6 Unanswered Questions

Women who are overweight appear to have knowledge and experience (from pre-pregnancy) of the strategies to implement in order to successfully manage their weight. It is unclear whether this knowledge and experience impacts on them feeling 'exempt' from dieting during pregnancy because they are confident they are able to lose excess gestational weight gained in the postpartum period, or they view pregnancy as a 'break' from dieting and relax. Some factors have been identified about what influences women who are overweight to follow a healthy lifestyle during pregnancy, which have also been cited as those experienced, by obese women during pregnancy. Some barriers experienced by women who are overweight have also been reported in maternity literature for women who are 'overweight/obese'. WO from this study appeared to have skills and knowledge about how to manage weight successfully. However, it remains unclear if there are factors influencing weight-related lifestyle choices specifically for WO. Therefore, it would be helpful

to understand these further by comparing constructs of behaviour changes in pregnant women who are overweight to those of normal weight, and obese pregnant women.

6.7 Chapter Summary

Findings from this study indicate there are factors that impact on whether women who are overweight follow a healthy lifestyle during pregnancy, similar to those experienced by obese pregnant women. As stipulated by NICE (2010) guidance women who are overweight receive the same advice regarding dietary and physical activity as normal weight. However, this advice has little impact on changing lifestyle behaviour in overweight pregnant women. What this study has highlighted is that women who are overweight are actively engaging in strategies known to reduce/maintain weight loss pre-pregnancy. Some women continued to implement these strategies (like self-monitoring) whilst others felt pregnancy was a time they didn't need to adhere to these. Consequently, this impacted on their dietary and physical activity choices. Whether the factors influencing women who are overweight to lead a healthy lifestyle, as reported here, are also experienced by normal weight and obese women remains unanswered. Therefore, comparing behaviour change constructs impacting on lifestyle decisions across three weight categories (normal, overweight, obese) in pregnant women might go some way to answering this question. This will be the focus of study 4 (chapter 7).

CHAPTER 7

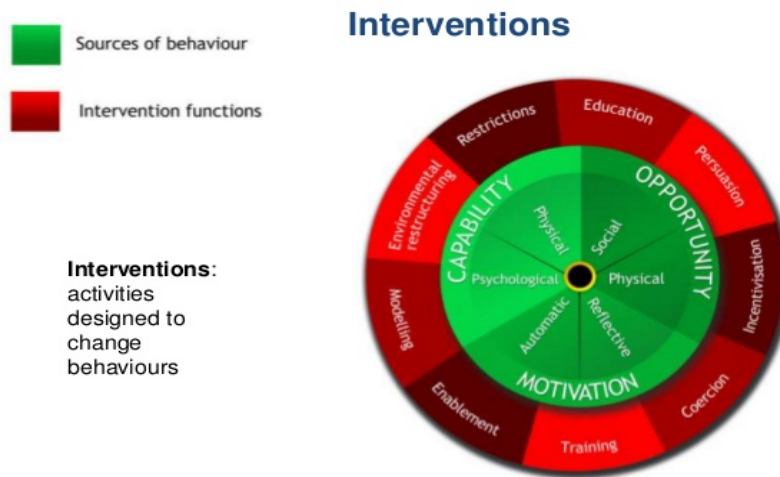
Using the Theoretical Domains Framework (TDF) to explore lifestyle choices for weight-management with overweight pregnant women.

7.0 Introduction

In the previous chapter (6) there were some factors impacting on weight-related decisions for women who were overweight. Many of the women had some pre-existing knowledge and skills, e.g. self-monitoring of weight, known to successfully impact on weight loss (Wing, 2004). However, adverse pregnancy symptoms (fatigue, morning sickness) and feeling 'exempt' from dieting during pregnancy acted as barriers interfering with some women making healthy lifestyle choices, similar to those identified in the maternal obesity literature. Some identified the role of the midwife as potentially acting as a facilitator to guide and advise on healthier eating habits, goal-setting and monitoring of these throughout pregnancy. However, the interview schedule informed by the 'overweight/obesity' literature didn't identify a full range of facilitators and barriers impacting on weight-related decisions for WO. Therefore, utilising a more systematic method to investigate this was required, and the Theoretical Domains Framework (TDF) was the chosen approach to guide the development of the interview schedule. As the previous study did not identify specific factors impacting on WO (and whether those identified are unique to them) conducting a qualitative study to examine this further, as well as the experiences of normal weight and obese pregnant women, was deemed the most suitable approach to use.

7.1 Background

The Theoretical Domains Framework TDF (as previously discussed in chapter 2) describes 14 factors from theories of behaviour change that fall into the COM categories. To bring about desired change as discussed in chapter 2, intervention functions and policy categories can be identified, in a systematic and transparent way, using the Behaviour Change Wheel (BCW) approach to the development of interventions (Michie et al., 2011, 2014). Findings from chapter 6 reported on a number of barriers (e.g. physiological symptoms) and facilitators (pre-pregnancy strategies to manage weight) that influenced whether women who are overweight followed a healthy lifestyle during pregnancy. Some of these have also been reported in the maternal obesity literature. However, many findings from these studies report 'overweight/obesity' as one group. At present it is difficult to specify the barriers and facilitators to healthy lifestyle choices experienced by women who are overweight as the evidence focussing exclusively on this group is sparse. The first step in designing an intervention, according to the BCW, is to define the behaviour of interest (Michie et al., 2014, see Figure 7.1 below), so for example, diet and physical activity in order to prevent excessive gestational weight gain.



Slide courtesy of Dr. Susan Michie

Figure 7.1: Behaviour Change Wheel for Designing Interventions (Michie et al., 2014)

The next steps in the BCW process would involve ascertaining what the specific barriers and facilitators are for overweight women. Although the literature suggests a wide range of barriers and facilitators these are normally in relation to obese women. Central to the BCW is an individual's Capability, Opportunity and Motivation (COM) factors relating to either the behaviour itself or those that compete with or support it (Michie et al., 2011). Therefore, the analysed data in this study are grouped and reported under the COM-B factors.

Therefore, this study has two aims. Firstly, to explore what the barriers and facilitators are for WO leading a healthy lifestyle during pregnancy and secondly, to assess whether these barriers are the same for normal weight and obese women.

7.2 Method

Design

This was a qualitative study using semi-structured interviews with women across three different weight categories to understand what factors influence them to follow a healthy lifestyle during pregnancy, using the TDF to inform the interview questions and as a framework for the coding.

Ethics

Ethical approval was granted by Sheffield Hallam University and NHS Barnsley Foundation Hospital R&D Department were informed the study was taking place, which was approved as a service evaluation project. The procedure was guided by the British Psychological Society ethical guidelines.

Participants

An opportunity sampling procedure was followed to identify and recruit women who met the study criteria. All women across each weight categories were recruited if they were over 18 years old, singleton or within 6 weeks post-partum, had fluency in English, and for G1: BMI 18.5-24.9 Kg/m² ; G2: BMI 25-29.9 Kg/m² ; G3: BMI ≥ 30 kg/m².

Materials

Interview questions were theoretically informed by reviewing previously published TDF questionnaires (Taylor, Lawton, Conner, 2013; Taylor, Parveen, Robins, Slater, Lawton, 2013; Huijg, Gebhardt, Crone, Dusseldorp, Presseau, 2014) and formulated from the results from chapter 6. The number of questions in the interview ranged from two to nine for each of the 14 domains (See Appendix 14).

When women provided short responses, prompts were used to elicit further information to address the constructs within each domain. Alternative questions were devised if women had not made changes to their lifestyle during pregnancy, for example, why do you think some women choose to follow a healthy lifestyle during pregnancy?

Procedure

Women were recruited via the antenatal clinic and labour ward at Barnsley Hospital NHS Foundation Trust. Midwives were informed of the aim of the study and the inclusion criteria. Staff at the antenatal clinic identified women who met the inclusion criteria and passed the volunteer's name and telephone number to the PHM. She then telephoned the women, provided more information about the study, and asked them if they would like to participate. The PHM arranged the interview date and time with the participant (typically to coincide with their next existing appointment at the antenatal clinic). The name of the participant, time, and location of the interview was then passed onto the researcher. All women who were approached agreed to participate, apart from one who went into labour whilst travelling to the interview. Sixteen women were recruited through this route. In addition, midwives on the labour ward looked at the notes of women who were inpatients on the ward and decided whether they were eligible for the study, based on the inclusion criteria. The midwife provided some information about the study to eligible women, and asked them if they would like to participate. Two agreed (one and two days postpartum).

All women received a £10 gift voucher in appreciation for their input. Participants were provided with an information sheet (See Appendix 15) and if they agreed to participate, they were then provided with a consent form to sign and a

debrief sheet (Appendix 16). All interviews lasted between 30-45 minutes and were completed face-to-face either in an empty medical office in the antenatal clinic or an unused bedroom on the labour ward.

Analysis

All interview transcripts were transcribed and anonymised. Given the deductive nature of this study a framework analysis was applied, using NVivo version 10 (2012) to reduce and organise the data (See Appendix 17 for a sample of transcribed and coded data). As recently specified by Atkins, Francis, Islam, O'Connor, Patey (2017), the deductive analyses applied to this study involved considering the relevance of the data to the TDF definitions of the domains, and then attributing them to one or more of the domains.

Following this, the five interconnected but distinct steps for framework analysis were undertaken (Ritchie & Spencer, 1994). Step 1 (familiarisation) involved rereading each transcript becoming immersed in the details of it, ensuring the data 'fitted' into the predefined TDF constructs. Brief notes were also taken at this stage. In Stage 2 (developing and identifying recurrent and important themes) recurring themes identified in the previous stage were added to a table in Microsoft Word. During Stage 3 (indexing and pilot charting), transcripts were imported into Microsoft Word under their related group and predefined themes. This stage enabled further identification of whether responses might be better placed in another theme or if there were any subthemes emerging. Therefore, a refined framework was completed during this phase. In Stage 4 (charting data in an analytical framework) data was reduced to brief summaries of what participants responded. An asterisk was inserted beside any particularly meaningful quotations and page numbers were included where to find it in the transcript, as recommended by Ritchie, Spencer &

O'Connor (2003). During Stage 5 (mapping and interpretation) comparisons of the data were made both within and the between groups, establishing whether there were factors specific to overweight pregnant women and if there were common features of the constructs across the groups. A sample (10%) of transcribed data was coded by a second researcher MA (experienced in using the TDF). Reliability between two coders is acceptable if kappa score is $>.60$ (Landis & Koch, 1977). The kappa score was 0.96 indicating there was a good agreement between coders. Where there were discrepancies these were discussed until agreement was reached, and the basis of these discussions were used to recode data into categories where there had been disagreement. The final stage involved comparing the data both within and between the three groups identifying whether common features of constructs existed across groups. Saturation of themes was not recorded as a deductive approach was used, so all data was analysed under each category.

7.3 Results

Participants

Eighteen pregnant women participated (6 normal weight NW; 6 overweight WO and 6 obese women OB) (Table 7.1 for participant characteristics). Women self-reported their current occupation, which was categorised using the Standard Occupational Classification (SOC, 2010). For those women who did not fall into the classification (stay-at-home mum) their occupational status has been reported.

Table 7.1: Participant Characteristics

BMI	Occupation	Parity	Gestation
Normal weight (18.5-24.9 kg/m²) n=6	Professional Occupation	2	2 days postpartum
	Professional Occupation	2	30 weeks
	Professional Occupation	1	40 weeks
	Caring, Leisure & Other Service Occupation	1	29 weeks
	Sale & Customer Service Occupation	3	28 weeks
	Unemployed	1	1 day postpartum
Overweight (25-29.9 kg/m²) n=6	Stay-at-home mum	4	31 weeks
	Professional Occupation	2	40 weeks
	Associated Professional & Technical Occupation	1	30 weeks
	Professional Occupation	1	29 weeks
	Stay-at-home mum	3	32 weeks
	Caring, Leisure & Other Service Occupation	2	40 weeks
Obese (>30kg/m²) n=6	Associated Professional & Technical Occupation	1	30 weeks
	Professional Occupation	4	40 weeks
	Stay-at-home mum	3	28 weeks
	Unemployed	2	28 weeks
	Sale & Customer Service Occupation	2	28 weeks
	Caring, Leisure & Other Service Occupation	1	28 weeks

The majority of domains were relevant to most women. No domain specifically influenced the dietary and physical activity changes women who are overweight made during pregnancy. In order to make it clearer where and how the three groups differ, and particularly what behaviours characterise the WO group (but also what they share in common with one or both other groups) the theoretical domains have been grouped under the categories of Capability, Opportunity and Motivation factors and results presented below. Implications of these are addressed in the discussion, at which point literature of relevance to the findings is also be considered. Appendix 18 provides a summary of the theoretical domains relevant to influencing lifestyle changes for women during pregnancy.

Capability Factors

The factors *Skills, Knowledge, Memory, Attention & Decision Processes*, and *Behavioural Regulation* are grouped together as they represent the component of Capability, within the COM-B model (Michie et al., 2014).

Overweight participants discussed leading a healthy lifestyle during pregnancy, which involved consuming more fruit and vegetables, and taking vitamin supplements, which suggested that this is what they understood a healthy lifestyle to be. However, other WO discussed wanting specific information from their midwife on how to lead a healthy lifestyle and what this entailed. Some overweight participants felt capable of making changes to their lifestyle during pregnancy and discussed *Skills* they implemented to successfully change. These WO women had *Knowledge* and skills to manage their portion sizes and knew how to read the nutritional content of food labels. Some had acquired these skills through previous attendance at slimming clubs and also their long history of 'dieting'. Others felt they ate healthily in pre pregnancy so continued making similar choices during

pregnancy. Like women who were overweight, some normal weight women also demonstrated skills to successfully alter their lifestyle choices in response to pregnancy changes. Some described having smaller meals more frequently or purchasing healthy snacks, when their appetite increased. Having the skills to alter their lifestyle, could explain why WO and NW women found it easy to modify their dietary and physical activity behaviours, compared to OB participants who reported that making changes was more challenging.

Some women who are overweight, like NW women, monitored their weight throughout pregnancy (*Behavioural regulation* domain), with another participant discussing how her weight gain directly impacted on her dietary choices. If she had eaten unhealthy foods and noted a significant rise in her weight, she would manage this by actively reducing her food intake for the proceeding few days or would try to eat healthier foods. Women who were overweight felt reassured when they weighed themselves that they had not gained excessively,

...I'm happy with my progress so I've decided to just keep things as they are
(Stacey, WO, 2nd pregnancy)

As a result of this monitoring those WO women continued to make the same dietary choices.

Opportunity Factors

Social Influences and *Environmental Context & Resources* were grouped together as they represent the physical and social opportunities influencing healthy lifestyle decisions for women during pregnancy.

The role of *Social Influence* impacted positively on many dietary choices women who are overweight made. This was also observed in normal weight and obese women. Dependent on how support was delivered and who it was delivered by influenced women differently across each group. Women who were overweight talked about how their families provided words of support, which acted as motivators, influencing them to make healthier choices. This was similar to normal weight women's experiences. When meeting with family or friends, overweight participants discussed how they often would have cooked a healthy meal or have brought healthy foods when visiting her.

...if I have stayed at my mum's and she's done my dinner and there are, like, a lot more colourful fruit and veg in there and things like that. (Leanne, WO, 4th pregnancy)

This contrasted with messages communicated by some family members of OB pregnant women, where one was told,

...it didn't hurt me when I was a bairn [to eat less healthy foods] (Tania, OB, 4th pregnancy)

Although such experiences were interpreted by women as being less supportive during pregnancy it did not always influence her choices. Sometimes familial influences conflicted with the choices some of them wanted to make. Consequently, these OB participants tended to rely on their partners' support to help make lifestyle changes.

As highlighted in the theoretical domains table (see Appendix 18), WO appeared to be influenced to make lifestyle changes due to input from their midwife, compared to NW and OB women. Participants who were overweight valued the

information the midwife provided regarding dietary choices, whereas others were reassured the choices they made were having a positive impact during pregnancy. This contrasted with the experiences of some OB women who felt ambiguous about whether they were making the correct dietary choices, and some had unanswered questions about their pregnancy. One WO described how weekly telephone calls from her midwife made her feel supported and she attributed this contact as being pivotal to sustaining the changes she made to her physical activity and diet.

Women from across each group reported having the necessary facilities and resources in their area to lead a healthy lifestyle. However, for most women who were overweight work and childcare commitments was a barrier to leading a healthy lifestyle. This was also an obstacle experienced by normal weight women. This meant at times some of women who were overweight chose less healthy foods and exercised less than they would have wanted. Struggling to break unhealthy eating habits, overcoming temptations, and eating healthier foods when they lived in an obesogenic area was difficult for some overweight pregnant women.

*...they [family] kept saying come on you've got to do this, you know
encouraging me to become healthier, because I do like me takeaways.*

(Maria, OW, 3rd pregnancy)

Having supportive families who reminded participants of the importance of making healthier choices helped these women to maintain their focus on leading a healthy lifestyle during pregnancy. This contrasted with some OB women's experiences where they discussed struggling eating less healthy foods when their partners and friends eat less healthy.

Motivation Factors

A number of factors (*Social Role & Identity; Beliefs about Capabilities; Optimism; Intentions; Goals; Beliefs about Consequences; Reinforcement; and Emotions*) impacted on whether women were motivated to choose a healthy lifestyle.

There were a range of responses, within the *Social Role & Identity* domain, on the expectations of women's family and friends on her lifestyle choices during pregnancy. Family members of most overweight women expected her to eat healthier and engage in some physical activity. Normal weight women reported this expectation from their family and friends also. Obese women reported their families placed more emphasis to stop smoking during pregnancy. Women who are overweight noticed their friends making healthier choices during pregnancy, which NW and OB had also observed in their peer groups.

Responses from the *Beliefs about Capabilities* domain indicated that the majority of participants felt in complete control to make lifestyle changes during pregnancy (see Appendix 18). Many women who are overweight discussed that despite feeling in control, there were often competing demands on them, and so implemented strategies to manage these effectively. For example,

Quite a lot [of control] because it's up to me really isn't it? I just tend to make healthier meals... I sometimes do it as a family rather than just me on my own. (Louise, WO, 2nd pregnancy)

More women who are overweight acknowledged intending to make changes to their diet and physical activity during pregnancy, compared to NW and OB women. An explanation for this could be that most NW women felt their existing lifestyle was healthy so did not need to make radical changes to their lifestyle.

No, not really [made many lifestyle changes]. I've just done what I've been doing before. Wendy (NW, 3rd pregnancy)

Whereas, this contrasted with some OB participants' whose primary focus was to stop/reduce smoking, so setting this specific goal was perhaps easier to measure compared to making healthy lifestyle changes.

Women who are overweight reported less specific, measurable and achievable goals, compared to NW and OB participants. Many WO set dietary, physical activity and weight loss goals in pre-pregnancy. Weight loss was predominantly the primary outcome of their efforts potentially motivating them to continue to change their lifestyle behaviours, whereas in pregnancy this outcome was not reinforced, as they were not losing weight. For women who are overweight who set a goal they predominantly centred on dietary choices or physical activity, for example,

...gentle exercise five days per week (WO, Sarah, 1st pregnancy),

Goals relating to physical activity and/or dietary choices were similar to normal weight participants, whereas most OB women's goals focussed on other behaviours (mostly smoking).

Since making minor lifestyle adjustments, the majority of overweight participants noticed improvements to overall health, specifically with their asthma which they attributed to a healthier diet and increased physical activity.

I think I just feel healthier. I feel better, I feel like the things I am doing are right. You know my body is responding to them properly and it just makes me feel healthier and happier I suppose (Sarah, WO, 1st pregnancy)

Similarly, obese women also experienced an improvement in their health, whereas, normal weight women had not noticed any major changes, presumably because many were leading a healthy lifestyle pre-pregnancy.

Like women who are overweight, participants from the other two groups were optimistic they could maintain lifestyle changes made during pregnancy. Incrementally, as BMI rose, an increasing number of participants reported needing to put strategies in place to maintain changes postpartum (see Appendix 18). WO women tended to have specific plans on how they would maintain dietary changes. Some had planned to return to their slimming clubs or freeze meals in advance, in preparation for having less time when their baby arrived.

I will go back to WeightWatchers and it really does help just to get me back on track. (Nina, WO, 2nd pregnancy)

Women who are overweight believed if they had not made lifestyle changes during pregnancy this might adversely have impacted on their baby (see Appendix 18). These women were also the only group to report having previously experienced miscarriages or vaginal bleeding in their current pregnancy, or having undergone fertility treatment to become pregnant. An overweight participant who previously had a miscarriage felt cautious about engaging in exercise as she *"did not want to put the baby at risk"* (Sarah, OW, 1st pregnancy) which influenced her decision to reduce her physical activity during her current pregnancy. Therefore, the experiences of these women might have increased their awareness of the potential consequences of their lifestyle choices during pregnancy.

Previous pregnancy experiences, relating to lifestyle choices, were considered by some WO participants in their current pregnancy, as well as some NW

women. Some believed their dietary and physical activity choices previously resulted in their baby being born healthy. Therefore, this affirmed that the choices they had made were correct, so they made similar choices in subsequent pregnancies. Overweight participants acknowledged they could have made healthier choices in previous pregnancies, but felt reassured that their children had been born healthy. Although some of these women had this experience, what motivated them to make healthier choices in their current pregnancy, was the excessive weight they gained which they struggled to lose postnatally. This was also a motivating factor for some OB women.

Some issues that emerged from women who are overweight were changes in their emotions during pregnancy, which for some had impacted on their choices. Given the experiences of miscarriages, vaginal bleeding and fertility treatment experienced by most women who are overweight in this study, their anxiety levels were increased. Many tried to manage this anxiety by eating more healthily.

I've been very, very apprehensive about it [pregnancy] really, with me miscarriage 4 years ago. I've been holding off and holding off buying stuff...it's had an effect because they've [feelings] make me think, eat me greens and exercise. (Maria, WO, 3rd pregnancy)

Similarly, persistent worries were common for some women in the OB group. They were concerned that labouring would be complicated, if they had felt their baby move or if their baby would be healthy. They found it helpful talking about their worries to their partner or mother. In an attempt to manage their concerns, those women who were overweight tended to try to eat more healthily. Other OB participants also implemented this strategy.

7.4 Discussion

This is the first study to examine the constructs of behaviour change impacting specifically on overweight pregnant women, compared to normal weight and obese women during pregnancy. There were no clear patterns of barrier/facilitators that applied to only women who are overweight, rather they share some things with obese and others with normal weight women. Most factors affected all women to varying degrees.

All women who were overweight were motivated to change aspects of their dietary and physical activity behaviours to ensure their baby was born healthy. Although this could be the result of a social desirability effect, whereby these women are changing aspects of their behaviours to avoid criticism and align with perceived cultural norms (Tourangeau & Yan, 2007). However, some evidence (e.g. Gardner et al., 2011) suggests pregnant women are not aware of the need for behaviour change. This present study found women were aware their lifestyle behaviour needed altering, but a number of factors interfered at times with them being able to make and sustain such changes.

The *Skills* and *Knowledge* domains captured that overweight pregnant women, who previously had attended slimming clubs or had a history of dieting, felt equipped some with adequate skills to make changes to their diet and physical activity. All participants in this group reported that making changes was relatively easy. Self-monitoring has been described as key in the behavioural treatment for weight loss in the general population (Wing, 2004). Having knowledge about a healthy diet, which exercises are safe, and the implications of this for neonatal and maternal health, have been shown to positively influence healthy changes for overweight and obese women during pregnancy (Sui, Turnbull & Dodd, 2013).

Some overweight pregnant women expressed a desire for information such as this. These participants felt that having information about what constituted a healthy lifestyle and also the benefits of modifying their lifestyle during pregnancy might facilitate changes more easily. Although previous research has regularly cited that information alone does not predict behaviour change, some studies have noted a small association between nutrition knowledge and GWG (Wright, Bilder, DeBlasis, Mogul, Rubin, 2013). Overweight pregnant women knew they needed to lead 'a healthy lifestyle during pregnancy', their request for more clarity on what they needed to do to action this, highlights the potential ambiguity surrounding the term 'healthy lifestyle'. Confusing language associated with advice on healthy lifestyle has been reported elsewhere (Kagan & Kuhn, 2004). Although women have understood what foods to avoid during pregnancy, other lifestyle advice was less clear and consequentially women sought advice from family or friends (Thornton et al., 2006), a finding also made in this study.

The *Behavioural Regulation* domain highlighted that many WO routinely weighed themselves, which predominantly reassured them they were making the right choices. NICE (2010) reported that the evidence base was insufficient to make recommendations on routine weighing of women, reinforcing the need for new research. Although for most participants routine weighing had a positive impact on their dietary decisions, for another overweight participant restricting her food intake was a consequence to monitoring her weight gain. Some evidence suggests that women's self-monitoring of weight gain throughout pregnancy is not always accurate (Shub, Huning, Campbell, McCarthy, 2013). However, although this was a small study, with self-selecting volunteers (who potentially were highly motivated), clearly some wanted to monitor their weight during pregnancy and others did not. While

regular routine weighing during pregnancy is not recommended (NICE, 2008), this current study indicates some evidence of modifiable behaviours for women during pregnancy that if detected early, through routine weighing, could lead to healthier GWG, particularly for women who are overweight. Some evidence suggests that weighing in pregnancy, weight target setting and feedback from community midwives is broadly acceptable to women (Daley et al., 2016). Therefore, midwife appointments, offering women the choice whether to be weighed, might help them have an accurate recording of their weight and gain advice from healthcare professionals how to set weight targets and receive appropriate feedback. Having confidence to make the necessary lifestyle changes, regardless of circumstances or context is a key influence on changing behaviour (Bandura, 1997). Generally, women who are overweight (like OB participants) reported less confidence in their abilities to make lifestyle changes, compared to normal weight women, under the *Belief about Capabilities* domain. The link between level of confidence and whether this translates into dietary and physical activity changes during pregnancy, for overweight and obese women, is a finding supported by other studies (e.g. Sui, Turnball & Dodd, 2013; Hinton & Olson, 2001). Therefore, exploring this link further in overweight pregnant women might deepen our understanding on the role of self-efficacy in their lifestyle decisions.

Under the domain *Social Influences*, practical and emotional support from family was pivotal in helping all women to make healthier choices during their pregnancy. It could be that this support enhanced motivation for women facilitating them to feel more confident to make healthy lifestyle decisions. The benefits of partner, family and friend's support have been reported as predictors of maternal mental and physical health and integral to helping women partake in physical

activity and follow a healthy diet (Cutron, Russell, Gardner, 2005; Beck, 2001; Robertson, Grace, Wallington, Stewart, 2004; Jelsma et al., 2016; Weir et al., 2010). When overweight and obese women were struggling to make healthier choices, particularly in obesogenic environments, the role of family support helped them to continue to be motivated to eat healthily. Interventions that target individual behaviours without considering the context in which they exist will potentially limit their success (Egger & Swinburn, 1997), given the easy access to nutritionally dense food in society today (Popkin, Adair, Ng, 2012). Addressing weight-related behaviours during pregnancy is complex. Therefore, if society was more health focussed and promoted healthier choices each day throughout the whole life span, this would be advantageous to women and their families during pregnancy (Dencker, Premberg, Olander, McCourt, Haby et al., 2016). Work and childcare commitments at times was a barrier, predominantly for overweight and normal weight women to lead a healthy lifestyle. The culturally endorsed stereotype of being a "good mother" often means that women perceive fulfilling their needs to be less of a priority, compared to their childcare or domestic responsibilities (Lewis & Ridge, 2005). Furthermore, time for mothers to tend to their own needs appears to be reducing, in the competing cultural expectations to be a "good mother" (Wall, 2013). Within the domain of *Social Influences* almost all overweight participants reported the positive influence support from their midwife had on their lifestyle choices, compared to the other two groups. Some felt the provision of information on leading a healthy lifestyle was valuable, whereas others found the reassurance comforting. Both these experiences led women who are overweight to feel supported by their midwife during pregnancy, potentially motivating them to maintain the changes they had made. The majority of overweight and normal weight participants expressed their families expected them to eat healthily and engage in some physical activity during

pregnancy (*Social Role & Identity*), whereas, family expectations in the obese group focused other health behaviours in pregnancy. These highlight the competing priorities women might face during pregnancy and whether they feel able to change more than one lifestyle behaviour during this time. Little research has focussed on how successful interventions are at addressing whether special groups (e.g. pregnancy) can change multiple behaviours simultaneously (King, Meader, Wright, Graham, Power et al., 2015).

The *Intentions* of overweight and normal weight women to eat healthier and engage in physical activity translated into the *Goals* they set during their pregnancy, which were quite specific (see Appendix 18 for examples). Likewise pregnant women, who intended to reduce/stop smoking, set this as their goal, which was potentially competing with behaviours associated with weight management. Some overweight and obese pregnant women's lifestyle changes (dietary/physical activity, smoking) were more radical (compared with normal weight women), which might explain why they observed notable physical improvements to their health. Physiological feedback has been cited as one way to enhance individual's self-efficacy to change their behaviour (Bandura, 1989). Coupled with verbal praise and encouragement, this can further boost a person's self-efficacy (Ashford, Edmunds, French, 2010). Potentially, these verbal comments could be delivered by women's midwives during appointments, where they could also encourage those attending with the woman (partner/family) to provide positive verbal feedback also.

Some studies demonstrated that women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby (Jelsma et al., 2016). Although there was some commonality of *Beliefs about Consequences* between the groups, the experiences of miscarriage, vaginal

bleeding and fertility treatment, elevated these overweight participant's anxiety (*Emotion*). The experiences reported by the WO potentially meant they were more primed to make lifestyle changes when they had a successful pregnancy, a finding reported elsewhere (Atkinson, Shaw & French, 2016). Numerous studies have found women's interpersonal beliefs about how safe it is to exercise in pregnancy predicts physical activity levels (Duncombe et al, 2009). This was evident for one overweight woman who reduced her physical activity levels having previously experienced a miscarriage. Given that some evidence suggests beliefs change throughout pregnancy, there may be a number of opportunities to address beliefs in antenatal appointments (Duncombe et al., 2009). Preventative action will be undertaken if the health risk is perceived to be serious, and there are fewer costs than benefits to engaging in protective action (Rosenstock 1966; Becker, 1974; Rosenstock 1994). Although vaginal bleeding and miscarriage was experienced by participants in the WO group only by chance, these experiences influenced healthier eating habits for these women, as they believed by not doing so might adversely have an impact on their baby's health.

Overweight participants had insight into their behaviour during previous pregnancies, acknowledging their choices could have been healthier (all their babies were born healthy). What they did experience in these pregnancies was excessive gestational weight and subsequently struggled to lose this weight. A similar finding has been reported elsewhere. For women who are overweight a rise in weight during pregnancy and postpartum weight retention could mean they begin subsequent pregnancies in a higher weight category (Nohr et al., 2005). Like obese women, although they wanted their current baby to be born healthy, they appeared motivated to make healthier choices to also manage their GWG. These women did

not make reference to the risks associated with excessive GWG, a finding supported by previous studies (Leslie, Gibson, Hankey, 2013). Although many women believe weight gain is inevitable during pregnancy and are less preoccupied with managing their weight (Olander et al., 2011), they feel midwives are the most appropriate healthcare professionals to guide them on the management of this (Weir et al., 2010).

7.5 Strengths & Limitations

This is the first study to provide an indicative pattern of behaviour change constructs influencing dietary and physical activity choices, specific to overweight pregnant women, using the TDF. The majority of data collated 'fitted' the TDF domains providing further validation that it captures the key domains affecting behaviour and behaviour change. The qualitative approach in this study enabled the views of women who are overweight to be captured in depth, and the framework method made comparing these views to normal weight and obese women, to be systematically analysed. It is unclear how much of women's reporting of motivation to lead a healthy lifestyle was due to a social desirability effect. All women approached by the PHM agreed to participate in the study potentially introducing a self-selecting bias. However, women were recruited and approached based on the study criterion, and were not previously known to the PHM, therefore, she was unaware of their level of motivation to participate. However, the sample size is small and so we cannot generalise the findings to all women who are overweight, normal weight and obese. There were no factors that specifically impacted on weight-related decisions for WO. Rather there was an indicative pattern of behaviours influencing all women across the three groups, to some degree, highlighting that maternal care and advice about weight management should include all women. This study could inform the design of a questionnaire to capture

behaviour change constructs, influencing lifestyle decisions during pregnancy, on a much larger scale. However, the method of analysis does lose some of the detail provided by the TDF that could be useful for developing the questionnaire.

Therefore, it would be helpful if a questionnaire or intervention was going to be developed to return to the original analysed data and use this, rather than summarised elements used for the purpose of the framework analysis.

7.6 Potential Implications for Practice

Given the small-scale nature of this study, these recommendations are made tentatively. It is not solely the responsibility of midwives to manage the care of women in maternity services. However, some evidence suggests these are the frontline staff with the highest level of contact with pregnant women and that this is the healthcare professional most women would prefer to offer support and advice. This study highlights the positive experience most women who are overweight had from their midwife and the subsequent impact on her lifestyle behaviour. Midwives could potentially implement brief interventions that involve providing strategies to change dietary and physical activity habits, as well as, goal setting for weight targets and monitoring of these. Such interventions could be delivered as part of routine care that support all women regardless of BMI and possibly reduce the stigma women with a higher BMI might face. By providing information regarding what a healthy lifestyle is and practical strategies on how to achieve this, women who are overweight might feel better skilled to make changes. Findings from the current study provide some scope for midwives to routinely weigh women, set weight targets, and provide appropriate feedback and encouragement. Apart from potentially increasing women who are overweight's self-efficacy to make lifestyle changes during pregnancy, it might also help to manage her GWG. This would

require training for some midwives to help them feel confident to deliver such interventions. However, it might also provide more opportunities for staff to raise the issue of lifestyle and gestational weight during pregnancy. Having such discussions might also reinforce to women who are overweight, the importance of dietary intake and physical activity during pregnancy and the associated risks of gestational weight gain.

7.7 Chapter Summary

Women who are overweight, as well as normal weight and obese women, wanted to have a healthy baby and manage their weight gain throughout pregnancy. This influenced their intentions and subsequent goals to eat healthily and engage in physical activity. Many were skilled to successfully achieve their goals, by monitoring their weight and/or implementing previously learned weight management strategies, but some lacked confidence to always make the changes they desired. However, having specific information was proposed as one way to help them feel more confident. Overweight participant's previous experiences of miscarriages, fertility treatment and vaginal bleeding compounded their motivation to make healthier choices, as they worried by not doing so might adversely impact on their baby. When some were struggling to make healthy decisions the support from their partner, family members, and midwife often encouraged them to sustain the changes made. There is potentially a role for midwife staff to deliver brief interventions to all pregnant women to change their lifestyle. This is the first study to report the constructs from the TDF that specifically influence the lifestyle decisions of overweight pregnant women. Although the sample size is small, the approach could be used to inform the design of a much larger study examining the role of behaviour change constructs, influencing lifestyle choices, for overweight pregnant women.

CHAPTER 8

Thesis Discussion, Recommendations, and Conclusions

8.0 Thesis Aims

The overall aim of this thesis was to advance knowledge of factors impacting on healthy lifestyle choices for pregnant women who are overweight. This chapter will discuss the key findings from all studies throughout this thesis (chapters 4-7) within the context of the existing literature; and make suggestions on the implications for future clinical practice and research.

8.1 Staff Perspectives on Supporting WO during Pregnancy

This is the first study attempting to provide an in-depth insight, as well as a quantitative account of the extent of practice and advice related to healthy lifestyle with a specific focus on women who are overweight. Findings suggest there is a lack of adequate provider care/advice for WO. This is particularly important to address, for two primary reasons. Firstly, adverse health risks (short and longer term) are present for pregnant women who are overweight (CEMACH 2007; 2011; Ovesen, Rasmussen & Kesmodel, 2011; Nuthalapaty & Rouse, 2004; Scott-Pillai et al., 2013), but there is a glaring absence of screening and management of these risks in current guidelines and resource provisions. Secondly, there is evidence that WO tend to gain excessive GWG during pregnancy (Kraschnewski et al., 2013), compared to normal weight and obese women. Therefore, healthcare professionals potentially have a role in influencing changes in their behaviour (Strychar et al., 2000).

Most staff across both studies did not have specific weight-related discussions with women who are overweight. Similar to previous research (e.g. Phelan et al., 2011; Chang et al., 2013), the interplay of complex factors significantly compromised HCP's ability to have weight-related discussions with pregnant women who are overweight. Findings highlighted the difficulties in raising the issue of weight with WO and many reported not feeling confident, skilled or knowledgeable about how to do this. Previous findings have highlighted that HCP's have felt embarrassed initiating weight-related conversations with overweight or obese pregnant women, due to the sensitivity of the issue and worry it may cause undue concern to women (Stewart, Wallace & Allan, 2012). Staff are uncomfortable raising the issue with obese women (Heslehurst et al., 2007). So this discomfort might be magnified further potentially with WO, as they might perceive these women to have less difficulty managing their weight, particularly given that some staff (chapter 4) discussed how there are less mobility issues with overweight women, so the 'problem' is less obvious.

Many healthcare professionals tended to normalise being overweight during pregnancy. A number of factors contributed to this perception, including an increased normalisation of being overweight in society generally, which in turn could have normalised staff (who were overweight) feeling that their own BMI was 'normal' also. Furthermore, to meet the increased demand of women with higher BMIs accessing maternity services, resources focussed on addressing the needs of obese rather than overweight women. Evidence suggests the surge of increased obesity rates has left maternity services and staff inadequately prepared to meet the demands of the affected women (Schmied et al., 2011). Many staff reported women who are overweight as being low risk and lower priority in comparison (to those

women with higher BMIs). The lack of guidance from NICE (2010) on how staff should support WO might also compound the perception that managing this group of women during pregnancy is less of a priority. By extending this guidance (NICE, 2010) information further into local policy and practice might emphasise the importance for staff to address this with women who are overweight during consultations.

Within antenatal care, HCP's discussed the lack of continuity of provider care by the same midwife throughout women's pregnancy and time restrictions within consultations to have weight-related discussions with WO. Continuity of care from the same midwife and a professional relationship is more likely to result in fewer interventions during labour and enhance women's experiences during pregnancy and postbirth, according to a recent systematic review (Sandall et al., 2016). Although some healthcare professionals discussed the risks associated with being overweight during pregnancy, being aware of the risks did not necessarily equate to them having weight-related discussions with WO. Some evidence has suggested that knowledge of the risks associated with higher BMI during pregnancy might not necessarily act as a driver for staff to raise the issue of weight, rather it might foster confidence when providing advice (Heslehurst et al., 2014).

Midwives identified opportunities where they could have weight-related discussions with WO, for example, routine weighing and antenatal checks. Adopting a sensitive approach was seen as helpful in preserving a therapeutic relationship when discussing issues such as weight and lifestyle factors. The use of terminology when having such dialogues is crucial to maintain positive relationship (McCourt, 2006; Gray et al., 2011). More generic terms, such as high/raised BMI were used to facilitate such discussions, with the term overweight sometimes being

used interchangeably with obesity. Women have reported they would prefer antenatal staff to use more generic terms, like BMI, during weight-related discussions (Jewell, Avery, Barber, Simpson, 2014)

Patient knowledge and practitioner advice about GWG have been shown to be two modifiable factors related to excessive GWG (Strychar et al., 2000). The advice staff provided to these WO varied (chapters 4 & 5). In the absence of an evidence-base and policies guiding staff on what advice to provide to women who are overweight, some (chapter 4) relied on NICE (2010) guidelines. Therefore as stipulated in these guidelines, their advice was the same to normal weight women and those who are overweight. However, some evidence has suggested that no advice being provided, may result in women not monitoring their GWG or downplaying the role of GWG (Thornton et al., 2006; Arden, Duxbury, Soltani, 2014); whereas, incorrect advice may result in women who are overweight expecting that they should gain excessive GWG and intending accordingly (Phelan et al., 2011). Therefore, the role of advice in helping WO monitor their weight throughout pregnancy is an important consideration. Although staff (chapter 5) demonstrated an awareness of local and NICE (2010) guidelines, many reported not being knowledgeable on its content, which might explain why staff tended to provide the same advice to overweight and obese participants. In the context of the maternal obesity literature, having a lack of knowledge of the evidence-base, determinants of obesity and weight gain impacted on a number of staff behaviours (e.g. 'emotion', 'motivation and goals' (unwilling to provide support)) and subsequent support offered to pregnant women who are obese (Heslehurst et al., 2014). However, when healthcare professionals felt they had knowledge this positively influenced their 'motivation and goals' to support women, and they also were confident that

pregnancy was an opportune time to intervene to change behaviour ('belief about consequences' domain) (Heslehurst et al., 2014). Therefore, the role of knowledge is another factor to consider on how best to support staff to help them support WO.

Advice provided centred around physical activity and dietary information. Numerous studies have provided evidence demonstrating that women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby, rather than themselves (Jelsma, et al., 2016; Szwajcer, Hiddink, Koelen, Woerkum, 2005; Szwajcer, Hiddink, Koelen, Van Woerkum, 2007). Similarly, those who tailored their advice, were weight-related discussions which, placed the baby at the centre, appeared to engage women and be more impactful in changing her weight-related behaviours. Staff across both studies questioned the extent to which their advice changed the lifestyle behaviour of women who were overweight. This is an important consideration given that if healthcare professionals do not perceive their advice to have an effect, this will likely predict whether they provide information (Rogers, 1975) and also the type of information offered (Weinstein, 1993). As many of the midwives did not consistently provide input to the same woman throughout her pregnancy, they were unsure whether their advice changed behaviours (chapter 5). Some highlighted that in the absence of regular routine weighing it was difficult to monitor any effect of their advice. Often, it wasn't until these women presented in subsequent pregnancies, that they were able to assess whether their advice had helped in changing her lifestyle behaviours. Although routine weighing is no longer recommended, more evidence is emerging that women are open to being weighed throughout their pregnancy (Allen-Walker et al., 2017; Brownfoot, Davey, Kornman, 2016; Daley et al., 2015). Furthermore, women were open to receiving weight

targets, goal setting and monitoring of these by their midwife, throughout pregnancy (Daley et al., 2016). The evidence base was deemed insufficient by NICE (2010) to warrant the reintroduction of routine weighing, highlighting the need for new research. Perhaps now is the time to reopen the debate about the reintroduction of routine weighing for all women during pregnancy, particularly for those WO.

8.2 Women's Perspectives on Leading a Healthy Lifestyle During Pregnancy

Both qualitative studies from women's perspectives have provided insight into a number of factors that facilitated pregnant overweight women to lead a healthy lifestyle, whereas other factors were a hindrance to this. These are the first studies to specifically explore what influences weight-related decisions for WO during pregnancy.

Many overweight women across both studies were motivated to lead a healthy lifestyle as they wanted to have a healthy baby, and/or be able to physically care for their baby postpartum. This influenced some of the physical activity and dietary changes they made. Adverse pregnancy symptoms (e.g. tiredness) and work/childcare commitments impacted on the dietary choices some overweight women made and their motivation to cook healthy meals. It also negatively affected their engagement in pre-existing physical activities and the uptake of new activities. These findings draw parallel with previous evidence reporting an association between adverse pregnancy symptoms and difficulty engaging in physical activities (Jelsma et al., 2016; Campbell et al., 2011). Some women would have liked to attend antenatal classes but these were scheduled either during the day (when they were working), or in the evening (when they were looking after their other children) (chapter 7), making attendance difficult. With more competing cultural expectations on women to be a "good mother" (Wall, 2013), prioritising their own needs appears

to be secondary, compared to their childcare or domestic responsibilities (Lewis & Ridge, 2005). This acts as a potential barrier therefore, for some WO to make lifestyle changes during pregnancy.

The assurances provided by some women's midwife in the first and second trimester that their baby was healthy provided initial motivation to eat healthy. However, this subsided in the latter stages of pregnancy believing that their baby now was healthy, so they did not feel the need to make as healthy food choices (chapter 6). As women are more motivated to lead a healthy lifestyle during pregnancy if they perceive the health risks to adversely impact on their baby (Jelsma, et al., 2016; Szwajcer, Hiddink, Koelen, Woerkum, 2005; Szwajcer et al., 2007) providing information of the associated risks might motivate women to continue making healthy choices until birth. Also, highlighting the benefits of acceptable GWG might also motivate these women to make healthy dietary and physical activity choices (Leiferman, Sinatra, Huberty, 2014).

There was an acceptance by many WO they would gain excessive GWG (chapter 6) and many of them did so during their pregnancy. This is in line with previous research, where many women believed that weight gain is inevitable and feel less preoccupied with managing their weight (Olander et al., 2011). The NICE (2010) guidelines encourage staff to dispel myths about what to eat and how much. However, in the absence of open dialogues and trusting relationships in which women are openly discussing their expectations during pregnancy, this opportunity might not happen. Most women who were overweight across both studies had knowledge and successfully implemented strategies to manage their weight through eating healthily, self-monitoring, managing portion sizes and exercising regularly. These are known to be some successful components of weight-related behaviour

change interventions (Burke, Wang, Sevick, 2011). However, although they were skilled to set goals, some lacked the confidence to make the necessary changes to lead a healthy lifestyle. Furthermore, some viewed pregnancy as a time when they did not have to follow a dietary regime. A number of other studies (Riles, 1993) have also reported a similar finding, whereby some women who are overweight feel 'exempt' from dieting during pregnancy. An explanation for this could be their pregnancy 'allows' them to be overweight and have a more relaxed attitude to their body image, rather than succumbing to the societal pressures to be slim (Fox & Yamaguchi, 1997; Loth et al., 2011). However, there was an acceptance that in the postpartum period they would revert back to the healthier lifestyle they lead pre-pregnancy. Therefore, intervening postpartum might prove a more opportune time for WO to change their weight-related behaviours, which has been reported previously (Brown et al., 2012; Furness et al., 2015; Atkinson, Olander & French, 2016). Many HCP's have proposed the pre-pregnancy period as the time to intervene, rendering pregnancy 'too late' to change (Heslehurst et al., 2007). Although this might be an ideal time for interventions to establish a healthy weight, often it is not practical as a high percentage (45%) of pregnancies are unplanned (Wellings et al., 2013). Further investigation is required to understand when the most appropriate time to intervene with supporting WO to address changing dietary and physical activity behaviours.

An indicative pattern showed that a number of factors influenced whether women who are overweight followed a healthy lifestyle during pregnancy. Some of these were also shared with normal weight and obese women (chapter 7). For some their previous experiences (of miscarriage or excessive GWG) motivated them to eat healthily and engage in physical activities. NICE (2010) stipulated that healthcare

professionals should *"have the skills to advise on the health benefits of weight management and risks of being overweight or obese before, during and after pregnancy, or after successive pregnancies pg 19."* There is an expectation that HCP's discuss these risks with WO. However, evidence from both studies suggests this does not routinely happen for overweight women, despite them discussing their concerns of excessive GWG with staff.

Support from family, friends and midwives were pivotal in helping some women who were overweight maintain the changes made during pregnancy. Staff in previous studies have perceived their advice to be less effective due to the influence of family members (Chang, Llanes, Gold, Feters, 2013). However, encouragement from family and friends to make lifestyle changes, including eating healthy and exercising has shown to facilitate positive changes in pregnant women (Sui, Turnball, Dodd, 2013; Martin et al., 2007; Teitler, 2001). Therefore, including family and social networks when attempting to change lifestyle behaviours in WO might be advantageous.

Many women who were overweight (chapter 6) were aware they were gaining excessive GWG and raised it as an issue with their midwife. However, midwives did not respond in a way that highlighted to women it was a concern, and so subsequently these women did not change their lifestyle behaviours. Some evidence, reporting a similar finding, has suggested this has resulted in a lack of monitoring of weight, or addressing weight management for women throughout their pregnancy (Thornton et al., 2006). Many staff reportedly lack confidence and knowledge as to what information they should provide women regarding GWG (Olander, Atkinson, Edmunds, French, 2011). There was a general consensus from women who were overweight (chapter 6) that having weight-related discussions

would be difficult. A finding supported by Mills et al. (2013) who reported that women wanted staff to have open and honest discussions regarding their weight, despite the potential discomfort caused. However, all acknowledged they would want to know if her midwife had a weight-related concern about her and that she was provided with strategies on how to address these. This has been conveyed also by other women, who discussed wanting to know what the practical solutions were to managing their weight during pregnancy, and not just being told they were gaining excessively (Arden, Duxbury, Soltani, 2014). Having a trusting relationship with her midwife would help facilitate potential lifestyle changes, but often women experienced resource and time restrictions from their midwife. Continuity of care from the same midwife and a professional relationship has found to result in fewer interventions during labour and enhance women's experiences during pregnancy and postbirth (Sandall et al., 2016). However, in both studies continuity of care from the same midwife was not the experience for some women who were overweight, which impacted on some of their weight-related lifestyle choices.

A study by Weir et al (2010) reported that women viewed midwives as the most appropriate source of information. Having knowledge about a healthy diet, which exercises are safe, and the implications of this for neonatal and maternal health, have been shown to positively influence healthy changes for overweight and obese women during pregnancy (Sui, Turnball, Dodd, 2013). Some overweight pregnant women expressed a desire for information such as this (chapters 6 & 7). Women who were overweight discussed wanting advice about how to lead a healthy lifestyle, rather than just being advised on which foods to avoid, highlighting potentially a role for midwifery staff to address lifestyle changes. Specifically, women discussed wanting to know what are healthy foods, the type and duration of

physical activities to undertake, as well as practical strategies on *how* to manage GWG. This might reinforce to women the importance of healthy lifestyle in pregnancy, but also help women who are overweight manage their GWG more effectively. There is some evidence that HCP's do not routinely provide women with information about the risks of obesity and the importance of weight management before or during pregnancy (Heslehurst et al., 2007). If staff are not applying this to obese women during pregnancy (where a number of guidelines, policies and care pathways exist), it seems unlikely that women who are overweight's needs are being addressed. Given women's beliefs surrounding physical activity change throughout pregnancy there may be a number of opportunities to address beliefs in antenatal appointments (Duncombe et al., 2009). Recommendations for staff (NICE, 2010) on the advice to provide to pregnant women who are overweight is vague, and does not provide them with the necessary information to guide women on managing excessive GWG. Therefore, clarity on how staff could advise women to manage potential excessive weight gain would be beneficial. While regular routine weighing during pregnancy is not recommended (NICE, 2008), findings from these studies indicates some evidence of modifiable behaviours for women during pregnancy that if detected early, through routine weighing, could lead to healthier GWG, particularly for women who are overweight.

There were no clear patterns of barriers/facilitators that applied specifically to women who are overweight impacting on them leading a healthy lifestyle during pregnancy. Rather they shared some factors with women who were obese and others with normal weight women. Most factors affected all women to varying degrees (chapter 7).

8.3 Summary of Findings

Although NICE (2010) reports that effective weight-loss programmes should *"identify and address barriers to change"* (pg 8), there is an incomplete guidance for healthcare professionals on how to assess and address these barriers effectively. Many staff across both studies struggled to know how to successfully do this. There are reasons, which interfere with them effectively addressing overweight during pregnancy including the lack of guidelines, knowledge, confidence and beliefs about their capabilities and skills.

Many WO experienced significant barriers interfering with them following a healthy lifestyle during pregnancy. Some of these barriers included adverse pregnancy symptoms, work/childcare commitments, feeling pregnancy was a time they were 'exempt' from dieting and an expectation they would gain excessive GWG. A number of WO had knowledge and skills to successfully manage their weight and the support from family, friends and their midwife facilitated lifestyle changes throughout pregnancy. Although there are commonalities of barriers/facilitators that have also been reported within the maternal obesity literature, guidelines, policies and care pathways exist to support these women, whereas women who are overweight's needs are being overlooked.

Some staff struggled to have weight-related discussions, and it is possible that the WO did not see their weight as a significant issue to address, therefore, they made no lifestyle changes. However, as these WO continued to gain excessive weight, staff identified numerous opportunities to intervene. Many felt they lacked the skills and knowledge needed to address GWG with women, and manage potential negative responses from them. Furthermore, staff had no objective way to measure whether their advice was changing women's behaviour. Within antenatal

services where time and resources are overstretched, there are limited incentives for staff to potentially intervene.

To the author's knowledge this is one of the first projects to focus specifically on weight-related lifestyle choices of pregnant women who are overweight, and of the healthcare professionals who support them. It makes an original contribution to knowledge as it has provided some insight into the difficulties staff face when supporting these women and also the advice provided to them. The qualitative design elicited a breadth of views of women who are overweight on what they feel influences their choices to leading a healthy lifestyle during pregnancy, as well as the information they receive and the impact of raising their weight as an issue. Furthermore, it has provided an original contribution by highlighting an indicative pattern of behaviour change constructs influencing dietary and physical activity choices, that women who are overweight share with normal weight and obese women, using the Theoretical Domains Framework.

8.4 Implications for Practice, Education and Research

Implications for practice and research have been made throughout this thesis, within each chapter (4 - 7). The following section will provide an overview of the recommendations needed to enhance our knowledge and/or practice when supporting women who are overweight to make dietary and physical activity changes throughout pregnancy.

8.4.1 Brief Interventions Delivered by Midwives

Chapter 7 identified some of the constructs of behaviour change impacting on overweight pregnant women leading a healthy lifestyle, using the TDF. It used the COM-B model to identify some of the barriers and facilitators impacting on weight-

related decisions for WO, which is the hub of the BCW. Surrounding this is a layer of nine intervention functions, depending on the COM-B identified, and will be utilised to make some evidence-based intervention recommendations below.

Although some WO were aware they needed to lead a healthy lifestyle during pregnancy, they lacked knowledge on what constitutes a healthy lifestyle, and the benefits of making changes (*Psychological Capability*). Therefore, HCP's could have a pivotal role in providing this information and advice on how to perform this behaviour i.e. *how* to lead to healthy lifestyle. Framing this advice in a positive light (e.g. benefits of leading a healthy lifestyle) could be more motivating for women, rather than presenting the risks associated with weight-related choices and excessive GWG. Verbal praise and encouragement can boost a person's self-efficacy (Ashford, Edmunds, French, 2010). Potentially, verbal feedback about changes women made could be delivered by midwives during appointments, where they could also encourage those attending with the woman (partner/family) to provide positive verbal feedback also. When information about leading a healthy lifestyle was provided to some WO by their midwife they found this support valuable and it acted as reassurance for others they were making the right choices. Some evidence suggests that weighing in pregnancy, weight target setting and feedback from community midwives is broadly acceptable to women (Daley et al., 2016). Furthermore, WO tended to under-assess their weight status and had limited knowledge on their weight category at the beginning of pregnancy, which resulted in significant excess GWG, compared to normal weight women (Herring et al, 2008; Shub, Huning, Campbell, McCarthy, 2013). Therefore, within a proposed intervention teaching women how to accurately record weight, set safe weight targets and monitor these throughout pregnancy might be advantageous. The support and

motivation to prevent excessive GWG will be unique to each woman, so it is important to understand her circumstances and personal needs at the beginning of her pregnancy (Olander, Berg, McCourt, Carlstrom, Dencker, 2015). Therefore, HCP's supporting WO could identify the barriers interfering with making weight-related changes and help them develop strategies to overcome these, to increase their capability to lead a healthy lifestyle.

Many WO found the support from their partners/family pivotal in facilitating positive lifestyle changes during their pregnancy. A supportive network (partner's and family/friends) have predicted positive maternal and physical health, which have played a crucial role in supporting pregnant women to successfully engage in physical activity and follow a healthy diet (Cutron, Russell & Gardner, 2005; Beck, 2001; Robertson, Grace, Wallington, Stewart, 2004; Jelsma et al., 2016; Weir et al., 2010). When overweight and obese women were struggling to make healthier choices, particularly in obesogenic environments, the role of family/partner support helped to facilitate healthy dietary choices. Partners/family members often are influential over the lifestyle choices pregnant women make, but are not regularly included in many lifestyle interventions (Campbell et al., 2011; Sui, Turnbull, Dodd, 2013). A woman and her family are living in a context that is not separate. Therefore, family/partner involvement in any proposed intervention which educated women's support network also might act as a driver to support healthy weight-related choices being made during pregnancy, which in turn might act to prevent excessive GWG.

8.4.2 Reintroduction of Routine Weighing

The practice of routine weighing throughout pregnancy was investigated and as it had little or no predictive value in identifying women at risk of small for

gestational age infants or hypertension (Dawes and Grudzinskas, 1991), so it was recommended not to repeatedly weigh pregnant women routinely. NICE (2010) reported that the evidence base was insufficient to make recommendations on routine weighing of women, reinforcing the need for new research. However, there is emerging evidence that women are open to, and accepting of weighing in pregnancy, weight target setting and feedback from community midwives is broadly acceptable to women (Daley et al., 2016). However, staff reported that a lack of regular routine weighing meant it was difficult to monitor whether their advice positively impacted on behaviour change, which meant they did not receive any feedback about the efficacy of their intervention (chapter 4). Furthermore, routine weighing was suggested by midwives as an opportunity where weight-related discussions could happen. Most women (chapters 6 & 7) monitored their weight pre-pregnancy and some continued with this during pregnancy. The role of self-monitoring in the prevention and treatment of overweight and obesity has been identified as one of the cornerstones of weight management (Wing, 2004). Furthermore, the first step in facilitating behaviour change is self-monitoring, which increases an individual's awareness of the nature and impact of the problem behaviour (i.e. excessive weight gain) (Kanfer, 1986), which then triggers self-evaluation processes to occur (Miller & Brown, 1991). Some WO discussed the potential benefits of being routinely weighed at each antenatal appointment, similar to expecting their blood pressure to be checked. Women who are overweight proposed routine weighing not only as a way to initiate weight-related discussions but also an opportunity to reflect on dietary choices being made (chapter 6 & 7). Having such discussions might also reinforce to women who are overweight, the importance of dietary intake and physical activity during pregnancy and important role this could play in managing GWG. Similarly, this has been reported in previous studies, where women wanted

to self-monitor their weight but wanted their midwife to support her with it, and also provide information regarding dietary intake and physical activity (Leiferman, Sinatra, Huberty, 2014). Given the increasing understanding of the risks associated with GWG for WO, and the findings from HCP's and women in this project, opening the debate about further investigation of the benefits of routine weighing as part of an intervention could be examined. Rather than focussing on weighing women most at risk, routinely weighing all women might also 'normalise' this procedure reducing potential stigma associated with having a higher BMI.

Midwives could potentially implement brief interventions that involve providing strategies to change dietary and physical activity habits, as well as, goal setting for weight targets and monitoring of these. Such interventions could be delivered as part of routine care that support all women regardless of BMI and possibly reduce the stigma women with a higher BMI might face.

8.4.3 Interventions to Increase Staff Confidence

Staff within chapters 4 & 5 highlighted their reluctance to have weight-related discussions with WO due to the sensitivity of the issue, not feeling confident with knowing how to address it and fear of compromising the relationship. These were similar communication barriers with HCP's, reported within maternal obesity. Delivering an intervention whereby HCP's addressed healthy lifestyle with WO would require training of staff, the content of which would also address behaviour change skills to engage women in a sensitive topic (like weight management) and diffusing negative responses. This might also help them feel more confident to have weight-related discussions (Dencker et al., 2016). The importance of developing a 'shared terminology' when health professional's discuss weight with patients has been suggested (Dutton et al., 2010). Numerous findings (albeit within maternal obesity)

has highlighted that women preferred HCP's to refer to BMI when having weight-related discussions (Jewell, Avery, Barber, Simpson, 2014; Dencker, et al., 2016). Furthermore, women have suggested that antenatal staff receive training on how to support and counsel them when having such dialogues (Campbell et al., 2011; Dencker, et al., 2016). Staff (chapter 4) discussed the importance of using appropriate language when eliciting weight-related discussions. Communication scripts have been used effectively when conducting invasive procedures with patients, and can be implemented relatively quickly (60 seconds) (Lang, 2011). This aide would avoid the need to memorise words and standardises the approach used (Lang, 2011), particularly if women see a number of different midwives throughout their pregnancy. Alternatively, considering that there are numerous reasons why women might react negatively to having weight-related discussions, having a standardised response might be problematic (Heslehurst et al., 2013). Therefore, having a common language/terminology (like using BMI when discussing weight) that all antenatal staff adopt when having weight-related dialogues might go some way in supporting staff to discuss this sensitive topic. Heslehurst et al.'s (2013) guide provides some examples of responses staff could use when a patient initiates or says certain weight related comments. These might help to open the conversation and discuss weight in a more positive way.

Staff (chapter 5) made suggestions that potentially would optimise them feeling more confident to have weight-related discussions, through training and recommendations to have such dialogues within national guidelines/policies. Evidence from patient-doctor communication studies have highlighted that effective communication involves more than the giving/receiving of information (Moore, Rivera Mercado, Grez Artigues, Lawrie. 2013). Although women want clear and

concise information, they also want antenatal staff to listen to them and respond to their individual needs (Rowe, Garcia, McFarlane, Davidson, 2002). Care that is tailored for women, not just their weight status is what they want (Arden, Duxbury, Soltani, 2014). Similar to the findings of our studies (chapters 4 & 5), staff lacked confidence and knowledge about what information to provide and how to raise weight-related issues. This is also reinforced in national guidelines; to provide women-focussed care (NICE, 2008). A recent systematic review reported that incorporating person-centred care into antenatal care might reduce women's dissatisfaction with maternity service and if provided with sufficient time potentially facilitate partnerships between provider and woman to address weight-related issues (Olander et al., 2015). However, staff would need training to incorporate this into their practice. Recently, there has been some success with interventions targeted at enhancing communication with antenatal staff and women. For example, a low-intensity online intervention which targeted HCP's improved their knowledge, perception of importance, confidence in counselling, and reported rated for counselling for antenatal physical activity (Leiferman, Gutilla, Nicklas, Paulson, 2016). Given the time pressures experienced by maternity staff, web-based training was acceptable to staff and could be utilised in future communication-skills training.

8.4.4 Implications for Research

Understanding the range of barriers and facilitators will enable a more comprehensive understanding of the strategies needed to change staff behaviour (French et al., 2012). Therefore, exploring these further with maternity staff might assist our understanding to enable staff to engage more fully in discussing sensitive issues, such as weight with overweight pregnant women.

Some WO in this study had skills and knowledge about how to change their weight-related lifestyle from attending previous slimming clubs. They were confident making the necessary changes to achieve successful weight loss pre-pregnancy. However, as reported elsewhere (e.g. Sui, Turnbull, Dodd, 2013; Hinton & Olson, 2001) it is not clear whether pre-pregnancy confidence translates into dietary and physical activity changes during pregnancy, for overweight and obese women. Therefore, exploring this link further in overweight pregnant women might deepen our understanding on the role of self-efficacy in their lifestyle decisions.

Findings from chapter 7 provided some insight into the factors influencing dietary and physical activity choices for women during pregnancy. Women who are overweight appeared to share some of these factors with others across normal and obese weight categories. Also, research studies continue to report 'overweight/obese' pregnant women as one group, therefore, conducting a study exploring if this is representative of women on a larger scale would help to clarify further whether common issues exist for women, independent of their BMI, or whether there are factors specifically influencing women who are overweight's decisions. All experiences were from Caucasian women and relatively little is known about the factors influencing weight-related lifestyle choices of women who are overweight from different ethnicities. Investigating this would be useful and comparing whether there are distinct factors influencing lifestyle choices across different groups. Therefore, the initial steps needed to explore this would be to identify those ethnicities most at risk of adverse health outcomes, as a result of elevated BMI. Given that qualitative research enables the 'why' and 'how' of phenomena to be explored (Green & Thorogood, 2010) utilising this approach could

help in understanding the behaviours impacting on lifestyle choices for WO across different ethnicities.

8.5 Conclusion

Healthcare professionals who support pregnant women who are overweight face a number of barriers which interfere with them having weight-related discussions. In the absence of specific NICE guidelines for these women or GWG markers, healthy lifestyle advice provided is the same as normal weight women. However, although women who are overweight appear to have some skills and knowledge on how to follow a healthy lifestyle during pregnancy, some struggle to make changes. No behaviour constructs were specific to pregnant women who were overweight, rather there was commonalities shared across the three BMI groups. Further research, which explores this on a larger scale, would be beneficial. However, pregnant women who are overweight and HCP's want more practical advice on healthy lifestyle choices and how to achieve them.

Chapter 9

Reflexive Account

9.0 Introduction

Reflexive practice is encouraged to help healthcare professionals and researchers bridge the gap between theory and practice by reflection on and in action (Taylor, 2011). Therefore, this chapter will provide a reflexive account of the research process and the researcher.

9.1 Why I Researched this Topic?

Reflexivity requires consideration of certain factors at different stages of the research process, like how personal history has influenced the research topic; values of the researcher; impact of personal and professional history during data collection; and the influence of pre-existing knowledge on emerging results (Hsuing, 2008; Greenaway, 2010). These were some of the factors that I reflected on at different phases of the research process.

For the past 12 years I have provided psychological input using a predominantly Acceptance and Commitment Therapy (ACT) approach to support individuals, and their families, following traumatic life-changing injuries. As the name implies ('ACT') the emphasis is on accepting difficult thoughts and feelings, while committing to behaviours that are in accordance with individual values (Hayes, 1999). I have also been involved with establishing services/groups to advocate and support disenfranchised populations. These professional experiences and the principles of ACT have significantly shaped how I lead my life (value-driven) and have a belief in other's voice (and their right to participate and

contribute) as well as my own professional practice. As part of reflection, in my clinical work, I attempt to develop “*my own continuing theory of practice under real-time conditions*” (Argyis & Schon, 1974, p. 157). What this requires of me is to consider contextually specific ideas about what works in the real world and be able to relate these “*microtheories to institutional norms and client expectations*” (Brookfield, 1986, p. 245). This in turn helps to bridge the theory-practice as I change my practice based on my reflections.

I conducted a qualitative research project as part of my MSc Health Psychology, which explored individuals’ and staff experiences contributing to the completion/incompletion of a weight management program. Often staff stigmatised the patients who accessed their service, and patients I interviewed (who hadn’t completed the programme) predominantly hadn’t because they didn’t have a good relationship with the person co-ordinating the group sessions. I was curious about the impact of staff-patient dynamics and the role of transference-counter transference within these relationships, which influenced their decision to leave the service. This was my first ‘real world’ research experience in weight-management and I was keen to pursue this interest further. Anecdotally, and from the evidence I reviewed highlighted to me that women who were overweight during pregnancy were a group that was overlooked within research, and potentially were not receiving the antenatal support they needed. This gap in research and practice, as well as my drive to support those underrepresented, spurred me on to devise my PhD project. The interest was not purely research oriented, but also provided me with insight that I could reflect upon in my professional practice.

9.2 Experiences during Data Collection

During data collection I was pregnant on two occasions. An interactive interviewing approach and being pregnant, I think undoubtedly helped to establish a rapport with many of the participants. Some women reported their experience of the interviews: as feeling naturalistic and felt they could be open and share their experiences without feeling judged or “*researched*”. Being pregnant meant that I was able to relate to some of the barriers/facilitators participants shared when trying to make healthy lifestyle decisions. However, there was also the counter to this, whereby when some women described their choices during pregnancy because it contrasted to mine, it made me more curious to explore more fully what influenced their decisions. Some women recounted their experiences within maternity services as feeling judged and stigmatised by the maternity staff caring for them. In particular, one of the participants became very tearful describing how a midwife had silently passed her a leaflet about managing weight during pregnancy. The participant told me how “*it [her weight] was the elephant in the room, but I was the elephant [referring to her high BMI]*”. Others shared emotive experiences of miscarriages, cot death and multiple failed IVF attempts. A combination of understanding my own values and attitudes, as well as my professional training ensured I managed these distressing situations and that the focus remained on the research and its participants.

Whilst waiting for the midwife focus group to begin I had an experience with one of the participants. Quite forcefully she verbalised “*why do you want to do this research you don’t have a problem with your weight, so what would you know about weight issues*”. At that time, I didn’t feel that I clearly knew why I was researching this topic, but I knew it was a worthwhile area to investigate. I relayed this to her

and also that *“we all have a relationship with food, and like any relationship we all have ups and downs”*. During the focus group this same midwife disclosed her own difficulties with food, and the impact her own experiences had with her interactions with women who are overweight. I now understood better her initial outburst to me. Working with clients (in my professional practice) who often have had a traumatic brain injury, I feel confident with managing unpredictable and challenging behaviours. However, the exchange with this midwife was not something I neither expected nor felt ‘prepared’ for, but felt I managed it professionally. Schon (1983) refers to this type of reflection as reflection-in-action, which occurs when one experiences an unforeseen event, which then enables researchers to competently function in situations where no standard protocols or procedures are available. It was useful this experience happened early in the data collection phase, as I was able to reflect on, and become aware of how my own BMI might be perceived by participants, and the potential impact this might have on interactions with them.

When the audio recording stopped, I sat with the midwife focus group for another 30 minutes approximately. A debate ensued about the pros/cons of supporting women who were overweight, as well as pregnant women who were obese. Discussions became very lively, which soon subsided as participants left to begin their shift on the maternity wards. The PHM and myself conversed how we felt the focus group had gone, and the proceeding debate. At that time it felt like raising the topic of supporting specifically WO was unearthing some opinion’s that had lay dormant for the staff, and the range of mixed opinion’s between them. It felt like I had come in an ‘opened Pandora’s box’, so naming this as the title to chapter 4 felt fitting.

9.3 Analysing the Data

The purpose of this reflexivity account is not to legitimise and validate research procedures, which is often why it is practiced in qualitative research (Mortari, 2015). Rather, it is to understand my role in the interview context and how my knowledge and experiences potentially influences each stage of the research process. For me, when investigating human behaviours, “...*understanding* [original emphasis] is a more fundamental concept” (Maxwell, 2002, p.45). My aim for this research was to provide the “*polyphony of voices and interpretations*” (Mruck & Mey, 1998, p.303), which might be present in the research process and become evident in the results.

Before beginning the analyses I spend time reading and considering which epistemological/ontological stance I should take, because that’s what I believed a “responsible” researcher should do. However, I was new to these debates, and at times I felt caught in the mire of the details reported from each of these standpoints. Again, I returned to my values and professional training, where I take a pragmatist approach to reflection and veer towards a Deweyan perspective. This involves having a method of thinking which extends our practical control on experiences, and it is then through the process of reflection that a method of inquiry can be pursued (Dewey, 1933). Therefore, taking a pragmatic approach to the research ran naturally in parallel with my own views: that paradigms are ever-changing beliefs systems (Morgan, 2014). This approach also meant there was less constraint on me to choose a particularly methodology, as I wasn’t being led by a particular epistemology or ontology, but rather which was most suitable to answer the research question.

Although this project is mixed methods, it has more of a qualitative focus. It felt natural (given my professional work/training) that I gravitated more toward a

narrative process, as opposed to a quantitative approach. I appreciate the contribution quantitative research brings to a particular paradigm. But for me, it felt uncomfortable reducing participant experiences and opinions into ‘replicable’ statistics. However, I also wanted to be able to provide evidence-based recommendations from the results, which partially influenced the type of analyses I conducted (statistical, thematic and framework analyses).

9.4 Evolving As a Researcher

Over the past four years I feel I have a much better understanding that *“personal accounting of how the researcher’s self-location, position, and interests influence all stages of the research process”* (Pillow, 2003).

After conducting my first focus group (obstetrician/GP group) I learned that clinical interview skills are not the same as research focus groups/interviews. However, I recognise that the transference of some of my skills helped during some points of the data collection. From the outset of my PhD project, I believed my research was worthwhile and the results could act as a beginning to further investigate how best to support pregnant WO, as well as maternity staff. However, during the project, I recognised I wasn’t investigating women/staff as participants in a study, but rather as individuals who connected with me, as much as I anticipated impacting on them in a meaningful way. After some interviews, I questioned which role I played when I was with a participant: therapist or researcher. I found it difficult at times to recognise when I had slipped from one role into another. However, listening to the audio recordings soon after each interview meant I was able to identify much easier when I had shifted roles and how the interview had taken a different turn, not because of the participant, but because of my own shift. In subsequent interviews I became better at ‘catching’ myself slip into the therapist

role. Having a printed interview schedule, not only acted as a prompt reminding me of the purpose of the interaction, but it also helped me to stay focussed.

During this research, I have juggled various roles and responsibilities both personally and professionally. To successfully progress with these, meant that I was overly task-focussed throughout much of my PhD. Over the past year, I have come to recognise that each stage of the research is a process, which requires me to be patient, and there is value in taking time to ‘think through ideas’.

For some women who shared particularly emotive experiences, I felt a responsibility to give their stories a ‘voice’ within the research results, even when this did not necessarily ‘fit’ into the phenomena being investigated. However, with the gentle guidance of my supervisors I learned that I add more gravitas to the experiences of participant’s (and research results), if they are reported within the context of the research objectives.

I have thoroughly enjoyed my PhD experience. I feel that I have grown in confidence and that I have a good grounding of research skills and qualities, on which to build upon in future research projects.

Word count: 60,207

References

- Abolhassani, S., Irani, M.D., Sarrafzadegan, N., Rabiei, K., Shahrokhi, S. (2012). Barriers and facilitators of weight management in overweight and obese people: Qualitative findings of TABASSOM project. *Iranian Journal of Nursing Midwifery Research*, 17(3), 205-210.
- Abraham, C., Kelly, M. P., West, R., & Michie, S. (2009). The UK National Institute for Health and Clinical Excellence public health guidance on behaviour change: A brief introduction. *Psychology, Health and Medicine*, 14(1), 1–8.
DOI:10.1080/13548500802537903
- Abraham, C. & Michie, S. (2008). A taxonomy of behaviour change techniques used in interventions. *Health Psychology*, 27(3), 379-387. DOI: 10.1037/0278-6133.27.3.379.
- Abraham, C. & Sheeran, P. (2005). The health belief model, in M. Conner and P Norma (eds.) *Predicting Health Behaviour*, 2nd ed. Maidenhead: Open University Press.
- Academy of Medical Royal Colleges. (2013). *Measuring Up: The Medical Profession's Perspectives for the Nation's Obesity Crisis*. London.
- Ahmad, A., Lavery, A., Aasheim E., Majeed, A., Millett, C. et al. (2014). Eligibility for bariatric surgery among adults in England: analysis of a national cross-sectional survey. *JRSM Open*, 5(1), 1-6.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organ Behav Hum Decis Process*, 50, 179-211.

Albarracin, D., Gillette, J. C., Earl, A. N., Glasman, L. R., Durantini, M. R., & Ho, M. H. (2005). A test of major assumptions about behavior change: A comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. *Psychological Bulletin*, 131, 856–897.

Alio, A.P., Kornosky, J.L., Mbah, A.K., Marty, P.J., Salihu, H.M. (2010). The impact of paternal involvement on feto-infant morbidity among whites, blacks and hispanics. *Journal of Maternal Child Health*, 14(5), 735-741.

Alio, A.P., Lewis, C.A., Scarborough, K., Harris, K., Fiscella, K. (2013). A community perspective on the role of fathers during pregnancy: a qualitative study. *BMC Pregnancy and Childbirth*, 13(60).

Allen-Walker, V., Mullaney, L., Turner, M.J., Woodside, J.V., Holmes, V.A., McCartney, D., McKinley, C. (2017). How do women feel about being weighed during pregnancy? A qualitative exploration of the opinions and experiences of postnatal women. *Midwifery*, 49, 95-101.

Al Zeera, Z. (2001). *Wholeness and holiness in education: An Islamic perspective*. Herndon, VA: International Institute of Islamic Thought.

Andres, A., Shankar, K., Badger, T.M. 2012. Body fat mass of exclusively breastfed infants born to overweight mothers. *Journal of the Academy of Nutrition and Dietetics*, 112(7), 991-995.

Annesi, J.J., & Gorjala, S. (2010). Relations of self-regulation and self-efficacy for exercise and eating and BMI change: A field investigation. *Biopsychosocial Medicine*, 4, (10). DOI:10.1186/1751-0759-4-10

- Arden, M., Duxbury A & Soltani, H. (2014). Responses to gestational weight management guidance: a thematic analysis of comments made by women in online parenting forums. *BMC Pregnancy and Childbirth*, 14(216).
- Armitage, C.J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *British Journal of Social Psychology*, 40(4), 471-499.
- Aronne, L.J., Nelinson, D.S., Lillo, J.L. (2009). Obesity as a disease state: a new paradigm for diagnosis and treatment. *Clinical Cornerstone*, 9(4), 9-25.
- Asbee, S.M., Jenkins, T.R., Butler, J.R., White, J., Elliot, M., Rutledge, A. (2009). Preventing Excessive Weight Gain During Pregnancy Through Dietary and Lifestyle Counseling. A Randomized Controlled Trial. *Obstetrics and Gynecology*, 113, 305–311.
- Ashford S, Edmunds, J., & French, D.P. (2010) What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *British Journal of Health Psychology*, 15, 265-288.
- Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., Foy, R., Duncan, E. M., Colquhoun, H., Grimshaw, J. M., Lawton, R., Michie, S. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Science*, 12(77), 1-18. DOI: 10.1186/s13012-017-0605-9
- Atkinson, L., Olander, E.K., French, D.P. (2016). Acceptability of a weight management intervention for pregnant and postpartum women with BMI >30kg/m²: A qualitative evaluation of an individualised, home-based service. *Journal of Maternal Child Health*, 20, 88-96.

Atkinson, L., Shaw, R. & French, D. (2016). Is pregnancy a teachable moment for diet and physical activity behaviour? An interpretative phenomenological analysis of the experiences of women during their first pregnancy. *British Journal of Health Psychology*, 21, 842-858.

Aune, D., Saugstad, O.D., Henriksen, T., Tonstad, S. (2014). Maternal Body Mass Index and the Risk of Fetal Death, Stillbirth, and Infant Death: A Systematic Review and Met-analysis. *JAMA*, 311(15), 1536-1546.

Aung, M., Zhang, M., Farhat, H., Gan, W., Salameh, M., Wu, L., et al. (2001). An exploratory study of the smoking issue in restaurants. *Management Decisions*, 39(4), 279-284.

Aviram A., Hod M., Yogev Y. (2011). Maternal obesity: implications for pregnancy outcome and long-term risks—a link to maternal nutrition. *International Journal of Gynecology & Obstetrics*, 115(1):S6–S10.

Bagheri, A., Dorosty, H., Sadrzadeh-Yeganeh, M., Eshraghian, E., Amiri, N., Khamoush-Cheshm, E. (2013). Pre-pregnancy body size dissatisfaction and excessive gestational weight gain. *Journal of Maternal & Child Health*, 17(4), 699-707.

Bandura, A. (1977). 'Self-efficacy: toward a unifying theory of behavioural change'. *Psychological Review*, 84(2), 191–215.

Bandura, A. (2004). Self-efficacy. In N. B. Anderson (Ed.) *Encyclopedia of health & behaviour*. Vol. 2, pp. 708-714. Thousand Oaks: Sage Publications. London.

- Banik, B.J. (1993). Applying triangulation in nursing research. *Applied Nursing Research*, 6(1), 47-52.
- Banks, J., Shield, J.P.H., & Sharp, D. (2011). Barriers engaging families and GPs in childhood weight management schemes. *The British Journal of General Practice*, 61(589), 492-497.
- Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2003). Are current health behavioral change models helpful in guiding prevention of weight gain efforts? *Obesity Research*, 11, 23S-43S.
- Bazian Ltd, Johnson L, Sebire S. (2014). *Maintaining a healthy weight and preventing excess weight gain in children and adults – partial update of CG43. Evidence review 1: An evidence review of modifiable diet and physical activity components, and associated behaviours*. Centre for Public Health at NICE.
- Bazian Ltd, Johnson L, Sebire S. (2014). *Maintaining a healthy weight and preventing excess weight gain in children and adults – partial update of CG43. Evidence review 2: Qualitative evidence review of the most acceptable ways to communicate information about individually modifiable behaviours to help maintain a healthy weight or prevent excess weight gain*. Centre for Public Health at NICE.
- Beck, C.T. (2001). Predictors of postpartum depression: an update. *Nursing Research*, 50(5), 275-285.
- Becker, M.H. (ed) (1974). *The Health Belief Model and Personal Health Behavior*. Thorofare, NJ: Charles B. Slack.

- Bellamy, L., Casas, J.P., Hingorani, A.D., Williams, D. (2009). Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. *Lancet*, 373(9677), 1773-1779.
- Bick, D. (2015). The challenge of obesity during pregnancy: When to intervene and what could work? *Midwifery*, 31, 655-656.
- Birdsall, K.M., Vyas, S., Khazaezadeh, N., Oteng-Ntim, E. (2009). Maternal obesity: a review of interventions. *International Journal of Clinical Practice*, 63, 494-507.
- Bodnar, L.M., Wisner, K.L., Moses-Kolko, E., Sit, D.Y., Hanusa, B.H. (2009). Prepregnancy body mass index, gestational weight gain, and the likelihood of major depressive disorder during pregnancy. *Journal of Clinical Psychiatry*, 70(9), 1290-1296.
- Booth, H.P., Prevost, A.T., Gulliford, M.C. (2013). Impact of body mass index on prevalence of multimorbidity in primary care: cohort study. *Family Practice*, 31(1), 38-43.
- Brannen, J. (2009). Prologue: mixed methods for novice researchers: reflections and themes. *International Journal of Multiple Research Approaches*, 3(1), 8-12.
- Braun, V. and Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- British Psychological Society (2010). *Code of Human Research Ethics*. London.
- British Psychological Society (2009). *Code of Ethics and Conduct*. London.

Brookfield, S. (1986). *Understanding and Facilitating Adult Learning*. Milton Keynes, Open University.

Brown, A. & Avery, A. (2012). Healthy weight management during pregnancy: What advice and information is being provided. *J Human Nutr Diet*, 25(4), 378-387.

Brown, W., Hockey, R., Dobson, A. (2010). Effects of having a baby on weight gain. *Am J Prev Med*, 38(2), 163-70.

Brown, M.J., Sinclair, M., Liddle, D., Hill, A.J., Madden, E., Stockdale, J. (2012). A systematic review investigating healthy lifestyle interventions incorporating goal setting strategies for preventing excess gestational weight gain. *PLoS One*. 2012, 7(7): e39503-10.1371.

Brown, I., & Thompson, J. (2007). Primary care nurses' attitudes, beliefs and own body size in relation to obesity management. *Journal of Advanced Nursing*, 60, 535–543.

Brownfoot, F.C., Davey, M.A., Kornman, L. (2016). Women's opinions on being weighed at routine antenatal visits. *BJOG: An International Journal of Obstetrics and Gynaecology*, 123, 263-270.

Burke, L.E., Wang, J., Sevvick, M.A. (2011). Self-monitoring in weight loss: a systematic review of the literature. *J Am Diet Assoc*, 111, 92–102.

Burrell, G., & Morgan, G. (1979). *Sociological paradigms and organizational analysis*. London: Heinemann.

Butryn, M.L., Phelan, S., Hill, J.O., Wing, R.R. (2007). Consistent self- monitoring

of weight: a key component of successful weight loss maintenance. *Obesity*, 15(12), 3091-6. DOI: 10.1038/oby.2007.368.

Byrne, S.M. (2002). Psychological aspects of weight maintenance and relapse in obesity. *Journal of Psychosomatic Research*, 53(5), 1029-36.

Campbell, F., Johnson M., Messina, J., Guillaume, L., Goyder, E. (2011). Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data. *BMC Public Health*, 11, 491-504.

Cane, J., O'Connor, D., Michie, S. (2012). Validation of the theoretical domains framework in behaviour change and implementation research. *Implementation Science*, 24(7), 34. DOI: 10.1186/1748-5908-7-37.

Carey, M.A. & Smith, M.W. (1992). Enhancement of validity through qualitative research approaches: incorporating the patient's perspective. *Evaluation and the Health Professionals*, 15(4), 107-114.

Carr, S. (2015). Obesity and pregnancy: overcoming the communication barriers. *NCT Preparing Parent for Birth and Early Parenthood*, 27, 13-15.

Catalano, P.M., & Ehrenberg, H.M. (2006). The short- and long-term implications of maternal obesity on the mother and her offspring. *BJOG: An International Journal of Obstetrics and Gynaecology*, 113(10), 1126-1133.

Cavaye, A. L. M. (1996). Case study research: A multi-faceted research approach for IS. *Information Systems Journal*, 6, 227-242.

Cedergren, M.I. (2004). Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstetric and Gynecology*, 103(2), 219-224.

Centre for Maternal and Child Enquiries. (2010). *Maternal Obesity in the UK: Findings from a National Project*. CMACE, London.

Centre for Maternal and Child Enquiries/Royal College of Obstetricians and Gynaecologists, Joint Guideline. (2010). *Management of Women with Obesity in Pregnancy*. CMACE/RCOG, London.

Cerhan, J.R., Moore, S.C., Jacobs, E.J., Kitahara, C.M., Rosenberg, P.S. et al. (2014). A Pooled Analysis of Waist Circumference and Mortality in 650,000 adults. *Mayo Clinic Proceedings*, 89(3), 335-345.

Chang, T., Llanes, M, Gold, K.J., & Fetters, M. (2013). Perspective about and approaches to weight gain in pregnancy: a qualitative study of physicians and nurse midwives. *BMC Pregnancy and Childbirth*, 13(47), 1-7.

Choo, E.K., Garro, A., Ranney, M.L., Meisel, Z., Morrow-Guthrie, K. (2015). Qualitative Research in Emergency Care Part 1: Research Principles and Common Applications. *Academy of Emergency Medicine*, 22(9), 1096-1102.

Chu, S.Y., Bachman, D.J., Callaghan, W.M., Whitlock, E.P., Dietz, P.M., Berg, C.J. (2008). Association between obesity during pregnancy and increased use of health care. *The New England Journal of Medicine*, 358, 1444-1453.

Clarke, P.E., Gross, H. (2004). Women's behaviour, beliefs and information sources about physical activity in pregnancy. *Midwifery*, 20, 133–141.

Coll, R. K., & Chapman, R. (2000). Choices of methodology for cooperative education researchers. *Asia-Pacific Journal of Cooperative Education*, 1, 1-8.

Council for International Organisation of Medical Sciences. (2002). *International Ethical Guidelines for Biomedical Research involving Human Subjects*. Geneva: CIOMS.

Cousins, C. (2002). Getting to the “truth”: Issues in contemporary qualitative research. *Australian Journal of Adult Learning*, 42, 192-204.

Creswell, J. W. (2009) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches (3rd edition)*. Sage: London.

Creswell, J. W., & Plano-Clark, V. (2007) *Designing and Conducting Mixed Methods Research*. Sage: London.

Crotty, M. (1998) *The Foundations of Social Research: Meaning and Perspective in the Research Process*, London: Sage Publications.

Crozier, S., Robinson, S., Godfrey, K., Cooper, C., Inskip, H. (2009). Women's dietary patterns change little from before to during pregnancy. *The Journal of Nutrition*, 34(6), 1956–1963.

Cun, S.Y., Callaghan, W.M., Bish, C.L., & D’Angelo, D. (2009). Gestational weight gain by body mass index among US women delivering live births, 2004-2005: Fuelling future obesity. *American Journal of Obstetric Gynaecology*, 200, 271-277.

Curioni, C.C. & Lourenco, P.M. (2005). Long-term weight loser diet and exercise: a systematic review. *International Journal of Obesity*, 29, 1168-74.

- Currie, S., Sinclair, M., Murphy, H., Madden, E., Dunwoody, L. & Liddle, D. (2013). Reducing the decline in physical activity during pregnancy: a systematic review of behaviour change interventions. *PLoS ONE*, 8(6), 45-56.
- Cutrona, C.E., Russell, D.W., & Gardner, K.A. (2005). The relationship enhancement model of social support. In: Kayser K, Bodemann G, Revenson TA, editors. *Couples Coping with Stress: Emerging Perspectives on Dyadic Coping*. Washington, DC: APA 73–95.
- Daley, A.J., Jolly, K., Jebb, S.A., Roalfe, A.K., Mackillop, L., Lewis, A.L., Clifford, S., Kenyon, S., MacArthur, C., Aveyard, P. (2016). Effectiveness of regular weighing, weight target setting and feedback by community midwives within routine antenatal care in preventing excessive gestational weight gain: randomised controlled trial. *BMC Obesity*, 3(7). DOI: 10.1186/s40608-016-0086-4
- Davies, S.C. (2014). *Annual report of the chief medical officer 2012. Surveillance volume: on the state of the public's health*. Department of Health.
- Davis, P., Campbell, R., Hildon, Z., Hobbs, L., Michie, S. (2015). Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health Psychology Review*, 9(3), 323-344.
- Davies, P., Walker, A.E., Grimshaw, J.M. (2010). A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implementation Science*, 5, 14. DOI: org/10.1186/1748-5908-5-14.

Dawes, M., Grudzinskas, J. (1991). Repeated measurement of maternal weight during pregnancy. Is this a useful practice? *BJOG: An International Journal of Obstetrics Gynaecology*, 98, 189-194.

Dencker, A., Premberg, A., Olander, E.K., McCourt, C., Haby, K., Dencker, S., Glantz, A., Berg, M (2016). Adopting a healthy lifestyle when pregnant and obese- an interview study three years after childbirth. *BMC Pregnancy and Childbirth*, 16, 201. DOI:10.1186/s12884-016-0969-x.

Denzin, N.K. (1987). *The research act: A theoretical introduction to sociological methods* (2nd ed.). New York: McGraw-Hill.

Denzin, N. K. (2012). Triangulation 2.0. *Journal of Mixed methods Research*, 6, 80-88.

Department of Health (2010). *Change4Life: One Year On*. Department of Health. London.

Dewey, J. (1933). *How we think*. In J. Boydston (Ed.), *The Middle works of John Dewey, 1899-1924* (Vol. 11, pp. 105-353). Carbondale: Southern Illinois University Press.

DiPetro, J.A., Millet, S., Costigan, K.A., Gurewitsch, E., Caulfield, L.E. (2003). Psychosocial influences on weight gain attitudes and behaviours during pregnancy. *Journal of American Dietetic Association*, 103(10), 1314-1319.

Dobbs, R., Sawers, C., Thompson, F., Manyika, J., Woetzel, J. et al. (2014). *Overcoming Obesity: An initial economic analysis*. McKinsey Global Institute.

Dodd, J.M., Grivell, R.M., Crowther, C.A., Robinson, J.S. (2010). Antenatal interventions for overweight or obese pregnant women: a systematic review of randomised trials. *BJOG*, 117, 1316-1326.

Dombrowski, S.U., Sniehotta, F.F., Avenell, A., Johnston, M., MacLennan, G. & Araujo-Soares, V. (2012). Identifying active ingredients in complex behavioural interventions for obese adults with obesity-related co-morbidities or additional risk factors for co-morbidities: a systematic review. *Health Psychology Review*, 6(1), 7-32.

Downs, D.S. & Ulbrecht, J.S. (2006). Understanding exercise beliefs and behaviours in women with gestational diabetes mellitus. *Diabetes Care*, 29(2), 236-240.

Draycott, T., Lewis, G., & Stevens, I. (2011). Executive Summary. Centre for Maternal and Child Enquiries (CMACE), *BJOG*, 118(1), e12-e21.

Duncombe, D., Wertheim, E.H., Skouteris, H., Paxton, S.J., Kelly, L. (2009). Factors related to exercise over the course of pregnancy including women's beliefs about the safety of exercise in pregnancy. *Midwifery*, 25, 430-438.

Duthie, E.A., Drew, E.M., Flynn, K.E. (2013) Patient-Provider Communication about Gestational Weight Gain among Nulliparous Women: A Qualitative Study of the View of Obstetricians and First-Time Pregnant Women. *BMC Pregnancy and Childbirth*, 13, 231-240.

Dzurec, L.C., & Abraham, I.L. (1993). The nature of inquiry: Linking quantitative and qualitative research. *Advances in Nursing Science*, 16(1), 73-79.

Egger, G., Swinburn, B. (1997). An “ecological” approach to the obesity pandemic. *BMJ (Clinical Research Ed.)* 315(7106), 477-480.

Elfhag, K., & Rossner, S. (2005). Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obesity Reviews*, 6(1), 67-85.

Ellison, G.T.H., & Holliday, M. (1997). The use of maternal weight measurements during antenatal care. A national survey of midwifery practice throughout the United Kingdom. *Journal of Evaluation in Clinical Practice*, 3(4), 303-317.

Elmore, P. B., & Woehlke, P. L. (1998). Statistical methods employed in *American Educational Researcher* and *Review of Educational Research* from 1978 to 1987. *Educational Researcher*, 17(9), 19–20.

Elo, S. & Kyngas, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62, 107-116.

Erzerberger, C. & Prein, G. (1997). Triangulation: Validity and empirically based hypothesis construction. *Quality and Quantity*, 31, 141-154.

Fairburn, C. G & Welch, (1990). The impact of pregnancy on eating habits and attitudes to shape and weight. *Int J Eat Disord*, 9, 160-168.

Farmer, T., Robinson, K., Elliott, S., & Eyles, J. (2006). Developing and Implementing a Triangulation Protocol for Health Research. *Qualitative Health Research*, 16(3), 377-394.

Fealy, S.M., Taylor, R.M., Foureur, M., Attia, J., Ebert, L., Bisquera, A., Hure, A.J. (2017). Weighing as a stand-alone intervention does not reduce excessive gestational weight gain compared to routine antenatal care: a systematic review and meta-analysis of randomised controlled trials. *BMC Pregnancy and Childbirth*, 17, 36. DOI: 10.1186/s12884-016-1207-2

Feilzer, M.Y. (2010). Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, 4(1), 6-16.

Fielding, N.G., & Fielding, J.L. (1986). *Linking data*. Beverly Hills, CA: Sage.

Fitzsimons, K.J., Modder, J., Green, I. (2009). Obesity in pregnancy: risks and management. *Obstetric Medicine*, 2(2), 52-62.

Flegal, K.M., Kit, B.K., Orpana, H., Graubard, B.I. (2013). Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. *JAMA*, 309(1), 71-82.

Foss, C., & Ellefsen, B. (2002). The value of combining qualitative and quantitative approaches in nursing research by means of method triangulation. *Journal of Advanced Nursing*, 40(2), 242-248.

Fox, P., & Yamaguchi, C. (1997). Body image change in pregnancy: a comparison of normal weight and overweight primigravidas. *Birth: Issues in Perinatal Care*, 24(1), 35-40.

French, D.P., Cameron, E., Benton, J.S., Deaton, C., Harvie, M. (2017). Can communicating personalised disease risk promote behaviour change? A systematic review of systematic reviews. *Annals of Behavioral Medicine*, 1-12.

French, S.D., Green, S.E., O'Connor, D.A. McKenzie, J. E., Francis, J.J. et al (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implementation Science*, 7, 38. DOI: 10.1186/1748-5908-7-38.

Furber, C.M., & McGowan, L. (2010). A qualitative study of the experiences of women who are obese and pregnant in the UK. *Midwifery*, 27(4), 437-444.

Furness, P.J., Arden, M.A., Duxbury, A. M.S., Hampshaw, S.M., Wardle, C., Soltani, H. (2015). Talking about weight in pregnancy: an exploration of practitioners' and women's perceptions. *Journal of Nursing Education and Practice*, 5, 89-102.

Galtier-Dereure, F., Boegner, C., Bringer, J. (2000). Obesity and pregnancy: complications and cost. *American Journal of Clinical Nutrition*, 71, 1242S-8S.

Geense W, van de Glind I, Visscher T, van Achterberg, T. (2013). Barriers, facilitators and attitudes influencing health promotion activities in general practice: an explorative pilot study. *BMC Family Practice*, 14, 20. DOI: 10.1186/1471-2296-14-20.

Gibbs, A. (1997). Focus Groups. *Social Research Update*, Issue 19.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, 11, 87-98.

Goodrich, K., Cregger, M., Wilcox, S., & Liu, J. (2013). A Qualitative Study of Factors Affecting Pregnancy Weight Gain in African American Women. *Matern Child Health J*, 17, 432-440.

Gray, C., Hunt, K., Lorimer, K., Anderson, A., Benzeval, M., Wyke, S. (2011). Words matter: a qualitative investigation of which weight status terms are acceptable and motivate weight loss when used by health professionals. *BMC Public Health*. 2011, 11: 513-10.

Greaves, C.J., Sheppard, K.E., Abraham, C., Hardeman, W., Roden, M., Evans, P.H., Schwarz, P. (2011). Systematic reviews of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. *BMC Public Health*, 18(11), 119. DOI: 10.1186/1471-2458-11-119.

Green, J. & Thorogood, N. (2010). Analysing qualitative data. In Silverman D (ed.). *Qualitative Methods for Health Research* (1st edn). London: Sage Publications, 173-200.

Greene, J.C. (2007). *Mixed methods in social inquiry*. San Francisco, CA: John Wiley & Sons.

Gross, H., & Bee, P.E. (2004). Perceptions of effective advice in pregnancy - The case of activity. *Clinical Effectiveness in Nursing*, 8, 161–169.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage.

Guelinckx, I., Devlieger, R., Mullie, P., Vansant, G. (2010). Effect of lifestyle intervention on dietary habits, physical activity, and gestational weight gain in obese pregnant women: a randomized controlled trial. *American Journal of Clinical Nutrition*, 91(2), 373–380.

Hardeman, W., Johnston, M., Johnston, D. W., Bonetti, D., Wareham, N. J., & Kinmonth, A. L. (2002). Application of the Theory of Planned Behaviour in behaviour change interventions: A systematic review. *Psychology & Health*, 17(2), 123-158.

Hastings, G., Stead, M. & Webb, J. (2004). Fear appeals in social marketing: Strategic and ethical reasons for concern. *Psychology and Marketing* 21(11), 961-986.

Hausenblas, H. A., Carron, A. V., & Mack, D.E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport & Exercise Psychology*, 19(1), 36-51.

Health and Social Care Information Centre (2012). *Health Survey for England 2012: trend tables*. London.

Health and Social Care Information Centre (2014). *Quality and Outcomes Framework – Prevalence, Achievements and Exceptions Report, England 2013-14*. London.

Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. *Qualitative Market Research – An International Journal*, 3(3), 118-126.

Herring, S., Oken, E., Haines, J., Rich-Edwards, J.W., Rifas-Sherman, S.L. (2008).

Misperceived pre-pregnancy body weight status predicts excessive gestational weight gain: findings from a US cohort study. *BMC Pregnancy Childbirth*, 8, 54.

DOI: 10.1186/1471-2393-8-54.

Herring, S., Platek, D., Elliott, P., Riley, L.E., Stubb, E.A. et al. (2010). Addressing

obesity in pregnancy: what do obstetric providers recommend? *Women's Health*,

19(1), 65-60.

Heslehurst, N. & Brown, A. (2013). *Managing obesity in pregnant women: an*

online guide for professionals. Tommy's Charity. London.

Heslehurst, N., Newham, J., Maniatopoulos, G., Fleetwood, C., Robalino, S., Rankin

, J. (2014). Implementation of pregnancy weight management and obesity

guidelines: a meta-synthesis of healthcare professionals' barriers and facilitators

using the Theoretical Domains Framework. *Obesity Review*, 358, 462-86.

Heslehurst, N., Rankin, J., Wilkinson, J.K., Summerbell, C.D. (2010). A nationally

representative study of maternal obesity in England, UK: trends in incidence and

demographic inequalities in 619 323 births, 1989-2007. *International Journal of*

Obesity, 34, 420-428.

Heslehurst N., Rankin, J., Wilkinson, J.K., Summerbell, C.D. (2007). Trends in

maternal obesity incidence rates, demographic predictors, and health inequalities in

36 821 women over a 15-year period. *BJOG An International Journal of Obstetrics*

& Gynaecology, 114(2), 187-194.

Heslehurst, N., Russell, S., McCormack, S., Sedgewick, G., Bell, R. and Rankin, J. (2012). Midwives perspectives of their training and education requirements in maternal obesity: A qualitative study. *Midwifery*, 29(7), 736-744.

Hill B, Skouteris H, Fuller-Tyszkiewicz, M. (2013). Interventions designed to limit gestational weight gain: a systematic review of theory and meta-analysis of intervention components. *Obesity Review*, 14(6), 435-50.

Hinton, P.S., & Olson, C.M. (2001). Predictors of Pregnancy-Associated Change in Physical Activity in Rural White Population. *Maternal and Child Health Journal*, 5(1), 7-14.

Hoppe, R., and Ogden, J. (1997) Practice nurses' beliefs about obesity and weight related interventions in primary care. *International Journal of Obesity*, 21, 141-146.

Huang, T.T., Yeh, C.Y., Tsai, Y.C. (2011). A diet and physical activity intervention for preventing weight retention among Taiwanese childbearing women: a randomised controlled trial. *Midwifery*, 7(2), 257-64. DOI: 10.1016/j.midw.2009.06.009.

Hui, A.L., Ludwig, S.M., Gardiner, P., Sevenhuysen, G., Murray, R., Morris, M. et al. Community-based exercise and dietary intervention during pregnancy: a pilot study. *Canadian Journal of Diabetes*, 30, 169–175.

Huijg, J.M., Gebhardt, W.A., Crone, M.R., Dusseldorp, E., Pesseau, J. (2014). Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research. *Implementation Science*, 9. DOI: 10.1186/1748-5908-9-11.

Institute of Medicine (2009). *Weight Gain During Pregnancy: Reexamining the Guidelines*. Institute of Medicine.

Jackson, R.A., Stotland, N.E., Caughey, A.B., Gerbert, B. (2011). Improving diet and exercise in pregnancy with Video Doctor counseling: a randomized trial. 2011. *Patient Educ Couns*, 83(3), 203-9.

Jackson, T. (2005). *Motivating Sustainable Consumption: a review of evidence on consumer behaviour and behavioural change*. Sustainable Development Research Network.

Jelsma, J.G.M., van Leeuwen, K.M., Oostdam, N., Bunn, C., & Simmons, D. (2016). Beliefs, barriers and preferences of European overweight women to adopt a healthier lifestyle in pregnancy to minimise risk of developing gestational diabetes mellitus: an explorative study. *Journal of Pregnancy*, 11. DOI: 10.1155/2016/3435791.

Jewell, K., Avery, A., Barber, J., Simpson, D.S. (2014). The healthy eating and lifestyle in pregnancy (HELP) feasibility study. *Br J Midwifery*, 22(10), 727–36.

Johnson, S., Burrows, A., Williamson, I. (2004). 'Does my bump look big in this'? The meaning of bodily changes for first-time mothers-to-be. *Journal of Health Psychology*, 9, 361–374.

Johnson, R.K., Appel, L.J., Brands, M., Howard, B.V., Lefevre, M. et al. (2009). Dietary Sugars Intake and Cardiovascular Health: A Scientific Statement From the American Heart Association. *Circulation*, 120, 1011-1020.

Johnson, R.B., & Onquegbuzie, A.J. (2004). Mixed methods research: a paradigm whose time has come. *Educational Researcher*, 33(7), 14-26.

Jones, C.J., Smith, H., Llewellyn, C. (2014). *Evaluating the effectiveness of health belief model interventions in improving adherence: a systematic review. Health Psychology Review*, 8(3). 253-269

Kagan K.O., & Kuhn, U. (2004). Sports & Pregnancy. *Herz*, 29(4), 426-434.

Kanagalingam, M.G., Forouhi, N.G., Greer, I.A., Sattar, N. (2005). Changes in booking body mass index over a decade: retrospective analysis from a Glasgow Maternity Hospital. *Br J Obstet Gynaecol*, 112, 1431–33.

Kanfer F.H. (1986). *Implications of a self-model of therapy for treatment of addictive behaviors*. W.R. Miller, N. Heather (Eds.), *Treating addictive behaviors: Processes of change*. Plenum, New York.

King, K., Meader, N., Wright, K., Graham, H., Power, C. et al. (2015). Characteristics of interventions targeting multiple lifestyle risk behaviours in adult population: a scoping review. *PLoS ONE* 10(1): e0117015.
DOI:10.1371/journal.pone.0117015.

Kirschenbaum, D.S. (1987). Self-regulatory failure: A review with clinical implications. *Clinical Psychology Review*, 7, 77-104.

Knafl, K.A., & Brietmayer, B.J. (1991). *Triangulation in qualitative research: Issues of conceptual clarity and purpose*. In J.M. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue* (pp. 226-239). Newbury Park, CA: Sage.

Knowler, W.C., Fowler, S.E., Hamman, R.F., Christophi, C.A., Hoffman, H.J. et al. (2009). 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet*, 374, 1677–1686.

Kosnik, L.R.D. (2007). Refusing to budge: a confirmatory bias in decision making? *Mind & Society*, 7(2), 193-214.

Kraschnewski, J.L., Chuang, C.H., Symons Downs, D., Weisman, C.S., Camant, E.L., Baptiste-Roberts, K., Zhu, J. (2013). Association of prenatal physical activity and gestational weight gain: results from the First Baby Study. *Women's Health Issues*, 23(4), 233-238.

Krauss, S.E. (2005). Research paradigms and meaning making: A primer. *The Qualitative Report*, 10(4), 758-770.

Kuhn, T. S. (1996). *The Structure of Scientific Revolutions (3rd ed)*. University of Chicago Press: London

Landis, J.R., & Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159–74.

Lain, K.Y., & Catalano, P.M. (2006). Factors that affect maternal insulin resistance and modify fetal growth and body composition. *Metab Syndr Relat Disord*, 4, 91–100.

Laitinen, J., Jaaskelainen, A., Hartikainen, A.L. (2013). Maternal weight gain during the first half of pregnancy and offspring obesity at 16 years: a prospective cohort study. *BJOG*, 119, 716-723.

Lang, E. V. (2012). A better patient experience through communication. *Journal of Radiology Nursing*, 31(4), 114-119.

Langley-Evans, S. & Swift, J.A. (2015). Obesity and Pregnancy: Overcoming the Communication Barriers. *NCT Journal*, 27, 14-15.

Laraia, B., Messer, L.C., Evenson, K. (2007). Neighborhood factors associated with physical activity and adequacy of weight gain during pregnancy. *J Urban Health*, 84(6), 793–806.

Laraia, B.A., Siega-Riz, A.M., Kaufman, J.S., Jones, S.J. (2004). Proximity of supermarkets is positively associated with diet quality index for pregnancy. *Prev Med* 39(5),869–875.

Lashen, H., Fear, K., Sturdee, D.W. (2004). Obesity is associated with increased risk of first trimester and recurrent miscarriage: matched case-control study. *Human Reproduction*, 19, 1644-6.

Lavender, T., Bennett, N., Blundell, J., Malpass, L. (2001). Redefining the midwifery role: midwives views on health promotion. *British Journal of Midwifery*, 9, 666–670.

Lefcourt, L.A., Rodis, J.F. (1996). Obstructive sleep apnea in pregnancy. *Obstetrical and Gynecological Survey*, 51, 503-506.

Leiferman, J.A., Gutilla, M.J., Nicklas, J.M., Paulson, J. (2016). Effects of online training on antenatal physical activity counselling. *American Journal of Lifestyle Medicine*. DOI: 10.1177/1559827616639023

Leiferman, J.A., Sinatra, E., Huberty, J. (2014). Pregnant women's perceptions of patient-provider communication for health behaviour change during pregnancy. *Open Journal of Obstetrics and Gynaecology*, 4, 672-684.

Leiferman, J.A., Swibas, T., Koiness, K., Marshall, J.A., Dunn, A.L. (2011). My baby, my move: examination of perceived barriers and motivating factors related to antenatal physical activity. *J Midwifery Women's Health*, 56, 33-40.

Levy, V. (1999). Maintaining equilibrium: a grounded theory study of the processes involved when women make informed choices during pregnancy. *Midwifery*, 15, 109–119. DOI: 10.1016/S0266-6138(99)90007-4.

Lewis, G. (2007). *The Confidential Enquiry into Maternal and Child Death (CEMACH). Saving Mothers' Lives: Reviewing Maternal Deaths to Make Motherhood Safer- 2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom*. CEMACH, London.

Lewis, B., & Ridge, D. (2005). Mothers reframing physical activity: Family oriented politicisation, transgression and contested expertise in Australia. *Social Science & Medicine*, 60(10), 2295–2306.

Li, G., Zhang, P., Wang, J., Gregg, E.W., Yang, W., et al., (2008) The long-term effect of lifestyle interventions to prevent diabetes in the China DaQing Diabetes Prevention Study: a 20-year follow-up study. *Lancet*, 37, 1783–1789.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Lindstrom, J., Peltonen, M., Eriksson, J.G., Ilanne-Parikka, P., Aunola, S., Keinänen-Kiukaanniemi, S., et al. (2013). Finnish Diabetes Prevention: Improved lifestyle and decreased diabetes risk over 13 years: long-term follow-up of the randomised Finnish Diabetes Prevention Study (DPS). *Diabetologia*, 56, 284-93.

Linne, Y., Dye, L., Barkeling, B., Rossner, S. (2004). Long-term weight development in women: a 15-year follow-up of the effects of pregnancy. *Obesity Research*, 12, 1166-1178.

Livesey, C. (2006). The Relationship between Positivism, Interpretivism and sociological research methods. AS Sociology. Available: <http://www.sociology.org.uk/notes/revgrm5.pdf>. Accessed September 2016.

Livingstone, M.B.E., Prentice, A.M., Coward, W.A., Black, A.E., Barker, M.E., McKenna, P.G., Whitehead, R.G. (1990). Accuracy of weighed dietary records in studies of diet and health. *British Medical Journal*, 300, 708-712.

Loth, K.A., Bauer, K.W., Wall, M., Berge, J., Neumark-Sztainer, D. (2011). Body satisfaction during pregnancy. *Body Image*, 8(3), 297-300.

- Luppino, F.S., de Wit, L.M., Bouvy, P.F., Stijnen, T., Cuijpers, P., Penninx, B.W.J.H., Zitman, F.G. (2010). Overweight, Obesity, and Depression: A Systematic Review and Meta-analysis of Longitudinal Studies. *Archive of General Psychiatry*, 67(3), 220–229.
- Lykouras, L., & Michopoulos, J. (2011). Anxiety disorder and obesity. *Psychiatriki*, 22(4), 307-313.
- Lythcott, J., & Duschl, R. (1990). Qualitative research: From methods to conclusions. *Science Education*, 74, 449-460.
- Macleod, M., Gregor, A., Barnett, C., Magee, E., Thompson, J & Anderson, A.S. (2013). Provision of weight management advice for obese women during pregnancy: a survey of current practice and midwives' views on future approaches. *Maternal and Child Nutrition*, 9(4), 467-472.
- Mamun, A.A., Kinarivala, M., O'Callaghan, M.J., Williams, G.M., Najman, J.M Callway, L.K. (2010). Associations of excess weight gain during pregnancy with long-term maternal overweight and obesity: evidence from 21 y postpartum follow-up. *American Journal of Clinical Nutrition*, 91(5), 1336-41.
- Mandal, J., Acharya, S., Parija, S.C. (2011). Ethics in Human Research. *Trop Parasitol*, 1, 2-3.
- Martin, L., McNamara, M., Milot, A., Halle, T., Hair, E. (2007). The effects of father involvement during pregnancy on receipt of prenatal care and maternal smoking. *Maternal Child Health J*, 11(6), 595-602.

- Mathieu, J.E., Tannenbaum, S.I., Salas, E. (1992). Influences of Individual and Situational Characteristics on Measures of Training Effectiveness. *Acad Manage J*, 35(4), 828- 847.
- Maxwell, J.A. (2002). *Understanding and validity in qualitative research*. In: Huberman, A.M., Miles, M.B. (Eds.). *The qualitative researcher's companion*. Sage. London.
- Mays, N., & Pope, C. (2000). Assessing quality in qualitative research. *British Medical Journal*, 320(7226), 50-52.
- McAlpine D, Wilson A. (2007). Trends in obesity related counseling in primary care: 1995– 2004. *Med Care*, 45(4), 322–329.
- McCourt, C. (2006) Supporting choice and control? Communication and interaction between midwives and women at the antenatal booking visit. *Social Science and Medicine* 62(6), 1307-1318.
- McNeill, J., Doran, J., Lynn, F., Anderson, G., Alderdice F. (2012). Public health education for midwives and midwifery students: mixed method study. *Pregnancy and Childbirth*, 12, 142.
- McPhie, S., Skouteris, H., Fuller-Tyszkiewicz, M., Hill, B., Jacka, F. et al. (2015). Relationship between mental health symptoms and body mass index in women with and without excessive gestational weight gain during pregnancy. *Midwifery*, 31, 138-146.

Medical Research Council. (2008). Developing and Evaluating Complex Interventions: New Guidance. London.

Melzer K, and Schutz, Y. (2010). Pre-pregnancy and pregnancy predictors of obesity. *International Journal of Obesity*, 34(2), S44-S52.

Michie, S. (2007). Talking to primary care patients about weight: A study of GPs and practice nurses in the UK. *Psychology, Health & Medicine*, 12(5), 521-525.

Michie, S., Abraham, C., Whittington, C., McAteer, J., Gupta, S. (2009). Effective techniques in healthy eating and physical activity interventions: A metaregression. *Health Psychology*, 28(6), 690-701.

Michie, S., Ashford, S., Sniehotta, F., Dombrowski, S.U., Bishop, A. & French, D.P. (2011). A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviour: the CALO-RE taxonomy. *Psychology & Health*, 26(11), 1479-1498.

Michie, S., Jochelson, K., Markham, W.A., Bridle, C. (2009). Low-income groups and behaviour change interventions: A review of intervention content, effectiveness and theoretical frameworks. *Journal of Epidemiology and Community Health*, 63(8), 610-622.

Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., Walker, A. (2005). Making psychological theory useful for implementing evidence based practice: a consensus approach. *BMJ Quality & Safety*, 14, 26-33.

Michie, S., Richardson, M., Johnston, Abraham, C., Francis, J. et al., (2013). The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques:

building an international consensus for the reporting of behaviour change techniques. *Annals of Behavioural Medicine*, 46(1), 81-95.

Michie, S., van Stralen, M.M., West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, 23(6), 42. DOI: 10.1186/1748-5908-6-42.

Michie, S., West, R., Campbell, R., Brown, J., Gainforth, H. (2014). *ABC of Behaviour Change Theories*. London: Silverback Publishing.

Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis* (2nd edn.). Thousand Oaks, CA. Sage Publications.

Milgrom, J., Gemmill, A.W., Bilszta, J.L., Hayes, B., Barnett, B., Brooks, J., Ericksen, J., Ellwood, D., Buist, A. (2008). Antenatal risk factors for postnatal depression: A large prospective study. *Journal of Affective Disorders*, 108(1-2), 147-157.

Miller, W.R., & Brown, J.M. (1991). *Self-regulation as a conceptual basis for the prevention and treatment of addictive behaviors*. In: Heather N, Miller WR, Greely J, editors. *Self-control and the addictive behaviours*. Sydney: Maxwell Macmillan; pp. 3–79.

Mills, A., Schmied, V.A., Dahlen, H.G. (2013). 'Get alongside us', women's experiences of being overweight and pregnant in Sydney, Australia. *Maternal and Child Nutrition*, 9, 309–321.

Mitchell, E.S. (1986). Multiple triangulation: A methodology for nursing science. *Advances in Nursing Science*, 8(3), 18-26.

- Moore, P.M., Rivera Mercado, S., Grez Artigues, M., Lawrie, T.A. (2013). Communication skills training for healthcare professionals working with people who have cancer. *Cochrane Database of Systematic Reviews* 28(3). DOI: 10.1002/14651858.CD003751.pub3.
- Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative quantitative methods. *Journal of Mixed Methods Research*, 1(1), 48 –76.
- Morgan, D.L. (1993). Qualitative content analysis: a guide to paths not taken. *Qualitative Health Research*, 3, 112-121. Morse, J.M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, 40(2), 120-123.
- Morgan, D.L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20(8), 1045-1053.
- Morgan, K.L., Rahman, M.A., Hill, R.A., Khanom, A., Lyons, R.A. (2015). Obesity in pregnancy: infant health service utilisation and costs on the NHS. *BMJ Open*, 5, e008357. DOI: 10.1136/bmjopen-2015-008357.
- Morgan, D.L. & Spanish, M.T. (1984). Focus groups: A new tool for qualitative research. *Qualitative Sociology*, 3, 253-270.
- Morse, J.M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research*, 40(2), 120-123.
- Mortari, L. (2015). Reflectivity in Research Practice: An Overview of Different Perspectives. *International Journal of Qualitative Methods*, 10, 1-9.

Mozaffarian, D., Afshin, A., Benowitz, N.L., Bittner, V., Daniels, S.R., Franch, H.A., Jacobs Jr., D.R., Kraus, W.E., Kris-Etherton, P.M., Krummel, D.A., Popkin, B.M., Whitsel, L.P., Zakai, N.A., 2012. Population approaches to improve diet, physical activity, and smoking habits: a scientific statement from the American Heart Association. *Circulation*, 126, 1514–1563.

Murphy, E., Dingwall, R., Greatbatch, D., Parker, S., Watson, P. (1998). Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment*, 2, 1-274.

Myers, G. (1998) Displaying opinions: topics and disagreement in focus groups. *Language in Society*, 27, 85-111.

Nakkash, R., Soweid, R.A.A., Nehlawi, M.T., Shediak-Rizkallah, M.C., Hajjar, T.A., & Khogali, M. (2003). The development of a feasible community-specific cardiovascular disease prevention program: Triangulation of methods and sources. *Health Education & Behaviour*, 30(6), 723-739.

National Institute for Health and Care Excellence. (2013). *Managing overweight and obesity in adults- lifestyle weight management services*. London: England.

National Institute for Health and Care Excellence. (2011). *Obesity: identification, assessment and management*. London: England..

National Institute for Health and Care Excellence. (2015). *Preventing Excessive Weight Gain*. London: England.

National Institute for Health and Care Excellence (2017). Surveillance report: Weight management before, during and after pregnancy (2010) NICE guidelines PH27. London: England.

National Institute for Health and Care Excellence. (2010). *Weight management before, during and after pregnancy*. London: England.

National Institute for Health and Care Excellence. (2014). *Weight management: lifestyle services for overweight or obese adults*. London: England.

National Institute for Health and Clinical Excellence. (2008). *Antenatal care: Routine care for the healthy pregnant woman*. London: England.

National Institute for Health and Clinical Excellence. (2010). *Dietary interventions and physical activity interventions for weight management before, during, and after pregnancy*. London: England.

National Institute for Health and Clinical Excellence. (2010). *Pregnancy and complex social factors: a model of service provision for pregnant women with complex social factors*. London: England.

National Institute for Health and Clinical Excellence. (2010). *Weight management before, during, and after pregnancy: Costings Report*. London: England.

National Institute for Health and Clinical Excellence. (2007). *How to change practice: understand, identify and overcome barriers to change*. London, England.

National Obesity Observatory. (2009). *Body Mass Index as a Measure of Obesity*. London, England.

Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N. et al., (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*, 384(9945), 766-781.

NHS Digital (2017). National Diabetes in Pregnancy Audit Report 2016: England, Wales and the Isle of Man. London: England.

Noar, S. M., & Zimmerman, R. S. (2005). Health behavior theory and cumulative knowledge regarding health behaviors: Are we moving in the right direction? *Health Education Research*, 20, 275–290.

Nohr, E.A., Bech, B.H., Davies, M.J., Frydenberg, M., Henriksen, T.B., Olsen, J. (2005). Prepregnancy obesity and fetal death: a study within the Danish National Birth Cohort. *Obstet Gynecol*, 106(2), 250-259.

Nathalpty, F., & Rouse, D. (2004). The Impact of Obesity on Obstetrical Practice and Outcome. *Clinical Obstetrics & Gynecology*, 47(4), 898-913.

Nuthalpty, F.S., & Rouse, D. Obesity on Obsterical Practice & Outcome. *Clinical Obstetrics & Gynecology*, 47(4), 898-913.

Olander, E.K., Atkinson, L., Edmunds, J., French, D. (2011). The views of pre- and post-natal women and health professionals regarding weight gain: An exploratory study. *Sexual and Reproductive Health*, 2, 43-48.

Olander, E.K., Berg, M., McCourt, C., Carlstrom, E., Dencker, A. (2015). Person-centred care in interventions to limit weight gain in pregnant women with obesity - a systematic review. *BMC Pregnancy Childbirth*, 15, 50.

Olds, D.L., Eckenrode, J., Henderson, C.R., Kitzman, H., Powers, J. et al. (1997). Long-term effects of home visitation on maternal life course and child abuse and neglect. Fifteen-year follow-up of a randomized trial. *JAMA*, 278(8), 637-643.

Olsen, W. (2004). *Triangulation in social research: Qualitative and Quantitative Methods Can Really Be Mixed*. In Development in Sociology, M. Holborn, Ormskirk: Causeway Press.

Onwuegbuzie, A.J., & Leech, N.L. (2005). On becoming a pragmatic researcher: the importance of combining quantitative and qualitative methodologies. *International Journal of Social Research Methodology*, 8(5), 375-387.

Organisation for Economic Co-Operation and Development (2012). *Health at a Glance: Europe 2012*. London.

Oteng-Ntim, E., Varmer, R., Croker, H., Poston, L., Doyle, P. (2012). Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcomes: systematic review and meta-analysis. *BMC Medicine*, 10, 47. DOI: 10.1186/1741-7015-10-47.

Ovesen, P.G., Rasmussen, S., Kesmodel, U.S. (2011). Effect of Prepregnancy Maternal Overweight and Obesity on Pregnancy Outcome. *Obstetrics and Gynecology*, 118(2), 305-315.

Paul, K.H., Graham, M.L., Olson, C.M. (2013). The web of risk factors for excessive gestational weight gain in low income women. *J. Matern Child Health*, 17(2), 344–351.

Phelan, S., Phipps, M.G., Abrams, M., Darroch, F., Schaffner, A., & Wing, R.R. (2011). Practitioner Advice and Gestational Weight Gain. *Journal of Women's Health*, 20(4), 585-591.

Peirson, L., Douketis, J., Ciliska, D., Fitzpatrick-Lewis, D., Ali, M.U., Raina, P. (2014). Treatment for overweight and obesity in adult populations: a systematic review and meta-analysis. *CMAJ Open*, 2(4). E306-17. DOI: 10.9778/cmajo.20140012

Pereira, M.A., Rifas-Shiman, S.L., Kleinman, K.P., Rich-Edwards, J.W., Peterson, K.E. and Gillman, M.W. (2007). Predictors of Change in Physical Activity during and after Pregnancy: Project Viva. *American Journal of Preventive Medicine*, 32, 312-319.

Perugini, M. & Bagozzi, R.P. (2001). The role of desires and anticipated emotions in goal-directed behaviours: Broadening and deepening the theory of planned behaviour. *British Journal of Social Psychology*, 40, 79-98.

Petchenik, J., & Watermolen, D. J. (2011). A cautionary note on using the internet to survey recent hunter education graduates. *Human Dimensions of Wildlife*, 16(3), 216-18.

Peters, G.-J.Y., Ruiter, R.A.C. & Kok, G. (2013). Threat communication: a critical re-analysis and a revised meta-analytic test of fear appeal theory. *Health Psychology Review*, 7, S8-S31.

Pillow, W. (2003) Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research, *International Journal of Qualitative Studies in Education*, 16(2), 175-196. DOI: 10.1080/0951839032000060635

Polit, D.F. & Hungler, B.P. (1995). *Nursing research: Principles and methods* (6th ed.). Newbury Park, CA: Sage.

Polley, B.A., Wing, R.R., Sims, C.J., (2002). Randomized controlled trial to prevent excessive weight gain in pregnant women. *Int J Obes Relat Metab Disord*, 26(11), 1494-1502.

Poobalan, A.S., Aucott, L.S., Gurung, T., Smith, W.C., Bhattacharya, S. (2009). Obesity as an independent risk factor for elective and emergency caesarean delivery in nulliparous women- systematic review and meta-analysis of cohort studies. *Obesity Review*, 10(1), 28-35.

Popkin, B.M., Adair, L.S., Ng, S.W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Review*, 70(1), 3-21.

Powell, R. A., & Single, H. M. (1996). Methodology Matter- V. *International Journal for Quality in Health Care*, 8(5), 499-504.

Powell, R. A., Single, H. M., Lloyd, K. (1996). Focus groups and mental health research: enhancing the validity of existing questionnaires. *Int J Soc Psychiat*, 42, 193-206.

Pramualratana, A., Havanon, N., & Knodel, J. (1985). Exploring the normative basis for age of marriage in Thailand: An example from focus group research. *Journal of Marriage and Family*, 41, 203-210.

Puhl, R. M. and Heuer, C. A. (2009), The Stigma of Obesity: A Review and Update. *Obesity*, 17, 941–964. DOI:10.1038/oby.2008.636.

Raine, R., Cartwright, M., Richens, Y., Mahamed, Z. Smith, D. (2010). A Qualitative Study of Women's Experiences of Communication in Antenatal Care: Identifying Areas for Action. *Maternal and Child Health Journal*, 14, 590-599.

Rauff, E.L., and Downs, D. (2011). Mediating effects of body image satisfaction on exercise behaviour, depressive symptoms, and gestational weight gain in pregnancy. *Annals of Behavioural Medicine*, 42(3), 381-390.

Reyes, N.R., Klotz, A.A., Herring, S.J. (2013). A qualitative study of motivators and barriers to healthy eating in pregnancy for low-income, overweight, African-American mothers. *J Acad Nutr Diet*, 113(9), 1175-1181.

Riebl, S.K., Dunsmore, J.C., Savla, J., Frisard, M., Dietrich, A.M. (2015). A systematic literature review and meta-analysis: The Theory of Planned Behaviour's application to understand and predict nutrition-related behaviors in youth. *Eating Behaviour*, 18, 160-78.

Rifas-Shiman, S.L., Rich-Edwards, J.W., Kleinman, K.P. Oken, E., Gillman, M.W. (2009). Dietary quality during pregnancy varies by maternal characteristics in Project Viva: a US cohort. *Journal of the American Dietetic Association*, 109(6), 1004-1011.

Ritchie, J. & Lewis, J. (2003). *Qualitative Research Practice. A Guide for Social Science Students and Researchers*. London: Sage Publications.

Ritchie, J. & Spencer, L. (1994). *Qualitative data analysis for applied policy research*, in B Bryman & R Burgess (eds.), *Analyzing qualitative data*. Routledge, London and New York, pp. 173–94.

Ritchie, J., Spencer, L., O'Connor, W. (2003) 'Carrying out Qualitative Analysis' in In Jane Ritchie and Jane Lewis (eds) *Qualitative Research Practice*. Sage Publication, London, pp. 219-262.

Robertson, E., Grace, S., Wallington, T. & Stewart, D.E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiatry*, 26(4), 289-295.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *The Journal of Psychology*, 91(1), 93–114.

Rogers, R.W. (1983). *Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation*. In J. Cacioppo & R. Petty (Eds.), *Social Psychophysiology*. Guilford Press. New York.

- Romero-Corral, A., Montori, V.M., Somers, V.K., et al. (2006). Association of bodyweight with total mortality and with cardiovascular events in coronary artery disease: a systematic review of cohort studies. *Lancet*, 368(9536), 666-678.
- Rosenstock, I.M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly*, 44, 94-124.
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1994). The health belief model and HIV risk behavior change, in *Preventing AIDS: Theories and methods of behavioral interventions*, R. J. DiClemente, ed., pp. 5-24.
- Rowe, R.E., Garcia, J., McFarlane, A.J., Davidson, L.L. (2002). Improving communication between health professionals and women in maternity care: a structured review. *Health Expectations*, 5, 63-83.
- Royal College of Physicians (2013). *Action on obesity: comprehensive care for all*. London.
- Russell, S., Fyle, J., Da Costa-Fernandes, M., Stockdale, J. (2010). *A Growing Problem. Does weight matter in pregnancy?* Netmums/RCM.
- Sale, J.E.M., Lohfield, L.H. & Brazil, K. (2002). Revisiting the quantitative-qualitative debate: implications for mixed methodology research. *Quality and Quantity*, 36, 43-53.
- Sandall J, Soltani H, Gates S, Shennan A, Devane D. (2016). Midwife-led continuity models versus other models of care for childbearing women. *Cochrane Database of Systematic Reviews*, 4. DOI: 10.1002/14651858.CD004667.pub5

Sayakhot, P., & Carolan-Olah, M. (2016). Internet use by pregnant women seeking pregnancy-related information: a systematic review. *BMC Pregnancy Childbirth*, 28(16), 65. DOI: 10.1186/s12884-016-0856-5.

Schmied, V.A., Duff, M., Dahlen, H.G., Mills, A.E., Kolt, G.S. (2010) 'Not Waving but Drowning': A Study of the Experiences and Concerns of Midwives and Other Health Professionals Caring for Obese Childbearing Women', *Midwifery*, 27(4), 424-430.

Schon, D.A. (1983). *The reflective practitioner*. Temple Smith. London, England.

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology: An International Review*, 57, 1–29.

Schwingshackl, L., Dias, S., Hoffman, G. (2014). Impact of long-term lifestyle programmes on weight loss and cardiovascular risk factors in overweight/obese participants: a systematic review and network meta-analysis. *Systematic Review*, 30(3), 130. DOI: 10.1186/2046-4053-3-130.

Scott, P. J. & Briggs, J. S. (2009). A pragmatist argument for mixed methodology in medical informatics. *Journal of Mixed Methods Research*, 3(3), 223 -241.

Scott-Pillai, R., Spence, D., Cardwell, C.R., Hunter, A. & Holmes, V.A. (2013). The impact of body mass index on maternal and neonatal outcomes: a retrospective study in a UK obstetric population: 2004-2011. *BJOG*, 120, 932-939.

- Sebire, N.J., Jolly, M., & Harris, J.P. (2001). Maternal obesity and pregnancy outcome: a study of 287,213 pregnancies in London. *International Journal of Obstetric Related Metabolic Disorders*, 25, 1175-1182.
- Sechrest, L., & Sidani, S. (1995). Quantitative and qualitative methods: Is there an alternative? *Evaluation and Program Planning*, 18(1), 77-87.
- Sharp, H.O. (1943). *Photogrammetry*. (3rd ed.). New York: John Wiley.
- Shaw, K., O'Rourke, P., Del Mar, C., Kenardy, J. (2005). Psychological interventions for overweight or obesity. *Cochrane Systematic Review*, 18(2), CD003818.
- Sheeran, P. (2002). Intention–behaviour relations: A conceptual and empirical review. *European Review of Social Psychology*, 12, 1–36.
- Sheeran, P., Gollwitzer, P. M., & Bargh, J. A. (2013). Nonconscious processes and health. *Health Psychology*, 32, 460–473.
- Shields, L. & Twycross, A. (2008). Content Analysis. *Paediatric Nursing*, 20(6), 38-45.
- Shub, A., Huning, E.Y., Campbell, K.J., McCarthy, E.A. (2013). Pregnant women's knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BMC Research Notes*, 18(6), 278. DOI: 10.1186/1756-0500-6-278.

Sim, J., & Sharp, K. (1998). A critical appraisal of the role of triangulation in nursing research. *International Journal of Nursing Studies*, 35(1/2), 23-31.

Smith, M.W. (1995). Ethics in focus groups: a few concerns. *Qualitative Health Research*, 5(4), 478-484.

Smith, J., & Bekker, H. (2011). Theoretical versus pragmatic design in qualitative research. *Nurse Researcher*, 18(2), 29-51.

Smithson, J. (2000). Using and analysing focus groups: limitations and possibilities. *International Journal of Social Research Methodology*, 3(2), 103-119.

Smithson, J. & Diaz, F. (1996) Arguing for a collective voice: collaborative strategies in problem-oriented conversation. *Text*, 16, 251—268.

Sniehotta, Presseau, J., Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour, *Health Psychology Review*, (8)1, 1-7.

Soltani, H., Arden, M.A., Duxbury, A.M.S., Fair, F.J. (2016). An Analysis of Behaviour Change Techniques Used in a Sample of Gestational Weight Management Trial. *Journal of Pregnancy*. DOI: 10.1155/2016/1085916.

Stengel, M.R., Kraschnewski, J.L., Hwang, S.W., Kjerulff, K.H., Chuang, C.H. (2012). "What My Doctor Didn't Tell Me": Examining Health Care Provider Advice to Overweight and Obese Pregnant Women on Gestational Weight Gain and Physical Activity. *Women's Health Issues*, 22(6), 535-540.

Stewart, Z., Wallace, E., Allan, C. (2012). Weight gain in pregnancy: a survey of current practices in a teaching hospital. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 52(2), 208-210.

Stotland, N.E., Gilbert, P., Bogetz, C.C., Harper, B., Abrams, B., Gerbert, B. (2010). Preventing excessive weight gain in pregnancy: how do prenatal care providers approach counseling? *Journal of Womens Health*, 19(4), 807-814.

Strauss, A. & Corbin, J.M. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. SAGE Publications. London.

Streuling, I., Beyerlein, A., von Kries R (2010). Can gestational weight gain be modified by increasing physical activity and diet counseling? A metaanalysis of interventional trials. *Am J Clin Nutr*, 92, 678-687.

Strychar, I.M., Chabot, C., Champagne, F., Ghadirian, P., Leduc, L., Lemonnier, M. C.et al. (2000). Psychosocial and lifestyle factors associated with insufficient and excessive, maternal weight gain during pregnancy. *Journal of American Dietetic Association*, 100, 353-356.

Sui, Z., Turnbull, D. & Dodd, J. (2013). Enablers and barriers to making healthy change during pregnancy in overweight and obese women. *Australasian Medical Journal*, 6(11), 565-577.

- Sui, Z., Turnbull, D.A., Dodd, J.M. (2012). Overweight and Obese women's perceptions about making healthy changes during pregnancy: a mixed method study. *Maternal Child Health*, 17, 1879-1887.
- Sutton, S.R. (1994). *The past predicts the future: interpreting behaviour-behaviour relationships in social psychological models of health behaviour*. In: Rutter, D.R. Quine, L. (eds). *Social Psychology and Health: European Perspectives*. Aldershot. Avebury.
- Skouteris, H., Wertheim, E.H., Germano, C., Paxton, S.J., Milgrom, J. (2009). Assessing sleep during pregnancy: a study across two time points examining the Pittsburgh Sleep Quality Index and associations with depressive symptoms *Women's Health Issues*, 19, 45-51
- Szwajcer, E.M., Hiddink, G.J., Koelen, M.A., van Woerkum, C.M.J. (2007). Nutrition awareness and pregnancy: implications for the life course perspective. *European Journal of Obstetrics and Gynaecology and Reproductive Biology*, 135, 58-64.
- Szwajcer, E.M., Hiddink, G.J., Koelen, M.A., van Woerkum, C.M.J. (2005). Nutrition-related information-seeking behaviours before and throughout the course of pregnancy: consequences for nutrition communication. *European Journal of Clinical Nutrition*, 59(S1), 27-33.
- Tabachnick, B.G., & Fidell, L.S. (2007). *Using Multivariate Statistics*. Pearson. London.

Taylor, D., Bury, M, Campling, N., Carter, S., Garfield, S, Newbould, J., Rennie, T. (2007). A Review of the use of the Health Belief Model (HBM), the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB) and the Trans-Theoretical Model (TTM) to study and predict health related behaviour change. *National Institute of Clinical Excellence*. London.

Taylor, N., Lawton, R., Conner, M. (2013). Development and initial validation of the determinants of physical activity questionnaire. *Int J Behav Nutr Phys Act*, 10, 74. DOI:10.1186/1479-5868-10-74.

Taylor, N., Parveen, S., Robins, V., Slater, B., Lawton, R. (2013). Development and initial validation of the Influences on Patient Safety Behaviours Questionnaire. *Implementation Science*, 8. DOI:10.1186/1748-5908-8-81.

Teitler, J.O. (2001). Father involvement, child health and maternal health behavior. *Children and Youth Services Review*, 23(4/5), 403-425.

Teixeira, P.J., Going, S.B., Houtkooper, L.B., Cussler, E.C., Metcalfe, L.L., Blew, R.M., Sardinha, L.B. Lohman, T.G. (2004). Pretreatment predictors of attrition and successful weight management in women. *International Journal of Relative Metabolic Disorder*, 28(9), 1124-33.

Thangaratinam, A., Rogozinska, E., Jolly, K., Glinowski, S., Roseboom, T., Tomlinson, J.W., Kunz, R., Mol, B.W., Coomarasamy, A., Khan, K.S. (2012). Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ*, 344. DOI: 10.1136/bmj.e2088

Thornton, P.L., Kieffer, E.C., Salabarría-Peña, Y., Odoms-Young, A. Willis, S.K., Kim, H., Salinas, M. (2006). Weight, Diet, and Physical Activity-Related Beliefs and

Practices Among Pregnant and Postpartum Latino Women: The Role of Social Support. *Maternal and Child Health Journal*, 10(1), 95-114.

Thurmond, V.A. (2001). The point of triangulation. *Journal of Nursing Scholarship*, 33(3), 253-258.

Tones, K. (2000). Evaluating health promotion: A tale of three errors. *Patient Education and Counseling*, 39, 227-236.

Tourangeau, R., & Yan, T. (2007). Sensitive Questions in Surveys. *Psychological Bulletin*, 133, 859-883.

Trochim, W. M., (2000). The research methods knowledge base. Retrieved May 13, 2016, from <http://www.socialresearchmethods.net/kb/>

van der Pligt, P., Campbell, K., Willcox, J., Opie, J., Denney-Wilson, E. (2011). Opportunities for primary and secondary prevention of excess gestational weight gain: General Practitioners' perspectives. *BMC Fam Pract*, 12(1):124.

Villamore, E., & Cnattingius, S. (2006). Interpregnancy weight change and risk of adverse pregnancy outcomes: a population-based study. *Lancet*, 368, 1164-70.

Wadsworth, M.E. & Kuh, D.J. (1997). Childhood influences on adult health: a review of recent work from the British 1946 national birth cohort study, the MRC National Survey of Health and Development. *Paediatric Perinatal Epidemiology*, 11(1), 2-20.

Wall, G. (2013). 'Putting family first': Shifting discourses of motherhood and childhood in representations of mothers' employment and child care. *Women's Studies International Forum*, 40, 162-171.

Warriner S 2000. Women's views on being weighed during pregnancy. *British Journal of Midwifery*, 8(10), 620-623.

Watson, M., Howell, S., Johnston, T., Callaway, L., Khor, S.L. Cornes, S. (2013). Pre-pregnancy BMI: Costs associated with maternal underweight and obesity in Queensland. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 53, 243-249.

Webb, J.B., Siega-Riz, A.M., Dole, N. (2008). Psychosocial determinants of adequacy of gestational weight gain. *Obesity*, 17, 300-309.

Weinstein, N.D. (1993). Testing Four Competing Theories of Health-Protective Behavior. *Health Psychology*, 12, 324-333.

Weir, Z., Bush, J., Robson, S.C., McParlin, C., Rankin, J., Bell, R. (2010). Physical activity in pregnancy: a qualitative study of the beliefs of overweight and obese pregnant women. *BMC Pregnancy and Childbirth*, 10, 18. DOI: 10.1186/1471-2393-10-18.

Wellings, K., Jones, K.G., Mercer, C.H., Tanton, C., Clifton, S. et al. (2013). The prevalence of unplanned pregnancy and associated factors in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyle. *Lancet*, 382(9907), 1807-1816.

Whitlock, G., Lewington, S., Sherliker, P. (2009). Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. *Lancet*. 373(9669), 1083-1096.

Whitaker, R.C. (2004). Predicting preschooler obesity at birth: the role of maternal obesity in early pregnancy. *Pediatrics*, 114, 29–36.

- Wiles, R. (1998). The views of women of above average weight about appropriate weight gain in pregnancy. *Midwifery*, 14, 254–260.
- Wilkinson, S. & McIntyre, H.D. (2012). Evaluation of the 'healthy start to pregnancy' early antenatal health promotion workshop: a randomised controlled trial. *BMC Pregnancy and Childbirth*, 12, 131.
- Wilkinson, S.A., Poad, D., Stapleton, H. (2013). Maternal overweight and obesity: a survey of clinicians' characteristics and attitudes, and their responses to their pregnancy clients. *BMC Pregnancy & Childbirth*, 13, 117-125.
- Williams, L.J., Pasco, J.A., Henry, M.J., Jacka, F.N., Dodd, S., et al. (2009). Lifetime psychiatric disorders and body composition: A population-based study. *Journal of Affective Disorders*, 118(1-3), 173-179.
- Wing, R.R. (2004). *Behavioral approaches to the treatment of obesity*. In: Bray GA, Bouchard C, James WPT, editors. *Handbook of obesity: Clinical applications*. Marcel Dekker. New York. pp. 147–167.
- Witte. K. & Allen, M. (2000). A meta-analysis of fear appeals: Implications for Effective public health programs. *Health Education and Behavior* 27(5), 591-615.
- Wolff, S., Legarth, J., Vangsgaard, K., Toubro, S., Astrup, A. (2008). A randomised trial of the effects of dietary counselling on gestational weight gain and glucose metabolism in obese pregnant women. *International Journal of Obesity*, 32(3), 495-501.

Wright, C., D., Shea, J.A. (2013). Psychosocial factors associated with gestational weight gain in a low-income cohort. *J Health Care Poor Underserved*, 24(1), 332–343.

Zhang C., and Ning Y. (2011). Effect of dietary and lifestyle factors on the risk of gestational diabetes: review of epidemiologic evidence. *American Journal of Clinical Nutrition*, 94(6), 1975S–1979S.

Appendix 1

Study 1 Executive Summary

Executive Summary

Exploring the experiences of overweight women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

Rationale for the study

Trends of a pre -pregnancy BMI of $>25 \text{ kg/m}^2$ have continued to rise since the 1990s in the UK (Heslehurst, 2010). Being overweight in pregnancy is associated with increased adverse outcomes for women and their baby (Kumari, 2001; Nuthalapaty & Rouse, 2004) and as the trajectory of weight increases in pregnancy, so does the risk of fetal death (Cedergren, 2004). Furthermore, some longitudinal studies revealed a relationship between GWG and maternal obesity. Compared to a high BMI prepregnancy, total GWG was found to be a more significant determinant of postpartum weight retention, three years later (Maddah & Nikooyeh, 2009). Some research has indicated that women who gained a high weight in pregnancy and had high weight retention in the one year postpartum period, tended to have a higher BMI 15-years later (Linne, Dye, Barkeling & Rossner, 2004).

A significant amount of attention has been given to the impact of obesity in pregnancy. However, the various potential barriers overweight women face, when attempting to follow a healthy lifestyle throughout pregnancy, is not as well understood.

This work will be comprised of initially one study, which will inform the development of two further studies the aims of which are listed below.

1. What are the barriers to following a healthy lifestyle in pregnancy and postpartum for overweight women?

Other important objectives are:

2. Do barriers identified by overweight women correspond to those proposed by health professionals?

3. What advice do health professionals provide overweight women about a healthy lifestyle throughout their pregnancy?



Faculty of Development and Society
Research Protocol

(INVESTIGATORS- Janice Smith*, Dr Maddy Arden, Dr Penny Furness, & Dr Hora Soltani)

Exploring barriers specific to overweight women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

Background

Weight gain in pregnancy is inevitable. However, how much gestational weight gain (GWG) results in positive obstetric outcomes remains less clear in the absence of universal guidelines¹. A significant amount of research²⁻³ has focussed on adverse maternal and infant health outcomes for obese women. Considering that trends of a pre-pregnancy BMI of $>25 \text{ kg/m}^2$ have continued to rise since the 1990s⁴ in the UK, little attention has been paid to the impact of being overweight in pregnancy and the postpartum period. Women tend to be more receptive to health messages in pregnancy and engage with healthcare professionals; therefore it is an opportunistic time to promote a healthy lifestyle⁵.

Being overweight in pregnancy is associated with increased morbidity, specifically hypertension, diabetes hypertension, gestational diabetes, and pre-eclampsia⁶⁻⁷. Furthermore, some research⁸ has reported that as the trajectory of weight increases in pregnancy, so does the risk of fetal death. Raatikainen, Heiskanen, & Heinonen (2006)⁹ investigated whether a relatively minor degree of overweight increases the risk of adverse pregnancy outcomes, for example perinatal death, and low Apgar scores, in 25,601 births from 1989-2001. Results indicated that as maternal weight increased, so did the risk of adverse obstetric outcomes, despite controlling

for numerous prepregnancy characteristics. This represents a major public health issue, given that an overweight maternal condition exists in over 20% of all pregnancies¹⁰.

Some longitudinal studies¹¹ revealed a relationship between GWG and maternal obesity. Compared to a high BMI prepregnancy, total GWG was a more significant determinant of postpartum weight retention, three years later¹¹. Whereas other research¹² found that overweight women prepregnancy do not have a higher risk of postpartum weight retention compared to normal weight women. Linne, Dye, Barkeling, & Rossner (2004)¹² found those who gained a high weight in pregnancy and had high weight retention in the one year postpartum period, tended to have a higher BMI 15-years later. This suggests that the amount of weight retained at the end of the postpartum year was the more significant predictor of future overweight/obesity 15 years later. These findings have also been confirmed from a 21-year longitudinal study, which reported that weight gain during pregnancy independently predicted long term weight gain and obesity of women, 21-years post birth¹³. This highlights the need to carefully consider at what stage interventions should be implemented, in order to help women effectively manage weight gain during pregnancy, the postpartum period, or both.

Some systematic reviews¹⁴ reported that dietary and physical activity interventions, successfully reduced weight gain, and negative obstetric outcomes. The evidence of employing dietary interventions compared to other methods to reduce GWG appeared most successful, for normal weight, overweight, and obese women¹⁴.

Relatively little is understood about the range of potential barriers overweight women face, when attempting to follow a healthy lifestyle throughout pregnancy. Although the Institute of Medicine (IOM)¹⁵ guidelines describe the optimum weight gain in pregnancy for American women based on their BMI, these are not national guidelines implemented in other countries, including the UK. Therefore, there is widespread variation on the advice women receive from healthcare professionals throughout their pregnancy. This is a complex issue. Some research has indicated¹⁶ that a number of

healthcare professionals lack confidence and knowledge as to what information they should provide women regarding GWG. Subsequently this was not addressed at antenatal appointments. Pregnant women perceived this absence of GWG advice as something that was not a priority for their midwife, minimising its importance to them. This resulted in a lack of monitoring of weight, or addressing weight management throughout their pregnancy. Often women were advised what foods to avoid in pregnancy, and advice provided was ambiguous. This led women to feel confused regarding how much weight they should gain throughout pregnancy, and consequently seek advice elsewhere via family or friends¹⁷.

Health Behaviour Models (e.g. the Theory of Planned Behaviour¹⁸, Self-Determination Theory¹⁹; the Health Belief Model²⁰; Social-Cognitive Theory²¹; and the Transtheoretical Model²²) have widely been used to gain a better understanding of what weight-related behaviour needs to change in order to lose weight. However, this understanding does not always equate to successful weight-loss interventions, and has provided mixed results in terms of efficacy²³. Although these models assume that individual's intention to change is the best predictor of change, this is not always the case. There are numerous reasons why an individual may decide not to change their behaviour, despite them being aware of the health risks it poses to them. These reasons are multifaceted, ranging from environmental, social, psychological and economic factors²⁴. Some research has highlighted the utility of barrier identification in tailoring interventions, for example, to help pregnant women stop smoking²⁵ and treatment adherence to asthma management in pregnancy also²⁶. Therefore, understanding what barriers overweight pregnant women face, in following a healthy lifestyle in pregnancy and postpartum, may be the first step in developing successful strategies to change their health behaviours.

Some women reported that having a pre-pregnancy BMI of $>25 \text{ kg/m}^2$ resulted in social stigma, but their larger body size as a result of pregnancy was more socially acceptable, which increased their self-confidence²⁷. This may have resulted in a lack of motivation to engage in physical activity. Some research has indicated that women's pre-pregnancy diet does not

change significantly when they become pregnant²⁸. Furthermore, some women view pregnancy as a time when they are exempt from dieting, because it could affect their baby, which is reinforced by the National Institute for Health and Clinical Excellence (NICE), guidelines which stipulate that "weight loss programmes are not recommended during pregnancy as it may harm the health of the unborn child, pg 8." ²⁹. Others viewed healthy eating as a more important component of a healthy lifestyle in pregnancy, compared to physical activity³⁰. Again there was confusion about the language associated with advice on this, for example 'moderate exercise'³¹. Given some of the views and beliefs held by women about following a healthy lifestyle in pregnancy, it would appear that accurate guidance and advice from healthcare professionals is even more pertinent in order to reduce rising GWG, and the adverse obstetric outcomes that result from it.

Methodology

A mixed method design will be implemented to investigate, the potential barriers for overweight women in following a healthy lifestyle throughout pregnancy and postpartum. This will involve conducting an initial study of two focus groups, which will then inform the development of two further studies potentially.

Study 1

Design: two separate focus groups; one with staff, and one with women.

Aim: to understand, from women and healthcare professionals, what are the potential barriers overweight women face in following a healthy lifestyle in pregnancy and postpartum.

Inclusion Criteria

Staff Focus groups

Convenience sampling of staff currently providing support and/or advice to women throughout their pregnancy will be invited to partake in the focus group. The researcher aims to recruit between 6-10 staff per focus group, over 3 groups; Group 1. Midwives; Group 2. Health Visitors; Group 3. GP's/Obstetricians.

Recruitment Process

Staff groups (Midwives, Health Visitors and GP's/Obstetricians) will be identified and contacted initially via email to generate interest in participating in the focus group. If staff members are potentially interested in participating the researcher will then forward the research protocol onto them. When sufficient numbers of staff have been recruited the researcher will then organise a date and suitable location to conduct the focus group.

Focus groups can be held at the University. However, if this is not convenient, alternative arrangements will be made. For staff working within a hospital or primary care setting it is anticipated that the focus group could be held for example, at a hospital room or GP surgery. Likewise, a convenient location would be arranged for community based healthcare professionals, for example a Children's Centre.

Participation would take place before/after staff member's hours of work. Alternatively, if the focus group was during working hours, it would be arranged during a substantial break.

Inclusion Criteria

Women's Focus Group

- Over 18 years old
- BMI- 25.0-29.9
- Pregnant
- Ability to read and understand English (to be able to communicate with researchers)
- Within one year postpartum

Exclusion Criteria

- Gestational Diabetes Mellitus
- Pregnancy induced hypertension/preeclampsia
- Food allergies
- Eating disorders

- Complications which may impact on their dietary/lifestyle pattern
- Multiple pregnancies

Again, it is anticipated that 6-10 women will be recruited for this focus group.

Recruitment Process

It is expected that midwives and staff from Children's Centres will act as gatekeepers and invite women who meet the inclusion criteria to participate in the focus group. The researcher will then contact these women to arrange a suitable date and location to conduct the group. Again, the focus group can be held at the University, or if more convenient at a mutually agreed location, for example, Children's Centre.

Analysis: data from both groups will be analysed using thematic analysis. An inductive approach will be used in this analysis, and literature relevant to the research question will be studied beforehand. A number of researchers³² have reported that reading relevant literature can improve the analysis by heightening awareness to less obvious elements of the data. Braun and Clarke's³³ phases of thematic analysis will be used as a framework for this current analysis.

Proposed Studies 2 and 3

It is anticipated that findings from study 1 will lead to the development of two further studies.

Based on themes generated from the staff focus group a questionnaire may be developed and administered on a much larger scale (Study 2). The aim of this would be to obtain healthcare professionals opinions on barriers they encounter when supporting overweight women to follow a healthy lifestyle in pregnancy, as well as, what information/advice they provide to this population.

Cross sectional themes from study 1 will inform issues to raise with women longitudinally (Study 3). The aim of this study would be to interview overweight women to identify what barriers they face in following a healthy lifestyle during pregnancy and the postpartum period. Also, to establish if

barriers exist specific to each trimester, whether barriers modify at each stage and factors which potentially influence behavioural change.

Implication of Results

Overall, the results would assist in understanding barriers specific to overweight women attempting to follow a healthy lifestyle, throughout pregnancy and postpartum. It would also contribute to an expanding pool of evidence of weight management research within maternity. The results could also potentially be salient in a number of ways:

1. Data collated from women participating in the study may assist in the development of interventions designed to prevent excess weight gain throughout pregnancy, as well as manage overweight women's weight more effectively. It could also guide healthcare professionals on how to raise the issue of weight with pregnant women, in a way that promotes engagement.
2. Data gathered from healthcare professionals may provide a more in-depth understanding on the range of advice different healthcare professionals provide to overweight pregnant women regarding lifestyle changes. This information may assist in the development of training programmes for healthcare professionals, to help them better provide consistent to overweight women throughout their pregnancy, and postpartum.

Materials

Focus groups will last between 30-45 minutes with participants consent. Data will be recorded using a digital Dictaphone.

Ethical Considerations

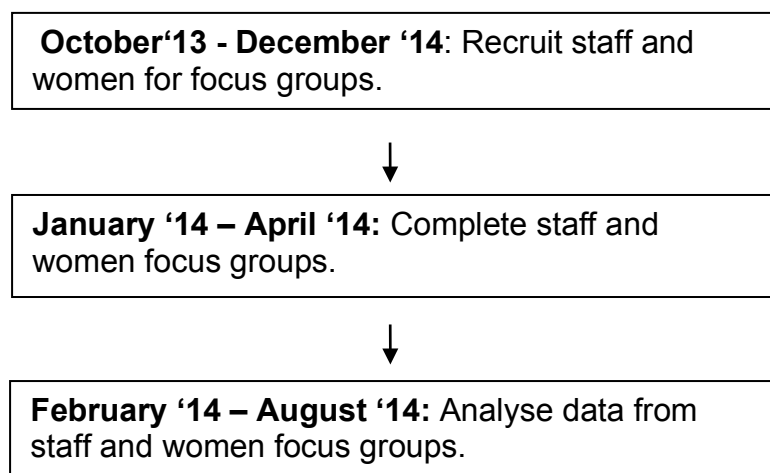
Discussing an individual's weight is often a sensitive topic, which may be upsetting for some individuals. It will be emphasised to each participant they do not have to answer any questions they do not feel comfortable with. However, if the participant does become distressed they will be offered to take a break, and are free to withdraw from the study at any time.

In order to be as inclusive of all participants as possible the researcher will endeavour to provide translated material, and/or the use of an interpreter.

Under the NRES 'Defining Research'³⁴, this project falls under the category of 'Proportionate Review'. As such, it may not require NHS IRAS approval. Ethics approval will also be sought from Sheffield Hallam University.

Research Plan

Please find below a planned timeline for Study 1.



References

1. Amorim A.R., Rossner, S., Neovius, M., Lourenco, P.M., & Linne, Y. (2007). Does Excess Pregnancy Weight Gain Constitute a Major Risk for Increasing Long-term BMI? *Obesity*, 15, 1278-1286.
2. Smith, D., Ward, C., Forbes, S., Reynolds, R.M., Denison, F.C. (2012). Weight management guidelines for pregnant women with a body mass index (BMI) >40kg/m²: A qualitative exploration of their use in maternity care. *Health Education Journal*, 1-6.
3. Powell, J., Hughes, C. (2012). Antenatal interventions that support obese pregnant women. *British Journal of Midwifery*, 20, 325-331.
4. Heslehurst, N. et al. (2010). A nationally representative study of maternal obesity in England, UK: trends in incidence and demographic inequalities in 619 323 births, 1989-2007. *International Journal of Obesity*, 34, 420-428.

5. Wilkinson, S.A. & McIntyre, D.H. Evaluation of the 'healthy start to pregnancy' early antenatal health promotion workshop: a randomised controlled trial. (2012). *BMC Pregnancy and Childbirth*, 12, 131-138.
6. Kumari, A.S. (2001). Pregnancy outcome in women with morbid obesity. *International Journal of Gynaecological Obstetrics*, 73, 101-107.
7. Nuthalapaty, F.S. & Rouse, D.J. (2004). The impact of obesity on obstetrical practice and outcome. *Clinical Obstetrics and Gynaecology*, 47, 898-913.
8. Cedergren, M.I. (2004). Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstetrics and Gynaecology*, 103, 219-224.
9. Raatikainen, K., Heiskanen, N. & Heinonen, S. (2006). Transition from Overweight to Obesity Worsens Pregnancy Outcome in a BMI-dependent manner. *Obesity*, 14, 165- 171.
10. Kac, G., Benicio, M., Velasquez-Melendez, G., Valente, J.G., Struchiner, C.J. (2004). Gestational weight gain and prepregnancy influence postpartum weight retention in a cohort of Brazilian women. *Journal of Nutrition*, 134, 661-666.
11. Maddah, M. & Nikooyeh, B. (2009). Weight retention from early pregnancy to three years postpartum: a study in Iranian women. *Midwifery*, 25, 731-737.
12. Linne, Y., Dye, L., Barkeling, B., Rossner, S. (2004). Long-term weight development in women: a 15-year follow-up of the effects of pregnancy. *Obesity Research*, 12, 1166-1178.
13. Mamum, A.A., Kinarivala, M., O'Callaghan, M.J., Williams, G.M., Najman, J.M. Callaway, L.K. (2010). Associations of excess weight gain during pregnancy with long-term maternal overweight and obesity: evidence from 21 y postpartum follow-up. *American Journal of Clinical Nutrition*, 91, 1336-1341.
14. Thangaratnam, S., Rogozinska, E., Jolly, K., Glinkowski, S., Duda, W., Borowiack, E., Roseboom, T., Tomlinson, J., Walczak, J. Kunz, R., Mol, B.W., Coomarasamy, A., Khan, K.S. (2012). Interventions to

- reduce or prevent obesity in pregnant women: a systematic review. *Health Technology Assessment*, 16-21.
15. Institute of Medicine. (2009). Weight Gain During Pregnancy: Reexamining the Guidelines. *Institute of Medicine*.
 16. Olander, E., Atkinson, L., Edmunds, J., French, D. (2011). The views of re- and post-natal women and health professionals regarding weight gain: An exploratory study. *Sexual and Reproductive Health*, 2, 43-48.
 17. Pamela L. Thornton, P.L., Kieffer, E.C., Salabarría-Peña, Y., Odoms-Young, A. Willis, S.K., Kim, H., Salinas, M. (1991). Weight, Diet, and Physical Activity-Related Beliefs and Practices Among Pregnant and Postpartum Latino Women: The Role of Social Support. *Maternal and Child Health Journal*, 10-18.
 18. Ajzen, I. (1991). The theory of planned behaviour. *Organisational Behavioural and Human Decision Processes*, 50, 179-211.
 19. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
 20. Rosenstock, I.M. (1966). "Why people use health services". *Milbank Memorial Fund Quarterly*, 44, 94–127.
 21. Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewoods Cliffs.
 22. Prochaska, J.O. & Velicer, W.F. (1997). The Transtheoretical Model of Health Behavior Change. *American Journal of Health Promotion*, 12, 38-48.
 23. Weinstein, N.D. (2003). Testing four competing theories of health-protective behaviour. *The Health Psychologist*, 12, 324-333.
 24. Schwarzer, R. (2008). Modelling Behaviour Change: How to Predict and Modify the Adoption and Maintenance of Health Behaviours. *Applied Psychology: An International Review*, 57, 1-29.
 25. Ingall, G. & Cropley, M. (2010). Exploring the barriers of quitting smoking during pregnancy: a systematic review of qualitative studies. *Women and Birth*, 23, 45-52.

26. Murphy, V.E. & Gibson, P. (2011). Asthma in Pregnancy. *Clinics in Chest Medicine*, 32, 93-110.
27. Campbell, F., Johnson M., Messina, J., Guillaume, L., Goyder, E. (2011). Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data. *BMC Public Health*, 11, 491-504.
28. Crozier, S.R., Robinson, S.M., Godfrey, K.M., Cooper, C., Inskip, H. (2009). Women's Dietary Patterns Change Little from Before to During Pregnancy. *Journal of Nutrition*, 139, 1956-1963.
29. National Institute for Health and Clinical Excellence (NICE). (2010). Dietary interventions and physical activity interventions for weight management before, during, and after pregnancy. London.
30. Weir, Z., Bush J., Robson, S.C., McParlin C., Rankin J., Bell R. (2010). Physical activity in pregnancy: a qualitative study of the beliefs of overweight and obese women. *BMC Pregnancy and Childbirth*, 10, 18-22.
31. Kagan, K.O. & Kuhn, U. (2004). Exercise and pregnancy. *Herz*, 29, 426-434.
32. Tuckett, A. G. (2005). Applying thematic analysis theory to practice: A researcher's experience. *Contemporary Nurse*, 19, 75-87.
33. Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
34. National Research Ethics Service (2009). Defining Research: NRES guidance to help you decide if your project requires review by a Research Ethics Committee. National Patient Safety Agency. London.

Appendix 2

Study 1 Information Sheet



Faculty of Development and Society

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Exploring the experiences of overweight women attempting to follow a healthy lifestyle throughout pregnancy

We would like to invite you to take part in our research study. Before you decide, it is important for you to understand the purpose of the research and what it will involve. **Please take time to read the following information carefully.** Please ask us, if there is anything that is not clear, or if you would like more information.

What is the purpose of the study?

We are interested in understanding some of the barriers overweight women face when attempting to follow a healthy lifestyle in pregnancy and post-partum. It is anticipated this may lead to tailoring interventions which may address some of the barriers identified. You are not obliged to take part in this study. Participation is entirely voluntary.

Why have I been invited?

You have been recruited into the study as you meet the entry criteria: health professional providing support to overweight women in pregnancy and/or post-partum.

How long is the study?

You will be asked to participate in a 30-45 minute focus group to discuss some reasons why you feel overweight women have found it difficult to follow a healthy lifestyle throughout their pregnancy and/or post-partum.

Do I have to take part?

Your participation in this study is entirely voluntary. If you agree to take part, we will ask you to sign a consent form. You are free to withdraw from the study at any time without giving a reason.

What will I be asked to do if I take part?

You will be asked to attend a focus group which will last approximately 30-45 minutes and answer some questions to understand better why patient's, in your experience, find it difficult to follow a healthy lifestyle in their pregnancy and post-partum.

What are the possible disadvantages and risks of taking part?

As the focus group does not require thinking about personal sensitive issues, it is not anticipated that you will experience emotional distress.

How will I benefit from participating in this study?

You will not receive any compensation for your time. However, by participating in the study you will be contributing to our understanding of reasons why overweight women struggle to follow a healthy lifestyle in pregnancy and post-partum. Ultimately it is hoped this would contribute further to the development of future patient care. You will also be asked about the information you provide specifically to overweight pregnant women. This may assist in the development of future guidelines on the content and delivery of advice provided to overweight women in their pregnancy and post-partum.

If I need to speak to someone about the research, whom should I contact?

If you have any questions, queries or concerns regarding the study, please contact the researcher using the contact details below.

Confidentiality

All the information that you provide will be treated in confidence to comply with UK Data Protection Laws. Your identification will only be in the form of a number and your initials (unique identifier). In the event that the results of the study are published, your identity will remain confidential. Some direct quotes may be used from the focus group however, you will be assigned a pseudonym to maintain your anonymity. Members of the research team may look at the information that you have provided to check that the study is being carried out correctly. These members will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty. Only members of the research team will have access to your personal and study data.

Please be advised that although the researcher will take every precaution to maintain confidentiality of the data, the nature of focus groups prevents the researcher from guaranteeing confidentiality. The researcher would like to remind participants to respect the privacy of your fellow participants and not repeat what is said in the focus group to others.

What will happen if I don't want to carry on with the study?

Your participation in this study is entirely voluntary. You are free to withdraw from the study at any time without giving a reason. When the researcher transcribes the data from the focus group you will be forwarded your contribution only. You will be given a two week period to read through this data and make any amendments. You are able to completely withdraw your data at this point. If you do not contact the researcher within this time frame for withdrawal of data, it is assumed you agree for your data to be part of the study.

How will we use the results of this research?

The results of the study will contribute towards a postgraduate degree (i.e. PhD). It is expected that the results will also be published in a scientific journal.

Am I able to know the results of the study?

Yes, if you would like a summary of the results, please contact the researcher (details below).

Who has reviewed the study?

This study has been reviewed and given a favourable opinion by the Sheffield Hallam University Research Ethics Committee and NHS Ethics Proportionate Review.

Contact details:

Janice Smith

Email: janice.smith@shu.ac.uk

Appendix 3

Study 1 Consent Form



Faculty of Development and Society

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

This project is being undertaken as part of a PhD; on behalf of Sheffield Hallam University, within the Faculty of Development and Society.

The overall purpose of the project is to understand what the reasons are overweight women find it easy/difficult when attempting to follow a healthy lifestyle throughout their pregnancy and postpartum.

The purpose of this focus group is to gain perspectives from various healthcare professionals on what the reasons are that contribute to overweight women attempting to follow or not follow a healthy lifestyle in their pregnancy and postpartum. The aim is also to understand what information/advice these women receive from healthcare professionals.

The focus group will last for approximately 30-45 minutes. It will be recorded on tape, if you are in agreement.

The tape is purely to assist the interviewer in remembering what has been said and to save time during the interview. You may switch the tape recorder off at any point during the focus group, if you wish. The content of the tape will not be disclosed to anyone beyond the research team and the tapes will be destroyed at the end of the project.

You may withdraw your consent for the use of information gained from the focus group (please see information sheet for further details or discuss with interviewer). Any material from the focus group that is used in project reports and academic papers will be quoted using a pseudonym and anything that could identify you will be removed.

During the focus group you will be asked about your own experiences in providing support to overweight women throughout their pregnancy and

postpartum. You do not have to answer any question that you do not want to and the interviewer will respect your decision.

Please be advised that although the researcher will take every precaution to maintain confidentiality of the data focus group participants will be asked to agree to maintain the confidentiality of their fellow participants.

Thank you for agreeing to take part in this project.



PARTICIPANT CONSENT FORM (Staff)

Title of Study: Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

Name of Researcher: Janice Smith

Name of Participant:

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis. ☐
3. I understand that my details will be kept confidential. ☐
4. I understand that the focus group will be recorded and that anonymous direct quotes from the interview may be used in the study reports. ☐
5. I agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session ☐
6. I understand that my data from this study will be anonymised and that only members of the research team will have access to the data and my personal information. ☐
7. I agree to take part in the above study. ☐

Please initial boxes

Name of Participant

Date

Signature

When the researcher transcribes the data from the focus group you will be sent a copy of your own contributions to the focus group, so that you can check you are happy for everything you have said to be included in

the data from the study. At this point you can decide to remove sections or all your data from the study, if you wish. However, the researcher will ask you to inform her of this within two weeks; if no reply is received in this time, it will be assumed you agree for your data to be part of the study.

Please provide an email address where your transcribed data can be sent to

Appendix 4

Study 1 Focus Group Interview Schedule



Faculty of Development and Society

Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

Focus Group Guide

INTRODUCTION

A. Introduction of moderator

B. Description of the focus group

We are going to discuss what your experiences are in supporting women to lead a healthy lifestyle throughout their pregnancy and postpartum. Of particular interest is what you feel are potential barriers and facilitators acting on these health choices. I would also like to discuss with you what advice you provide to these women.

C. Setting the ground rules (could people turn their phone's onto silent, reiterate what we discuss stays in the room, people do not have to answer anything they don't feel comfortable with and feel free to leave at any time)

D. Introduction of the participants (if staff don't already know one another)

When you introduce yourself, please tell everyone your profession and how long you've worked within maternity services.

WARM UP (5 minutes) Desired outcome: to know what their definition of a healthy lifestyle is

A. I would like you to think of what it means to lead a healthy lifestyle during pregnancy. How would you describe this?

B. What things would women do or not do to show they are leading a healthy lifestyle? (*PROBE: eating behaviours, physical activity etc*).

ASSESSMENT OF WOMEN (15 minutes) Desired outcome: understanding of what information is gathered regarding weight and any signposting

For the remainder of the discussion we are going to focus predominantly on weight management and physical activity in pregnancy for overweight women.

I want to spend a few minutes talking about the first time you see a woman in her pregnancy.

- A. Do you always calculate a women's BMI at the first appointment? If so, what do explain to the woman what this is and the purpose of it?
- B. If a woman is overweight do you inform her of this? What do you say? How do women respond to this? (*PROBE: surprise, denial, shock, insulting, acceptance*).
- C. Does the woman's reaction to this tailor in any way what you do next to address this? For example do you assess, advise and/or refer for weight management or healthy eating or physical activity education or do you not raise the issue again? If not, why?
- D. Are you able to address the issue in future appointments? What would help you to do this? (*PROBE: training, guidelines, policies etc*).
- E. Do you actively look for signs of excessive gestational weight gain with these women? What are the signs you look for? What do you do/say if you feel an overweight woman is excessively gaining weight in her pregnancy?
- F. What do you regard as the most important consequences of overweight in pregnancy and excess weight gain?

BARRIERS & FACILITATORS (25 minutes) Desired outcome- to understand what health professionals observe as being barriers and facilitators to overweight women leading a healthy lifestyle in pregnancy and what advice they provide to women.

I would like you to try and think about what are the factors which make it easy or difficult for overweight women to follow a healthy lifestyle in pregnancy.

- A. What kind of information do overweight women tend to seek in their pregnancy? Do they seek advice about weight gain and physical activity? If so, what? (*PROBE: ask them to provide examples*).

- B. What advice do you provide to these women about weight gain and physical activity in pregnancy? How confident do you feel delivering this advice? Whose role do you feel it should be to deliver this information?
- C. How important do you think these women regard issues such as weight gain and physical activity in pregnancy? Why do you think this is the case?
- D. In your experience do women follow the advice they have received? What are some of the reasons they follow the advice? What are some of the reasons they don't follow the advice? **LIST**
- E. What things could make it easier for women to follow a healthier lifestyle in pregnancy? (*PROBE: guidelines, specialist services, free antenatal classes, fruit & veg vouchers*)
- F. How important do you think it is that overweight women's weight is monitored in pregnancy? Why do you think this? Are there other things that are more of a priority throughout their pregnancy? (*PROBE: vitamin and mineral intake, supplements, avoidance of alcohol/smoking*).
- G. How important do you think it is to weigh overweight women throughout their pregnancy? If so, why? What indicators do you rely on to show a woman is gaining excessive weight in her pregnancy?
- H. In an ideal world, how could you be better supported to deliver advice about healthy lifestyle in pregnancy? What is the best way this support could be delivered? (*PROBE: Internet, telephone, peer group support, information sheets*).
- I. What do women believe are ways they can lose weight post-natally? Do you provide any advice about how they can lose weight then? If so, what advice do you provide? (*PROBE: breastfeeding*).

CLOSURE (5 minutes)

- A. You have all provided some very insightful comments about healthy lifestyle during pregnancy today.
- B. Thank you for taking the time to participate. Any questions?

Appendix 5

Sample of Transcribed Data from Obstetrician/GP & Midwife Focus Groups

Sample of Transcribed Data from Obstetrician/GP Focus Group

30	CLAIRE	We don't do anything with a BMI of 30, it's 35. We advice vitamin D and offer GDC.	
31	JESSICA	But then we counsel them about the risks of this don't we.	
So whenever an overweight lady comes under your care, do you raise the issue of weight with her?			
32	REBECCA	Frankly speaking no, because if they're not considered high risk, you know for obstetrician management in pregnancy then 29, no.	
It would have to be over 30 or 35?			
33	JESSICA	Well there are practical difficulties because it is obviously time consuming when you have limited time in clinic and to focus on a practical area where it could be difficult to know what to suggest to address it, and secondly it can be a very very touchy area because unfortunately patients can feel alienated by having the focus on one thing they may not even consider to be an issue, so I mean maybe it's something more that should be addressed by community midwives. I know that they're also under a lot of time pressure as well, but the hospital appointments should be a lot more focused on obstetrics and medical issues.	
Do you link higher weight with negative obstetric outcomes?			
34	JACKIE	Yes BMI of 30 or above, which is why a BMI of 30 is our cut off point.	
You raised the issue that discussing the issue of weight can be a touchy subject, how confident do people feel about raising the issue of weight with a lady?			
35	CLAIRE	Very difficult.	
36	JESSICA2	I mean even with a BMI of 40 I still say you have a slightly higher BMI, I still struggle to say, to phrase it, it's very sensitive <i>[everyone agreeing]</i> . But I still don't know exactly what phrase to use to be honest. I still don't know.	
37	JESSICA	I mean that comes back to what Janna was saying that the more people see everyone else in the waiting room looking that size or bigger then it almost is normal.	
38	CLAIRE	Even patients who come to our gynae clinics if they come with any menstrual problems and infertility problem we mention this overweight thing, especially this weight group that you are looking at. But they then say, oh doctor wait a minute I was heavier than this weight 5 years ago and my periods were normal, now how can you blame my diet, and it is a difficult situation for a patient.	
39	JESSICA	Yes it is	

Sample of Transcribed Data from Midwife Focus Group

110	Carol	We don't weigh in pregnancy anymore, so we don't know whether that weight is rising, like we did in the past.
111	<i>Is that a problem?</i>	
112	Maria	No.
113	Carol	No because it doesn't mean anything, that's why we stopped weighing, it's irrelevant, cause somebody could put
114		on 2 pounds or 5 stone and it don't make a difference.
115	Lucy	In Australia they brought it back, yeah weighing at 28 weeks.
116	Carol	Generically your bigger ladies, your big BMIs don't necessarily put as much weight on, in fact they may
117		Standardly stay quite levelled. Your 25s to 29s might be the ones that stack the weight on, but we don't weigh.
118	<i>Do you think in your experiences the ladies with BMI 30 or above who perhaps maintain their weight during pregnancy, that's because they're getting more specialised advice?</i>	
119	Carol	I think that's just what happens, it's generic, that's what happens in my opinion, because they've already got
120		that laid on deposit the baby is feeding off, so they're not particularly, that's how I feel, I mean I don't know.
121	Maria	You know they ladies with the BMI between 25 and 29 could be missed because they put on weight through
122		pregnancy and then.
123	Carol	Then it would back to, if you had continuity of care in the community you can clearly see. So if you had
124		continuity of a midwife who was looking after someone all the way through your pregnancy then you would be able
125		to, you would know that women, and you would be able to have confidence to have the conversation, and rapport,
126		and you would easily be able to say to that lady "Oh you look like you're stacking some weight on, have I to stick you
127		on the scales, and that would.
128	<i>Everyone laughs</i>	
129	Claire	I would find that really difficult to say.
130	Emma	I wouldn't say that.
131	<i>What would you say?</i>	
132	Carol	Why? Even if you'd like known them the whole way through.
133	<i>Ok let's take that situation. If you had a lady who was 25 to 29, you're seeing her throughout her whole pregnancy, and you notice her weight has significantly increased.</i>	
134	Kerry	I would ask her.
135	Carol	I would say, god you're stacking some weight on, jump on the scales.

Appendix 6

Initial Themes from Midwife Data (sample)

Exploring the experiences of women attempting to follow a healthy lifestyle in pregnancy- Midwives

MAIN THEMES (CODES)	SUBSECTION	DESCRIPTOR	EXAMPLES (SCRIPT NUMBERS) Midwives
Raising the topic of weight (R)	Opportunities (R1)	Booking Appointment (R1B)	12-15, 39-40
		Women (R1W)	18-23, 24-27, 139, 141-142
		Health checks (R1H)	28-31
		Resources (R1R)	42-46
		Weighing (R1W)	304-307, 309, 312, 316-319, 321-325, 331, 333-338
	Approach (R2)	Women's attitude (R2W)	18-23, 162-163, 215-218
		Staff (R2S)	54-57, 125, 129-130, 134-136, 143-144
		Normalising (R2N)	56-57, 65-68
		Sensitivity (R2Se)	67-68 79-82, 155-161
		Language (R2L)	83-84, 86-93
Defining overweight (D)	Perspective (D1)	Societal (D1S)	173-174, 203-204
		Medical (D1M)	100-101
		Service Level (D1SL)	
Advice (A)	What is offered (A1)	Nothing (A1N)	103
		Same as normal weight women (A1S)	
		Tailored advice (A1T)	189-191
		General advice (A1G)	104-106, 146-151, 196-198
		Terminology used (A1Te)	
		Monitoring of weight (A1M)	116-117, 110, 296
		Other (A1O)	180-185, 215
	Who seeks advice (A2)	Normal weight BMI <25 (A2N)	180-183, 185
		Overweight BMI 25-29 (A2O)	215-218
		General (A2G)	222-223
	Uptake of advice (A3)	Priorities (A3P)	226-227
		Barriers (A3B)	229-233
		Subsequent pregnancies (A3S)	234-240
		Unsure (A3U)	281-284
		Hopeful (A3H)	286-288

Appendix 7

Study 2 Information Sheet



Faculty of Development and Society

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Do healthcare professionals offer 'NICE' advice to overweight women in pregnancy? An investigation into what determines the advice provided and intervention offered.

We would like to invite you to take part in our research study. Before you decide, it is important for you to understand the purpose of the research and what it will involve. **Please take time to read the following information carefully.**

What is the purpose of the study?

We are attempting to understand a number of issues. Firstly, what healthcare professionals understand about the term 'overweight' in pregnancy; what advice they provide to overweight pregnant women; and factors which influence whether the healthcare professional raises the issue of weight with these women. It is anticipated this may lead to identifying areas where staff may benefit from additional support, to help overweight pregnant women lead a healthier lifestyle. You are not obliged to take part in this study. Participation is entirely voluntary.

Why have I been invited?

You have been invited to participate in the study, as you are a health professional providing support to overweight women in pregnancy.

Do I have to take part?

Your participation in this study is entirely voluntary. You are free to withdraw from the study at any time without giving a reason.

What will I be asked to do if I take part?

You will be asked to complete an online survey, which should take approximately 15-20 minutes to complete.

How will I benefit from participating in this study?

By participating in the study you will also be contributing to our understanding of what the reasons are that influence whether or not they address weight with overweight pregnant women. You will also be asked about the information you provide specifically to overweight pregnant women. This may assist in the development of future guidelines on the content and delivery of advice provided to overweight women in their pregnancy. There are some resources provided in the debrief sheet, on managing weight in pregnancy, which you may find useful.

If I need to speak to someone about the research, whom should I contact?

If you have any questions, queries or concerns regarding the study, please contact the researcher using the contact details below.

Confidentiality

All the information that you provide will be treated in confidence to comply with UK Data Protection Laws. The data will be collected anonymously.

What will happen if I don't want to carry on with the study?

Your participation in this study is entirely voluntary. Once you have pressed the submit button your data cannot be withdrawn. However, if you no longer wish to participate in the questionnaire you can log off the site at any time, and any data will not be saved.

How will we use the results of this research?

The results of the study will contribute towards a postgraduate degree (i.e. PhD). It is expected that the results will also be published in a scientific journal.

Am I able to know the results of the study?

Yes, if you would like a summary of the results, please contact the researcher (details below).

Who has reviewed the study?

This study has been reviewed and given a favourable opinion by the Sheffield Hallam University Research Ethics Committee.

Contact details:

Janice Smith

Email: janice.smith@shu.ac.uk

Appendix 8

Study 2 Survey

Do healthcare professionals offer 'NICE' advice to overweight women in pregnancy? An investigation into what determines the advice provided and intervention offered.

By ticking the box below you are agreeing to participate in this survey.

By ticking the box below you are agreeing for your data to be used in this study, or subsequent studies.

Occupation: _____

Age: _____

Ethnicity: _____

Length of time working in antenatal care: _____

Below are a list of questions which aim to gain an insight into your experiences of providing care to overweight pregnant women.

Health in Pregnancy

1. Please rank in order from 1-7 (1 being very important, 7 being not as important) how important you consider each of the issues below to be during a consultation with a pregnant woman.

Smoking _____

Stress _____

Domestic abuse _____

Relaxation _____

Gestational weight gain _____

Alcohol _____

Taking vitamin supplements _____

2. How would you define overweight?

3. Do you use the term 'overweight' when discussing weight above BMI 29 with patients?

Yes

☐

No

☐

4. If yes, why do you use the term 'overweight'?

5. If no, do you use any other term? if so what term to you use, and if so why?

For the following questions, the term 'overweight' is defined as a BMI 25-29.

6. In your opinion, please list the barriers preventing overweight women from leading a healthy lifestyle in pregnancy?

7. In your opinion, please list the factors that facilitate overweight women in leading a healthy lifestyle in pregnancy?

Knowledge

8. Are you aware of any guidelines for managing overweight in pregnancy?

Yes ☐

No ☐

9. If yes, please list what these are in the box provided.

10. From the list of guidelines you have provided above (Question 9), rate how knowledgeable you feel about the content of these, using the scale below?

Not knowledgeable		Somewhat knowledgeable		Knowledgeable		Very knowledgeable	
-------------------	--	------------------------	--	---------------	--	--------------------	--

11. Please answer below, which set of guidelines you think the extracts below are taken from:

a) Many pregnant women ask health professionals for advice on what constitutes appropriate weight gain during pregnancy.

b) Women who are a normal weight for their height (BMI 18.5–24.9) should gain 11.5–16 kg (25–35 pounds) during pregnancy. Overweight women (BMI 25–29.9) should gain 7–11.5 kg (15–25 pounds) and obese women (BMI greater than 30) should only put on 5–9 kg (11–20 pounds).

c) At the earliest opportunity, for example, during a pregnant woman's first visit to a health professional, discuss her eating habits and how physically active she is. Find out if she has any concerns about diet and the amount of physical activity she does and try to address them.

d) Do not weigh women repeatedly during pregnancy as a matter of routine. Only weigh again if clinical management can be influenced or if nutrition is a concern.

12. Do you think there are any obstetric risks associated with being overweight in pregnancy?

No risk		Very low risk		Low risk		High risk		Very high risk	
---------	--	---------------	--	----------	--	-----------	--	----------------	--

13. If yes, please list what you think these are in the box provided.

Advice

14. Please rate on the scale below, how confident you feel raising the issue of weight with a patient?

Not confident		Somewhat confident		Confident		Very confident	
---------------	--	--------------------	--	-----------	--	----------------	--

15. If you answered Confident/Very confident, what has contributed to you feeling confident in raising weight with a patient?

16. If you answered Not confident/Somewhat confident, what has contributed to you feeling not as confident with raising weight with a patient?

17. Have you ever had a negative reaction to you raising the issue of weight with a patient? If yes, please could you briefly describe what happened?

18. Has a patient reacted positively when you raised the issue of weight with her? If yes, please could you briefly describe what happened?

19. Do you think there is a need for national guidelines to support overweight women in pregnancy?

Yes ☐

No ☐

20. If yes, what information should these guidelines contain?

21. Please tick below, what you think would help you to feel more confident in discussing weight with a patient? (Please tick more than one if appropriate)

Training ☐

National guidelines ☐

Policies ☐

Routine weighing ☐

Your own BMI ☐

Patient raises issue of weight ☐

Other

22. What barriers do you feel impact on your ability to raise the issue of weight with overweight pregnant women?

23. What factors do you feel make it easier to raise the issue of weight with overweight pregnant women?

24. Do you always provide healthy lifestyle advice to overweight pregnant women?

Yes ☐ No ☐ Sometimes ☐

25. If yes, what advice do you provide?

26. If sometimes, when do you provide the advice and what do you say?

--

27. Please tick whether you provide the same advice to overweight women as:

Normal weight women ☐

Obese women ☐

Neither ☐

28. How confident are you that the information and/or advice you provide can change overweight women's behaviour?

Not confident	<input type="checkbox"/>	Somewhat confident	<input type="checkbox"/>	Confident	<input type="checkbox"/>	Very confident	<input type="checkbox"/>
---------------	--------------------------	--------------------	--------------------------	-----------	--------------------------	----------------	--------------------------

29. In your opinion what factors might influence whether your information/advice has an effect on changing behaviour?

--

30. Please indicate below, which professions you feel are best placed to offer healthy lifestyle advice to overweight pregnant women? (Please tick more than one if appropriate)

Obstetricians/Gynaecologists ☐

Midwives ☐

Health visitors ☐

GPs ☐

Dieticians ☐

All of the above ☐

None of the above ☐

Other

31. Why do you think this/these professionals are best placed to provide healthy lifestyle advice to overweight pregnant women?

--

Intervention

32. In your opinion, when is the most opportune time to support overweight women to change their lifestyle? (Please tick more than one if appropriate)

Pre-pregnancy	<input type="checkbox"/>
First trimester	<input type="checkbox"/>
Second trimester	<input type="checkbox"/>
Third trimester	<input type="checkbox"/>
Post-partum	<input type="checkbox"/>
Other	<input type="text"/>

33. What do you think an effective intervention to support overweight women to change their lifestyle would include?

34. In your opinion, where is the most appropriate place to deliver such an intervention?

Primary care	<input type="checkbox"/>
In the community (e.g. Children's centre)	<input type="checkbox"/>
Hospital based	<input type="checkbox"/>
Other	<input type="text"/>

Your characteristics

As part of this survey it would be helpful to know some of your characteristics, if you would prefer not to answer one or more of the questions, that is fine, just choose 'skip this question' and move onto the next screen.

1) What is your BMI? _____

2) If you do not know your BMI, what is your height and weight approximately?

Height _____ cms

Weight _____

3) Do you think your own BMI influences the advice you provide to patients?

Yes ☐

No ☐

4) If yes, in what ways do you feel it influences the advice?

5) Are you aware of your own BMI when speaking to patients?

Yes ☐

No ☐

6) If yes, why is this?

7) Has a patient ever commented on your BMI when you were discussing their weight with them?

Yes ☐

No ☐

8) If yes, what were the comments?

Please provide any further comments in the space provided below.

Thank you for taking the time to complete this survey

Appendix 9

Study 3 Interview Schedule



Faculty of Development and Society

Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy

Interview Schedule

WARM UP (5 minutes) Desired outcome: to know what their definition of a healthy lifestyle is

- C. I would like you to think of what it means to lead a healthy lifestyle during pregnancy. How would you describe this?
- D. What things would you do or not do to show you are leading a healthy lifestyle? (*PROBE: eating behaviours, physical activity etc*).

PRIOR TO PREGNANCY (10 minutes) Desired outcome: understanding of what their health behaviours were like pre-pregnancy?

For the rest of the interview we are just going to focus on eating behaviours and physical activity. So when I use the term 'healthy lifestyle' it is predominantly these two behaviours I am referring to. I want to spend a few minutes talking about what kind of health choices you made before you became pregnant.

- G. Would you have considered yourself to lead a healthy lifestyle before becoming pregnant? Tell me more about what things you did or didn't do that made you feel you were or were not leading this lifestyle (*PROBE: eating behaviours- portion sizes, junk food, snacks. Physical activity- activities at home e.g. housework, Wii Fit, Leisure or at work*).
- H. Was there anything that stopped you leading the kind of healthy lifestyle you wanted before pregnancy? (*PROBE: finances, work, other children, time restrictions, limited access to shopping, transport*).

DURING PREGNANCY (25 minutes) Desired outcome- what they see as a healthy lifestyle during pregnancy, how do they feel this has changed throughout their pregnancy? What are the barriers and facilitators enabling these changes? What information have they received about healthy lifestyle throughout their pregnancy and what has been the source of this information?

I would like you to try and think about what changes you have made to your lifestyle throughout this pregnancy.

- J. You have identified that (*whatever the group have identified as ways they lead healthy lifestyles*) means you are living a healthy lifestyle in this pregnancy. Has this changed since you became pregnant? Why do you think it has changed?
- K. Have making these changes been easy or difficult? Can you explain why? Do you think you will maintain these changes once your baby is born? Why? (*PROBE: personal reasons e.g. motivation, health, stress, unwell; social factors e.g. supportive friends, partner, environmental factors e.g. access to facilities, weather*).
- L. What have you been advised about how much weight you should gain in pregnancy? Where did this information come from? (e.g. family, partner, friends, healthcare professionals, internet, books) Are you following it?
- M. What have you heard about what you should eat in pregnancy? Was this advice clear? Did you understand it?
- N. Have you received any advice about what physical activity you are able to do in pregnancy? Where did you receive this advice? Do you understand it? If you followed this advice or not what were the reasons that enabled you to do or not do it?
- O. You have said that you received advice about (*whatever has been said about eating and physical activity*) how easy or difficult is it to follow this advice? What are the reasons that make it easy/difficult to follow? *LIST THESE*.
- P. How important is it that you follow the advice your midwife/obstetrician gives you regarding healthy lifestyle in pregnancy? Why is this/or not important?

Desired outcome: understand how women would feel if staff raised their weight was an issue?

- A. How would you feel if your midwife/obstetrician raised your weight as an issue during pregnancy?
- B. What approach would you like them to use?
- C. What type of information/advice would you like them to say?
- D. What would you not like them to say?

CLOSURE (5 minutes)

- C. You have provided some very insightful comments about healthy lifestyle during pregnancy today.
- D. Thank you for taking the time to participate. Any questions?

Appendix 10

Study 3 Information Sheet



Faculty of Development and Society

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy

We would like to invite you to take part in our research study. Before you decide, it is important for you to understand the purpose of the research and what it will involve. **Please take time to read the following information carefully and discuss it with friends, relatives** if you wish. Please ask us, if there is anything that is not clear, or if you would like more information.

What is the purpose of the study?

We are interested in understanding if pregnant women with a Body Mass Index (BMI) between 25-29 find it difficult or not to follow a healthy lifestyle throughout their pregnancy. It is anticipated this may lead to tailoring interventions which may address some of the reasons identified. You are not obliged to take part in this study. Participation is entirely voluntary and is in no way related to the treatment you will receive in the future if you are a patient within maternity services.

Why have I been invited?

You have been recruited into the study as you meet the entry criteria: over 18 years old, single pregnancy (carrying one baby only) or within one year postpartum, first or second pregnancy, and a BMI between 25-29.

How long is the study?

You will be asked to participate in a 30-45 minute focus group to discuss some of the reasons for pregnant women following or not following a healthy lifestyle throughout their pregnancy.

Do I have to take part?

Your participation in this study is entirely voluntary. If you agree to take part, we will ask you to sign a consent form. You are free to withdraw from the

study at any time without giving a reason. This would not affect the standard of care you receive in the future.

What will I be asked to do if I take part?

You will be asked to attend a group session with other women which will last approximately 30-45 minutes and answer some questions to understand better reasons why it may be difficult (or not) to follow a healthy lifestyle in pregnancy.

What are the possible disadvantages and risks of taking part?

Discussing weight and a healthy lifestyle may be a sensitive issue for some women to discuss. However, discussion within the focus group will be managed sensitively and professionally. You do not have to answer any questions you do not want to.

How will I benefit from participating in this study?

You will receive a £10 high street gift voucher for participating in this study. Also by participating you will be contributing to our understanding of women's experiences of following a healthy lifestyle during pregnancy. Ultimately it is hoped this would contribute further to the development of future maternity care.

If I need to speak to someone about the research, whom should I contact?

If you have any questions, queries or concerns regarding the study, please contact the researcher using the contact details below.

Confidentiality

All the information that you provide will be treated in confidence to comply with UK Data Protection Laws. Your identification will only be in the form of a number and your initials (unique identifier). In the event that the results of the study are published, your identity will remain anonymous. Some direct quotes may be used from the focus group. To ensure anonymity is maintained each participant will be assigned a pseudonym. Members of the research team may look at the information that you have provided to check that the study is being carried out correctly. These members will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty. Only members of the research team will have access to the study data.

Please be advised that although the researcher will take every precaution to maintain confidentiality of the data focus group participants will be asked to agree to maintain the confidentiality of their fellow participants.

What will happen if I don't want to carry on with the study?

Your participation in this study is entirely voluntary. You are free to withdraw from the study at any time without giving a reason. When the researcher transcribes the data from the focus group you will be sent a copy of your own contributions to the focus group, so that you can check you are happy for everything you have said to be included in the data from the study. At this point you can decide to remove sections or all your data from the study, if you wish. However, the researcher will ask you to inform her of this within two weeks; if no reply is received in this time, it will be assumed you agree for your data to be part of the study.

How will we use the results of this research?

The results of the study will contribute towards a postgraduate degree (i.e. PhD). It is expected that the results will also be published in paper in a scientific journal.

Am I able to know the results of the study?

Yes, if you would like a summary of the results, please contact the researcher (details below).

Who has reviewed the study?

This study has been reviewed and given a favourable opinion by the Sheffield Hallam University Research Ethics Committee and NHS Ethics Proportionate Review.

Contact details:

Janice Smith

Email: janice.smith@shu.ac.uk

Tel: (0114) 225 6622

Research supervisor:

Dr Madelynne Arden, C.Psychol, AFBPsS, Health psychologist

Email: m.arden@shu.ac.uk

Tel: (0114) 225 5623

Appendix 11

Study 3 Consent Form & Debrief Sheet

Focus Group Consent Form Framework

Exploring the experiences of women attempting to follow a healthy lifestyle throughout pregnancy

This project is being undertaken as part of a PhD project within the Faculty of Development and Society at Sheffield Hallam University.

The overall purpose of the project is to understand some of the reasons why women find it difficult or not to follow a healthy lifestyle in their pregnancy.

The purpose of the focus group is to gain women's understanding of healthy lifestyle in pregnancy and perspectives on what they feel may have contributed to them finding it difficult or not to follow a healthy lifestyle throughout their pregnancy.

The focus group will last for approximately 30-45 minutes. It will be recorded on tape, if you are in agreement.

The tape is purely to assist the interviewer in remembering what has been said and to save time during the group. You may leave or ask for the tape recorder to be switched off at any point, if you wish. The content of the tape will be used to transcribe a record of the focus group. You will not be named in this transcript and the contents will not be disclosed to anyone beyond the research team. The tapes will be destroyed at the end of the project.

You may terminate your participation in the focus group at any stage and may withdraw your consent for the use of information gained from the group (please see information sheet for further details or discuss with interviewer). Any personal material from the focus that is used in project reports and academic papers will be quoted using a pseudonym and anything that could identify you will be removed.

During the focus group you will be asked about your own experiences in attempting to follow a healthy lifestyle throughout your pregnancy. You do not have to answer any questions that you do not want to and the interviewer will respect your decision.

Please be advised that although the researcher will take every precaution to maintain confidentiality of the data focus group participants will be asked to agree to maintain the confidentiality of their fellow participants.

Thank you for agreeing to take part in this group.



PARTICIPANT CONSENT FORM

Title of Study: Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy

Name of Researcher: Janice Smith

Name of Participant:

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis.

☐

3. I understand that my details will be kept confidential.

☐

4. I understand that the focus group will be recorded and that anonymous direct quotes from the interview may be used in the study reports.

☐

5. I agree to maintain the confidentiality of the information discussed by all participants and researcher during the focus group session

☐

6. I understand that my data from this study will be anonymised and that only members of the research team will have access to the data and my personal information.

☐

7. I agree to take part in the above study.

☐

Please initial boxes

Name of Participant

Date

Signature

When the researcher transcribes the data from the focus group you will be sent a copy of your own contributions to the focus group, so that you can check you are happy for everything you have said to be included in the data from the study. At this point you can decide to remove sections or all your data from the study, if you wish. However, the researcher will ask you to inform her of this within two weeks; if no reply is received in this time, it will be assumed you agree for your data to be part of the study.

Please provide an email address where your transcribed data can be sent to



Faculty of Development and Society

Exploring experiences of women attempting to follow a healthy lifestyle throughout pregnancy & postpartum

Debrief Sheet

I would like to thank you for taking the time to participate in this study. Your contribution has been invaluable.

If you would like to read further information on topics relating to healthy lifestyle in pregnancy, please see information on the Tommy's charity website:

www.tommys.org

Appendix 12

Sample of Transcribed Data (Study 3)

Sample of Transcribed Data

#	Pt 5	Transcription
1		<i>Ok. I'd like you to think about what it means to lead a healthy lifestyle in</i>
2		<i>pregnancy. What do you think this is?</i>
3	Vicky	Eating fruit and veg, innit, and stuff like that.
4		<i>What kind of things would you do or not do to show you're leading a healthy</i>
5		<i>lifestyle?</i>
6	Vicky	What do you mean?
7		<i>Like drinking, smoking.</i>
8	Vicky	Oh, I don't drink or smoke.
9		<i>So when you say you would eat more fruit and veg. Would you eat more</i>
10		<i>when you're pregnant?</i>
11	Vicky	Yeah since I found out I were pregnant yeah. Cut all alcohol out, and
12		stopped smoking and started eating loads of fruit and veg.
13		<i>Did you smoke before?</i>
14	Vicky	Yeah.
15		<i>And you've stopped all that?</i>
16	Vicky	Yeah, yeah.
17		<i>Well done that's an achievement. How did you manage to stop?</i>
18	Vicky	I don't know.
19		<i>Did you smoke in your previous pregnancies?</i>
20	Vicky	No, nothing.
21		<i>What motivated you to stop?</i>
22	Vicky	I think it's baby in't it. I wouldn't like it if it were me. When I see
23		pregnant women smoking, I feel like smacking them. I'm sorry but in't it, that
24		poor little baby.
25		<i>That's fair enough. I suppose some people struggle with the willpower of it.</i>
26	Vicky	Yeah they do.
27		<i>So, for the rest of our conversation when I talk about healthy lifestyle, I mean</i>
28		<i>diet and physical activity specifically. So, would you have considered</i>
29		<i>yourself to lead a healthy lifestyle before becoming pregnant?</i>
30	Vicky	I started Slimming World before I become pregnant.
31		<i>Have you continued with that?</i>
32	Vicky	No I stopped that, because obviously I'm craving ice cream, and
33		you're not meant to eat ice cream when you're in Slimming World, are ye.
34		So I stopped going.
35		<i>So were you trying to manage your weight before becoming pregnant?</i>
36	Vicky	Yeah at first because I'd got up to 16 stone, after me eldest. After me
37		youngest daughter. And then I lost some weight and then I got pregnant.
38		<i>Goodness, you've done really well.</i>
39	Vicky	And then I lost some and then I got pregnant. And stuck it all back
40		on.
41		<i>In your previous pregnancies when you said you put a lot of weight on, what</i>
42		<i>what influenced that?</i>
43	Vicky	You don't seem to be bothered when you're eating chocolate and
44		you're pregnant, 'cause your gonna get fat anyway.
45		<i>Yeah it's difficult to tell.</i>
46	Vicky	It's only when baby comes you realise how much weight you've put on.

Appendix 13

Sample of Initial Themes (Study 3)

Study 3 Sample of Initial Themes

#	MAIN THEMES (CODES)	SUBSECTION	DESCRIPTOR	EXAMPLES (SCRIPT NUMBERS)
1	Healthy lifestyle	Meaning	Definition of Healthy lifestyle	Pt 2: 4, 5, 7-9
				Pt 3: 3-8
				Pt 4: 2-8
				Pt 7: 3, 4
		Behaviour	Evidence for leading a healthy lifestyle	Pt 1: 3, 13
				Pt 4: 12-18, 20-30
				Pt 7: 10, 11, 14, 15, 20, 21
2	Lifestyle changes since pregnant	Behaviours	Smoking	Pt 5: 14
			Alcohol	Pt 5: 11
				Pt 1: 19
				Pt 2: 21-23, 25, 43-44
			Diet	Pt 5: 12, 56-57
				Pt 4:
				Pt 3: 25, 47
				Pt 7: 49
			Physical activity	Pt 3: 29
		Factors influencing change	Health of baby	Pt 1: 84
				Pt 2: 39-41
				Pt 5: 22-24
			Family	Pt 4: 58-62
			GWG	Pt 1: 60-61
			Knowledge	Pt 7: 147, 148, 153, 155, 156, 158-161
			Attitude	Pt 3: 40-41
				Pt 7: 150, 151
		Implementing change	Easy	Pt 2: 108-109
			Difficult	Pt 2: 45, 50, 51, 53, 54, 56, 57, 112-114
				Pt 7: 21

Appendix 14

Study 4 Interview Schedule

Faculty of Development and Society

Mum knows best? Factors that determine healthy lifestyle choices in pregnancy.

Interview Schedule

INTRODUCTION

E. Introduction

F. Description of the interview

I would like to discuss with you some of your thoughts on what influences you to lead a healthy lifestyle in pregnancy or not. You do not have to have any special knowledge in this area I just want to hear about what your thoughts are regarding healthy lifestyle in pregnancy.

1. Knowledge

(Aim: to understand participant's level of knowledge regarding a healthy lifestyle during pregnancy)

- a. What have you heard or read about the kind of things you need to do in pregnancy to follow a healthy lifestyle?(PROMPT: eating healthy, physical activity, no alcohol, no smoking, vitamins, rest).
- b. Why do you think you need to be doing this (provide some of the examples said for the previous answer)?
- c. Are you aware of any information (leaflets/guidelines etc.) that provides you with guidance about leading a healthy lifestyle during pregnancy?

2. Intentions

(Aim: to understand what their intentions are to lead a healthy lifestyle, and what has influenced this decision)

- a. Do you feel you need to follow a healthy lifestyle during your pregnancy?
- b. What influences your decision to follow/or not follow a healthy lifestyle during pregnancy?
- c. You said you (whatever change was made) when you became pregnant. Why do you think becoming pregnant was the time you made that change?
- d. Was there any other time in your life you wanted to make these changes?

3. Skills

(Aim: to assess practical and interpersonal skills to lead them to making changes or not)

- a. Have you made any changes to your lifestyle since becoming pregnant?
- b. If yes, how have you made these changes? (PROMPT: skills, abilities effecting behaviour change)
- c. Have making these changes been easy or difficult?
- d. What has made it easier or difficult for you to implement these changes? (PROMPT: partner, Fit mums, support of midwife)

Alternative if they haven't made changes.

- e. What does it mean to you to lead a healthy lifestyle in pregnancy?
- f. If you haven't thought about making any changes, what has influenced this decision? (Explore: peers, family, media, knowledge from different sources)
- g. Why do you think some women choose to follow a healthy lifestyle in pregnancy?

4. Social role & identity

(Aim: to understand what are the social norms, group norms for each participant, learning and modelling from others)

- a. With regard to lifestyle choices, in your circle of family and friends, what is the expectation of what to do, or not do, when you're pregnant?
- b. Have you observed other people around you leading a healthy lifestyle in pregnancy?
- c. If yes, what influence has this had on the choices you have made during your pregnancy?
- d. Have you had any advice about lifestyle from family and friends? (PROMPT: from mum, friends having been pregnant, shared experiences, myths "eating for two").
- e. Would your family and friends expect you to make similar lifestyle choices they have done during their pregnancy?
- f. If your family and friends expected you to (provide example of what they said to 3a answer) and you didn't agree, how would you manage that?
- g. Do you feel your family and friends influence the lifestyle changes you make/not make during pregnancy?

5. Beliefs about capabilities *(Aim: to understand participants self-efficacy and perceived behavioural control)*

- a. How much control do you feel you have with making lifestyle changes in your pregnancy? (PROMPT: practically, emotionally, effects of pregnancy).
- b. If you wanted to make a change throughout your pregnancy (provide an example of something they've previously said), what would make it easier for you to change?

- c. What kind of things would make it difficult for you to make that change?
(PROMPT: confidence; skills (e.g. haven't cooked before), limited money).
 - d. How have you felt making the changes you describe (include a change they've already provided)?
6. **Optimism** (*Aim: explore participants self esteem and empowerment to make changes*)
- a. How confident are you that you can maintain these changes for the remainder of your pregnancy or after birth?
 - b. What do you think you need to put in place to maintain these changes?
7. **Beliefs about consequences** (*Aim: to understand participants anticipated outcomes, attitudes, and how they evaluate/appraise these*)
- a. How would you feel if you hadn't made the change(s) you described?
 - b. ALTERNATIVE: If you haven't made any changes, how do you feel about this?
 - c. What impact would not making these changes have? (PROMPT: on partner; children; baby; self; long term & short term consequences).
 - d. Once you've had your baby, looking back at your pregnancy, how do you think you will feel about the lifestyle you led throughout?
8. **Reinforcement** (*Aim: exploring what has contributed to maintaining any behaviour change*)
- a. Have you noticed anything different since making/not making these changes?
(PROMPT: feel healthier; partner & children eating more healthy; feeling fitter).
 - b. What do you feel have been the benefits of making these changes, compared to how you were pre-pregnancy?
9. **Goals** (*Aim: to understand process of goal setting, goal priority, transtheoretical models, and stages of change*)
- a. Did you set any lifestyle goals during pregnancy? (PROMPT: eat healthier; attend antenatal classes; swim one day per week; rest)
 - b. What influenced your decision to set those goal(s)?
 - c. Have you been able to achieve the goals you set?
 - d. How does it feel knowing you are/have achieved those goals?
 - e. What has made it easier to achieve the goal?
 - f. What has made it difficult to achieve the goal?
 - g. Reflecting on this pregnancy, would you have set different goals in hindsight?
 - h. If so, why?
 - i. From the goals you set, which of them are the biggest priority for you?

10. Memory, Attention & Decision processes

(Aim: assess what cognitive processes may impact on decision making)

- a. Thinking about the times when you perhaps haven't, for example eaten healthily, or attended swimming, why do you think that was? (PROMPT: practical issues, tiredness, forgot).

11. Environmental Context & Resources

(Aim: to understand participant's availability to resources, and potential environmental stressors)

- a. To what extent do you feel you have the necessary facilities to lead/not lead a healthy lifestyle where you live? (PROMPT: physical activities, time classes are on; access to shops)
- b. Do you feel at times there are other things in your life that perhaps take precedence over leading a healthy lifestyle during pregnancy? (e.g. work commitments; childcare)

12. Social influences

(Aim: to understand participant's social support, and the influence of this on their decision-making)

- a. During this pregnancy how influential have others been in helping/hindering you to lead a healthy lifestyle? (PROMPT: peers, family, partner, midwife).
- d. Do you feel you have received the support you needed during your pregnancy? (PROMPT: peers, family, partner, midwife).
- e. What impact has having or not having that support had on the choices you've made during this pregnancy?
- f. What information have you received, heard, or read throughout this pregnancy regarding healthy lifestyle?
- g. Has that had any effect on the choices you've made?

13. Emotion

(Aim: to understand emotional factors which may help or hinder decision-making, and what coping strategies, if any are implemented to address these)

- a. How would you describe your emotions throughout this pregnancy?
- b. Do you have any fear or worries throughout this pregnancy?
- b. Have you felt at any time they've had an influence on lifestyle choices you've made?
- c. If yes, how have they impacted on your choices?
- d. Have you developed coping strategies to manage these emotions? (PROMPT: chat with friend/partner, read some information; speak with midwife).

14. Behaviour Regulation

(Aim: to assess participant's ability to self-monitor, and the influence of previous experience on behaviour change)

- a. How has your previous pregnancy/or someone close to you, influenced choices you've made in this pregnancy?
- b. Have you monitored your weight throughout this pregnancy?
- c. If yes, how has this influenced decisions you've made regarding healthy lifestyle?

Thank you for your time. Is there anything you would like to ask?

FINISH

Appendix 15

Study 4 Information Sheet



Faculty of Development and Society

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Mum knows best? Factors that determine healthy lifestyle choices in pregnancy.

Information Sheet

We would like to invite you to take part in our service evaluation. Before you decide, it is important for you to understand the purpose of the evaluation and what it will involve. **Please take time to read the following information carefully and discuss it with friends, relatives** if you wish. Please ask us, if there is anything that is not clear, or if you would like more information.

What is the purpose of the study?

We are interested in understanding what are some of the processes that influence whether women follow a healthy lifestyle in pregnancy or not. It is anticipated this may lead to tailoring interventions, which may help women to be healthy in pregnancy.

Why have I been invited?

You have been invited into the service evaluation as you meet the entry criteria: over 18 years old, single pregnancy (carrying one baby only) or within 6 weeks post-partum, and a body mass index (BMI) >18.5.

How long is the service evaluation?

You will be asked to participate in a 30-45 minute interview to discuss what some of the reasons influencing whether you lead a healthy lifestyle in pregnancy or not.

Do I have to take part?

Your participation in this service evaluation is entirely voluntary. If you agree to take part, we will ask you to sign a consent form. You are free to withdraw from the evaluation at any time without giving a reason. This would not affect the standard of care you receive in the future.

What will I be asked to do if I take part?

You will be asked to attend an interview, which will last approximately 30-45 minutes and answer some questions to understand better what are some of the reasons influencing whether you lead a healthy lifestyle in pregnancy or not.

What are the possible disadvantages and risks of taking part?

It is not anticipated there will be any disadvantages to you taking part in this service evaluation. However, you can withdraw from it or take some time out. You do not have to answer any questions you do not want to.

How will I benefit from participating in this service evaluation?

By participating in the service evaluation you will be contributing to our understanding of reasons influencing whether you lead a healthy lifestyle in pregnancy or not. Ultimately it is hoped this would contribute further to the development of future maternity care. You will receive a £10 high street vouchers a token of our thanks for your contribution.

If I need to speak to someone about the research, whom should I contact?

If you have any questions, queries or concerns regarding the evaluation, please contact the researcher using the contact details below.

Confidentiality

All the information that you provide will be treated in confidence to comply with UK Data Protection Laws. Your identification will only be in the form of a number and your initials (unique identifier). In the event that the results of the study are published, your identity will remain confidential. Some direct quotes may be used from the interview however, you will be assigned a pseudonym to maintain your anonymity. Members of the research team may look at the information that you have provided to check that the study is being carried out correctly. These members will have a duty of confidentiality to you as a research participant and we will do our best to meet this duty. Only members of the research team will have access to your personal and data relating to the service evaluation.

What will happen if I don't want to carry on with the service evaluation?

Your participation in this service evaluation is entirely voluntary. You are free to withdraw from it at any time without giving a reason. When the researcher transcribes the data from the interview you will be forwarded your contribution only, if you provide your email address on the consent form. You will be given a two-week period to read through this data and make any amendments. You are able to completely withdraw your data at this point. If you do not contact the researcher within this time frame for withdrawal of

data, it is assumed you agree for your data to be part of the service evaluation.

How will we use the results of this service evaluation?

The results of the evaluation will contribute towards a postgraduate degree (i.e. PhD). It is expected that the results will also be published in a scientific journal and may be presented at conferences.

Am I able to know the results of the service evaluation?

Yes, if you would like a summary of the results, please contact the researcher (details below).

Who has reviewed the service evaluation?

This evaluation has been reviewed and given a favourable opinion by the Sheffield Hallam University Research Ethics Committee.

Contact details:

Primary Researcher	Project Supervisor
Janice Smith Email: janice.smith@shu.ac.uk	Dr Maddy Arden C.Psychol AFBPsS Email: m.arden@shu.ac.uk Telephone: (0114) 225 5623

Appendix 16

Study 4 Consent Form & Debrief Sheet



PARTICIPANT CONSENT FORM

Title of Study: Mum knows best? Factors that determine healthy lifestyle choices in pregnancy.

Name of Researcher: Janice Smith

Name of Participant:

Please initial boxes

1. I confirm that I have read and understand the information sheet for the above evaluation and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that I if I wish I can have my transcribed data emailed to me, and that I have two weeks to make any amendments. If I do not respond after this period, it is assumed that the data will be included in the analysis. ☐
3. I understand that my details will be kept confidential. ☐
4. I understand that the interview will be recorded and that anonymous direct quotes from the interview may be used in reports. ☐
5. I understand that my data from this evaluation will be anonymised and that only members of the research team will have access to the data and my personal information. ☐
6. I agree to take part in the above service evaluation. ☐

Name of Participant

Date

Signature

Name of Researcher

Date

Signature

Please provide an email address where your transcribed data can be sent to:



Faculty of Development and Society

Mum knows best? Factors that determine healthy lifestyle choices in pregnancy.

Debrief Sheet

I would like to thank you for taking the time to participate in this service evaluation. Your contribution has been invaluable.

If you would like to read further information on topics relating to healthy lifestyle in pregnancy, please see some resources below.

1. Tommy's charity website:

www.tommys.org

2. NICE (2010). Weight management before, during and after pregnancy:

<http://www.nice.org.uk/nicemedia/live/13056/49926/49926.pdf>

Appendix 17

Sample of Transcribed & Coded Data (Study 4)

Sample of Transcribed and Coded Data

Pt	Transcript	TDF
Emma	And like where I say oh I feel rubbish today and I want us to eat something healthy I'll be like right okay what shall we have then? Shall we have some chicken or fish, you know, it just makes, you know, a big difference really	12- Social Influence
R	<i>It does, it definitely does. With regard to lifestyle choices you said do you know you didn't want to be the only one in like your circle of friends, what do you think from your family and friends was the expectation you would do during pregnancy?</i>	
Emma	I don't think my friends or anybody had expectations, I think it was me putting expectations on myself really, I think my family might've commented if I'd have started eating a lot more, you know, they'd have probably acknowledged the fact that I'm eating a bit too much or they'd have probably said something to me, but my friends or anybody I don't think they would've said anything, you know, but you know that you're always judged and I would judge other people if I, you know.	12- Social Influence
R	<i>And you don't want to</i>	
Emma	You don't want to.	
R	But you just do.	
Emma	But you just do, it's just human nature isn't it? It's just the way it is, so I don't think there were expectations placed on me, I think it was more me placing expectations on myself.	8- Intentions
R	<i>Yes, other people around you have you observed them leading a healthy lifestyle in pregnancy?</i>	
Emma	Yes, to be honest, because a lot of my friends are PE teachers.	
R	<i>Oh right, that would be my worst nightmare</i>	
	I know, so, you know, my friends that have been pregnant and things we all tend to lead pretty healthy lifestyles, you know, we're all very aware of it and I think that's the thing now with the media and everything you're so aware and magazines, pregnancy magazines, books, internet, you're so aware of what you should and shouldn't do it's just I don't know, I think most people now, certainly in my circle, you know, they definitely maintain.	12-Social Influences 1- Knowledge

Appendix 18

Study 4: Domains Influencing Lifestyle Decisions for Pregnant Women who are Overweight, compared with Normal Weight and Obese Pregnant Women

Domains Influencing Lifestyle Decisions for Pregnant Women who are Overweight, compared with Normal Weight and Obese Pregnant

Domain	Specific factors influencing behaviour	Sample quote from interviews	Number of items reported		
			NW women (n=6)	WO women (n=6)	OB women (n=6)
Capability					
Skills	Demonstrates skills to implement changes	"I think it [WeightWatchers] gives you healthy habits and it gives you an idea of what you should be eating and what portion sizes looks like...it makes you aware of what you put in your mouth" (Nina, WO, 2 nd pregnancy)	3	3	2
	Lack of skills to make changes	"Well [information] leaflets like. I mean I go on the internet to have a look, so if I see ought I'll say oh I'll have a look on the internet for that" (Maria, WO, 2 nd pregnancy)	0	1	2
		"...the biggest issue for me is being able to take a second and hitting 'pause' when there's cake and buns, and thinking I'll have fruit instead" (Tania, OB, 4 th pregnancy)			
Knowledge	Information helped make changing easier	I looked on the NHS website. It was just about what things you can't and can't eat and things you should or shouldn't be doing exercise wise. It was quite informative because I've not looked into anything before really (Sarah, WO)	1	3	1

	Not having clarity of information	1 st pregnancy) ...everytime I've seen someone [midwife] I've had a leaflet [Obesity in Pregnancy] shoved under my nose. I don't read it. They don't talk to me about the leaflet. They slide it across the table as if it's like the big elephant in the room, but I'm the elephant (Daphne, OB, 3 rd pregnancy)	0	2	3
Behaviour regulation	Regularly monitored weight throughout pregnancy	"I'd felt like I'd lost weight so that made me weigh myself because I worried a little bit then that maybe I shouldn't be losing weight...then when I felt like I was getting a bump I weighed myself a little bit more just to check that I was putting the weight on" (Lisa, NW, 1 st pregnancy)	3	3	1
	Altered food intake to compensate for weight gain	"But knowing that I may have had things... I wouldn't ordinarily have eaten and then knowing that I've put weight on does make me think right I'll cut back or eat healthily for a couple of days rather than eating whatever I want" (Sarah, WO, 1 st pregnancy).	0	1	0
Opportunity					
Social influences	My family are supportive and this helps me to feel motivated to make healthier choices	"You know if I'm going for meals at their house they'll cook meals that they know I can eat and perhaps are healthier" (Stacey, WO, 2 nd pregnancy)	2	2	3
	Tend to be more influenced by partner	"My husband mainly, because I think he shares the same sort of viewpoint that I do that, you	2	2	3

	Positive support from midwife has made it easier to implement changes and maintain them	know, you need to be healthy, you need to maintain a healthy lifestyle" (Emma, NW, 2 nd pregnancy)	0	5	2
	Didn't feel I received the support I needed from my midwife	"Well they tend to know best for you don't they" (Louise, WO, 4 th pregnancy)	3	1	3
	Observed peers making healthier dietary choices during pregnancy	I think the communication between everyone [maternity staff] involved in my care has been poor and I think that's had an onward impact... in terms of what I wanted to achieve throughout my pregnancy (Tania, OB, 4 th pregnancy)	4	4	3
		"I've got quite a few friends that are pregnant at the moment, and we all have the same circle, they come to my house or I go to theirs, we bring healthy food and none of us are real drinkers, we don't smoke" (Sarah, WO, 1 st pregnancy)			
Environmental context & resources	I have all the necessary facilities and resources in my area to lead a healthy lifestyle High calorie foods are readily available	"Yes I think there's a lot round here that we can do" (Nina, OW, 2 nd pregnancy)	6	5	5
		"[where I live] it's just full of takeaways and I think oh, shall I, should I" (Maria, WO, 3 rd	1	4	3

		pregnancy) "I am at my mothers and I am picking in her fridge there's always treats..." (Tania, OB, 4 th pregnancy)			
Motivation					
Social role & identity	Family members expectations are eat healthier and/or do some physical during pregnancy	"You don't smoke, you don't drink, you eat healthily. I suppose those are the expectations" (Nina, OW, 2 nd pregnancy)	6	5	1
Beliefs about capabilities	I feel in complete control to make lifestyle changes during pregnancy	"I think I have all of the control" (Wendy, NW, 3 rd pregnancy)	6	6	4
Optimism	Feel optimistic I can maintain lifestyle changes	"...very confident, yeah, I can maintain the changes made [eating more fruit and walking]" (Maria, WO, 3 rd pregnancy)	4	4	4
Intentions	Continue to eat healthy and/or physical activity as did in pre pregnancy	"No, not really [made lifestyle changes]. I've just done what I've been doing before [becoming pregnant]" (Wendy, NW, 3 rd pregnancy)	3	2	0
	Need to lead a healthy lifestyle by changing diet and physical activity	"I try to eat best I can and I don't smoke and I don't drink or anything like that..." (Louise, WO, 1 st pregnancy)	2	4	3
Goals	Specific, measurable, and achievable	"...gentle exercise five days per week" (Sarah, WO, 1 st pregnancy)	4	3	1

	General goals	<p>"... three morning per week indoor cycling" (Wendy, NW, 3rd pregnancy)</p> <p>"not to overeat" (Bridget, OB, 2nd pregnancy)</p>	0	1	2
Beliefs about consequences	If I hadn't changed something might have happened to my baby	"...just eat what you want, within reason" (Gayle, OB, 2 nd pregnancy)	4	5	2
	It's OK to eat what I want in pregnancy	"I think with me having two that are healthy and happy, and the choices that I made then of keeping healthy and exercising have influenced me to do the same" (Wendy, NW, 3 rd pregnancy)	1	0	2
	My baby turned out ok when I made similar choices when previously pregnant	"Well with me other two I think I could have ate a lot better. But they turned out okay so" (Maria, WO, 2 nd pregnancy)	2	3	0
	Experience of weight gain in previous pregnancies	"I gained two stone when I was pregnant last time so kind of that's about what I would want to gain this time...because I know that was okay to lose again after having the baby" (Becky, NW, 2 nd pregnancy)	0	2	3
		"It was my first pregnancy that I gained all my weight... and then six months later I was pregnant again and I just gained the normal amount" (Daphne, OB, 3 rd pregnancy)			
Reinforcement	I noticed lots of physical differences when I made lifestyle changes during pregnancy	"I am not as tired even though I am not sleeping great. But I am not really, I don't feel lethargic, I don't feel down or anything like that... I just feel better I think (Sarah, WO, 1 st	1	4	5

		pregnancy)			
Emotion	<p>Didn't feel emotions changed significantly throughout pregnancy</p> <p>Noticed changes in mood and feelings of anxiety</p> <p>Strategies used (walking/talking to family/deep breathing) to manage adverse feeling</p> <p>Implemented strategies used in pre pregnancy to manage negative emotions during pregnancy</p>	<p>"...just the same as before I think really, I've not felt much different" (Kate, NW, 1st pregnancy)</p> <p>"An emotional mess" (Gayle, OB, 2nd pregnancy)</p> <p>"Don't hold it in; talk about it. If you need to cry then you're best off crying, otherwise it'll just blow up" (Leanne, WO, 1st pregnancy)</p> <p>"There's times for me when I generally feel down in dumps, I am a big comfort eater and then I'll have a binge" (Tania, OB, 4th pregnancy)</p>	<p>4</p> <p>2</p> <p>1</p> <p>0</p>	<p>1</p> <p>5</p> <p>3</p> <p>0</p>	<p>0</p> <p>6</p> <p>2</p> <p>2</p>