Sheffield Hallam University

Physical Activity and Physiotherapy: Moving Forwards

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This Thesis is submitted in partial fulfilment of the requirements of Sheffield Hallam University for the degree of Doctor of Philosophy (article-based).

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Preliminary Information

Contents

0.1 Thesis Abstract

Background
Physical inactivity affects every system in the body and is associated with many chronic diseases. This impacts on the lives of individuals and has substantial social and economic implications. A large proportion of the UK population is insufficiently active and system-wide approaches to promoting physical activity are required. There are over 55,000 physiotherapists in the United Kingdom, yet little is known about physical activity promotion in this domain of healthcare. The overarching research aim is to explore physical activity promotion in physiotherapy practice and to understand the factors that influence current practice.

Method
This programme of research is underpinned by a philosophical position of pragmatism. Within this methodological framework, a systematic scoping review was first undertaken to assess the state of the existing global evidence. Following this, a mixed methods study, was completed using a sequential explanatory design. Phase 1 involved a national, cross-sectional survey of UK physiotherapists. Phase 2 involved a qualitative, explanatory follow-up which aimed to further explain the quantitative findings.

Findings
Thirty-one studies were included in the systematic scoping review. Findings from Phase 1 of the mixed methods study indicated that respondents (n=514) initiate conversations with patients about physical activity but lack a systematic approach. Physical activity status was not routinely assessed, signposting to other services was inconsistent, and knowledge of the physical activity guidelines was poor. These findings were further explained in Phase 2; participants (n=12) highlighted a lack of understanding of key concepts which underpinned the inconsistent approach to physical activity promotion. Phase 2 also identified that physiotherapists focus on short-term restoration of function over longer-term promotion of health.

Conclusion
Physical inactivity is a major public health issue, and physiotherapists have the potential to contribute to tackling inactivity. However, the current approaches identified within this programme of research were inconsistent and unsystematic. Changes in demography necessitate holistic physiotherapy approaches that promote long-term health and wellbeing. Recommendations are made to improve physiotherapy practice in line with the aspiration of orientating healthcare toward prevention.

0.2 Article-Based Thesis

The format of an article-based thesis is substantially different to the traditional monograph Ph.D., however the regulations and assessment criteria for the award remain the same. Sheffield Hallam University's guidance on article-based theses describes the approach as a thesis format in which a number of research articles (between three and five) are produced by the Ph.D. candidate during their period of candidature. These articles will either already be published or will be accepted for publication in peer-reviewed journals at the time of submission. An article-based thesis will usually comprise an introduction including an explanation of the research question(s), the research subject, relevant literature and methodology and a concluding chapter in which the results of the research are summarised and discussed.

This article-based thesis comprises three articles that have published in peer-reviewed journals. The articles report discrete, but linked, projects within the overall programme of research, they are embedded within the thesis with an accompanying narrative.

0.3 Outputs, Contribution Statements and Permissions

Article A

Title	Physical activity promotion in physiotherapy practice: A systematic scoping review of a decade of literature.
Authors	Anna Lowe, Melanie Gee, Dr Sionnadh McLean, Dr Chris Littlewood, Carolyn Lindsay, Simon Everett.
Full Reference	Br J Sports Med 2016; doi: 10.1136/bjsports-2016-096735
Contribution Statement	This piece of work was led by Anna Lowe (AL) who oversaw and was actively involved in all of the research processes at each stage.
Permissions	The BMJ Author Licence allows authors to use their articles for their own non-commercial purposes without seeking permission from the BMJ – the only condition being that a full reference or link to the original is included.

Article B

Title	Physiotherapy and physical activity: A cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists.
Authors	Anna Lowe, Dr Chris Littlewood, Dr Sionnadh McLean, Dr Karen Kilner.
Full Reference	BMJ Open Sport & Exercise Medicine 2017; 3:e000290. doi: 10.1136/bmjsem-2017-000290
Contribution Statement	This piece of work was led by Anna Lowe (AL) who oversaw and was actively involved in all of the research processes at each stage.
Permissions	The BMJ Author Licence allows authors to use their articles for their own non-commercial purposes without seeking permission from the BMJ – the only condition being that a full reference or link to the original is included.

Article C

Title	Understanding physical activity promotion in physiotherapy practice: A qualitative study.
Authors	Anna Lowe, Dr Chris Littlewood, Dr Sionnadh McLean.
Full Reference	Musculoskeletal Science and Practice 2018; doi: 10.1016/j.msksp.2018.01.009.
Contribution Statement	This piece of work was led by Anna Lowe (AL) who oversaw and was actively involved in all of the research processes at each stage.
Permissions	Elsevier journal authors retain the right to include the article in a thesis or dissertation whether in full or in part, subject to proper acknowledgment.

0.4 Abbreviations

Terms are written in full in the text in the first instance and are abbreviated thereafter.

PA	Physical Activity
PI	Physical Inactivity
NHS	National Health Service
NICE	National Institute of Clinical and Health Excellence
BI	Brief Intervention
VBI	Very Brief Intervention
UK	United Kingdom
NCDs	Non-Communicable Diseases
MECC	Making Every Contact Count
BCT	Behaviour Change Technique
AL	Anna Lowe
CL	Chris Littlewood
SM	Sionnadh McLean
AHP	Allied Health Profession/Professional

0.5 Terminology

Physical Activity (PA)	PA is defined as "any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level" (Caspersen, Powell and Christenson, 1985). Despite it being than 30 years since first published this definition of PA still dominates the literature in this field and concurs with other global definitions from the World Health Organisation who define PA as any bodily movement produced by skeletal muscles that requires energy expenditure (World Health Organisation, 2017).
Exercise	Exercise is defined as a subset of PA that is planned, structured, and repetitive and has as a final or an intermediate objective the improvement or maintenance of physical fitness (Caspersen, Powell and Christenson, 1985). Physical fitness is defined as a set of attributes that are either health- or skill-related. The degree to which people have these attributes can be measured with specific tests (Caspersen, Powell and Christenson, 1985).
Physical Inactivity (PI)	PI is defined as performing insufficient amounts of PA, that is, not meeting specified PA guidelines (Tremblay *et al.*, 2017).

0.6 List of Figures

This list does not include figures within published material; these are listed within each published article.

0.7 List of Tables

This list does not include tables within published material; these are listed within each published article.

Chapter 1: Introduction

1.1 Introduction

This chapter sets the scene for the programme of research, it introduces key information about the relationship between physical activity (PA) and health and outlines the scale of physical inactivity (PI). It rationalises the need for change and explains the purpose of this programme of research. This is followed by explicit research aims and objectives and a visual overview of the complete programme of research. The structure of the thesis is explained, and the anticipated contribution of new knowledge is clearly mapped out.

1.2 The Scale of Physical Inactivity

PI is the fourth leading cause of death worldwide (Kohl *et al.*, 2012). In 2012, global comparisons of PI were available for the first time, previously a lack of standardised measurement tools had been a barrier. Hallal *et al.*, (2012) used the World Health Organization Global Health Observatory Data Repository to gain access to comparable data from 122 countries (together comprising 88.9% of the world's population). Findings indicated that 31.1% (95% CI 30.9-31.2) of adults worldwide were physically inactive, with proportions ranging from 17.0% (16.8-17.2) in southeast Asia to about 43% in the Americas and the eastern Mediterranean. Furthermore, the proportion of 13-15-year-olds doing fewer than 60 min of PA of moderate to vigorous intensity per day was 80.3% (80.1-80.5) (Hallal *et al.*, 2012).

In England, 36% of adults were sufficiently active for good health in 2008 and this had risen to 60% by 2012 showing a positive trend (Health and Social Care Information Centre, 2016). Data on PI is often conflicting due to the complexities of measurement and the inconsistencies in reporting which presents an ongoing challenge for researchers and policy makers (Ainsworth *et al.*, 2015). Recent statistics from the Active Lives Survey classified 26% of adults in England as inactive and 61% sufficiently active for good health (that is, achieving 150 minutes of moderate intensity PA or more per week). The Active Lives Survey is an online survey based on a random sample of approximately 198,250 people each year (Sport England, 2017). The representativeness of the sample is considered, and Office for National

Statistics data is used to weight population measures for geography and key demographics. This is the most comprehensive population-level PA surveillance and updated data is released every 6 months (Sport England, 2017). Prior to the Active Lives Survey the best available data was the Health Survey for England data, however this was based on a much smaller sample (8011 adults in 2016) and although it is an annual survey, PA data is not collected every year (Health and Social Care Information Centre, 2017). Thus, the Active Lives Survey is the most current and credible source of information and will therefore inform this thesis going forwards.

It is important to note that the levels of inactivity are influenced by key factors including socioeconomic class, levels of deprivation, age, gender, disability, ethnicity and geographical location (Physical Activity and Health Alliance, 2007). For example, the proportion of adults with no impairments who are considered inactive is 21% but levels of inactivity amongst people with three or more long-term, limiting impairments is 51% (Sport England, 2017). PI is known to rise with age, levels are higher in women than in men, and are increased in high-income countries (Hallal *et al.*, 2012). Furthermore, both men and women who report poor health are significantly more likely to do no PA (Hunter *et al.*, 2015).

Thus, PI is now being comprehensively and consistently monitored and although recent data from England shows some positive trends, levels of PI remain high and disproportionally so with in certain demographic groups.

1.3 Physiological Effects of Physical Inactivity

A lack of PA affects almost every cell, organ, and system in the body causing physiological dysfunction and premature death (Booth *et al.*, 2017). PI directly contributes to the development of over 35 chronic diseases as shown in Figure 1.

Figure 1. Impact of PI on 35 Chronic Diseases (adapted from Booth *et al.*, 2012).

It is estimated that PI causes 6% of the burden of disease from coronary heart disease, 7% of Type 2 diabetes, 10% of breast cancer, and 10% of colon cancer (Lee *et al.*, 2012). The

relationship between PI and many chronic diseases is clear yet the actual mechanisms involved are complex. Chronic diseases are generally characterised by uncertain aetiology, multiple risk factors, a long latency period, a prolonged course of illness, noncontagious origin, functional impairment or disability, and incurability (Goodman *et al.*, 2013). Lee *et al.*, 2012) identified that PI causes 9% of premature mortality which equates to more than 5.3 million of the 57 million deaths that occurred worldwide in 2008. More recently, Booth *et al.*, (2017) estimated that PI makes at least some contribution to more than two million (or 86%) of all deaths in the United States of America per year, based on a failure to reach the current PA guidelines. Booth *et al.*, (2017) went on to propose a model to illustrate the complex interactions between PI and chronic disease. Figure 2 shows the multiple, interrelated causal pathways that link PI with morbidity and mortality.

The complexity of the interactions illustrated in Figure 2, combined with prolonged periods of latency (that is, the potentially extensive time lag between the onset of PI and the recognition of related physiological dysfunction) creates challenges for the research and development of effective programmes in this field.

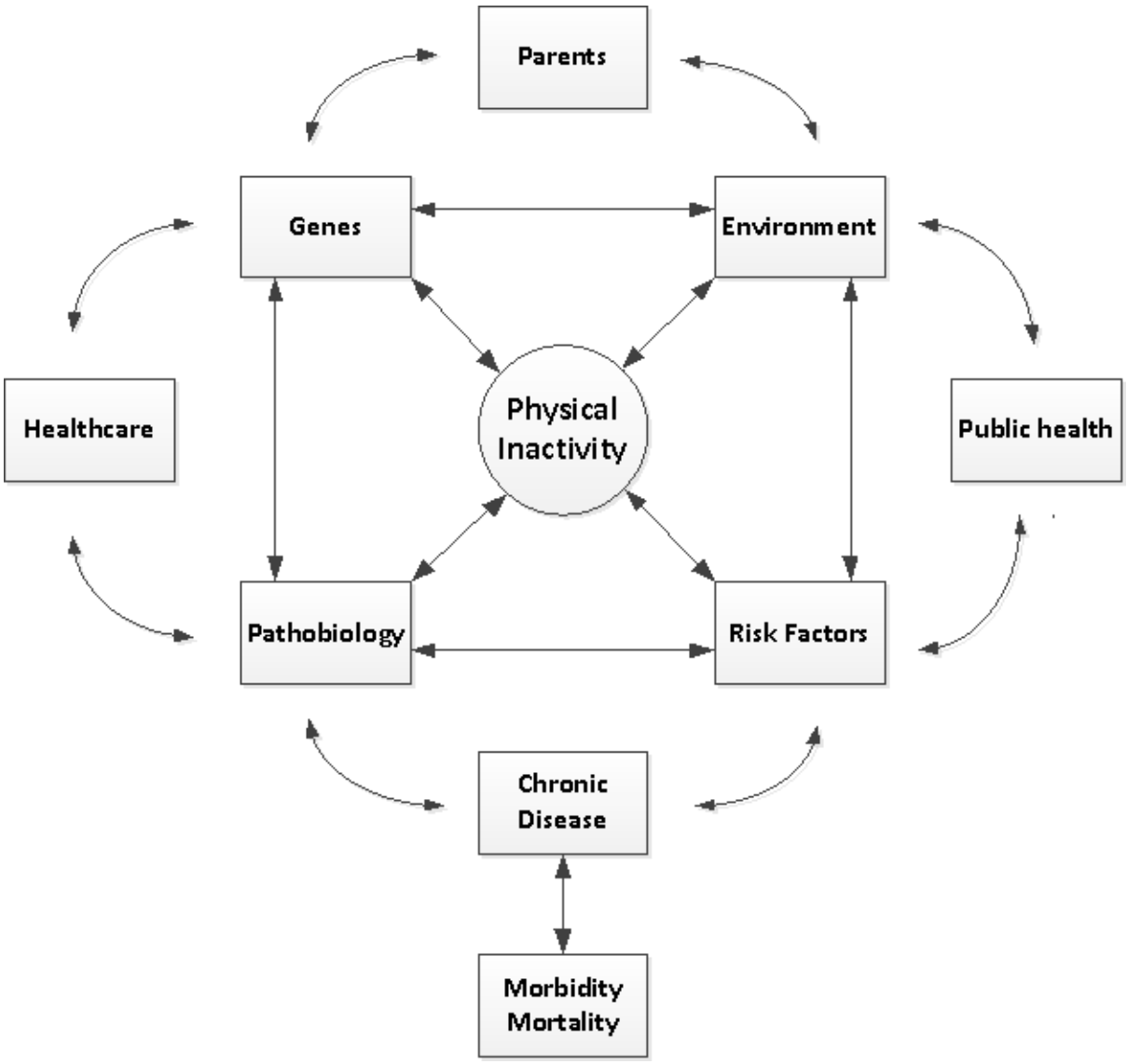

Figure 2. Mechanisms that contribute to chronic disease (adapted from Booth *et al.*, 2017).

1.4 Social and Economic Impact of Physical Inactivity

PI places a significant economic burden on healthcare systems and wider society. Inactive people spend 38% more days in hospital and use significantly more healthcare resources than active people (Sari, 2009). In the most recent global analysis of the economic burden, it is estimated that PI has cost health-care systems 53.8 billion international dollars (a standard measure that allows direct comparison of the economic burden across different

currencies) worldwide in 2013, of which $31·2 billion was paid by the public sector, $12·9 billion by the private sector, and $9·7 billion by households (Ding *et al.*, 2016).

The most recent UK estimate suggests that over £43 billion of National Health Service (NHS) spending (46% of total NHS costs) was due to modifiable risk behaviours (smoking, alcohol, PI, poor diet and overweight/obesity); of this total, £0.9 billion was due to PI-related ill health (Scarborough *et al.*, 2011).

1.5 Promoting Physical Activity

It has been suggested that PA has largely been engineered out of daily life, for example manual labour is less prevalent, levels of active transport are low and technological solutions have contributed to a situation that has been described as "a culture of convenience" (CBC News, 2014). Along with the successful removal of PA, longer-term health has also been engineered out (Booth, Roberts and Laye, 2012). It has been suggested that the only valid scientific therapeutic approach to counter the physiological dysfunction caused by PI is primary prevention with PA. Where primary prevention is not possible, for example in the presence of existing PI-related symptoms, disease or dysfunction then secondary and tertiary prevention with PA is advocated (Booth, Roberts and Laye, 2012).

However, PI has been described as the "Cinderella" risk factor for noncommunicable disease prevention with a poverty of policy attention and resourcing proportionate to its importance (Bull and Bauman, 2011) . Kohl *et al.*, (2012) suggest that the role of PA continues to be undervalued despite evidence of its protective effects and the cost burden posed by present levels of PI globally. To this end there have been widespread calls for greater focus on PA promotion at every level in order to limit the immense and growing impact of PI (Hallal *et al.*, 2012; Kohl *et al.*, 2012; Milton and Bauman, 2015; Engelen *et al.*, 2017).

Approaches to the promotion of PA have evolved significantly; over a decade ago Sallis *et al.*, 2006) outlined limitations of approaches which, at that time, were focused on

individuals or small groups. Limitations included the small to moderate effect sizes, insufficient recruitment rates to programmes and poor maintenance following interventions. This highlighted the fact that programmes with moderate and temporary effects that reach small numbers of people will not create population-wide increases in PA and that new approaches were required (Sallis *et al.*, 2006).

The Social Ecological Model for Active Living described by Sallis *et al.*, (2006) identifies the four key domains of PA (leisure, occupations, active transport and household activity), but in addition acknowledges peoples' interactions with their physical and sociocultural surroundings. This model maps levels of influence from intrapersonal factors through to the policy environment thus enabling a broader, more evolved approach to the promotion of PA which looks beyond individual responsibility. The complexity of PA behaviours and the interrelated nature of influencing factors highlights the need for nuanced approaches that recognise the role of the individual but also look more broadly to recognise the influence of social, cultural and environmental influences (Sallis *et al.*, 2006).

It is clear that PI has become a global health issue and that no single approach to increasing PA levels will be sufficient. Integrated approaches within and across systems are required highlighting the need for joined-up thinking and cross-sector working when planning interventions.

1.6 The Role of Healthcare in Promoting Physical Activity

Embedding approaches to increase PA within healthcare has become one of several areas of priority in the ongoing efforts to reduce PI. Over 30 years ago The Ottawa Charter for Health Promotion identified that health promotion and prevention should be embedded within health services (World Health Organisation, 1986). This is furthered in more recent global guidance (Global Advocacy Council for Physical Activity and International Society for Physical Activity and Health., 2010; World Health Organization, 2010) and subsequent policy guidance, aimed at assisting governments in identifying "best bets" for PA investment

(International Society for Physical Activity and Health and Global Advocacy for Physical Activity, 2011).

In the UK, the focus on integrating mechanisms to address PI into healthcare is evident in clinical guidance (National Institute for Health and Care Excellence, 2013 and 2014), government policy (NHS England, 2014), programmes of work lead by public health agencies (Public Health England, 2016) and workforce education agencies (Public Health England *et al.*, 2016). This guidance has implications for the all of the healthcare professions, yet despite being recognised as a public health priority in England it has been suggested that healthcare systems to not promote PA sufficiently but instead focus on reactive treatment of illness (Speake *et al.*, 2016).

There are more than 55,000 physiotherapists in the UK working across the spectrum of health and care settings (Health and Care Professions Council, 2018). They often support people with long-term conditions and chronic disease, a large proportion of whom are likely to be insufficiently active and have concurrent morbidities (Bauman *et al.*, 2012; Hallal *et al.*, 2012; McPhail, 2015). Thus, physiotherapists along with other healthcare professionals have cause to consider the extent to which their practice reflects policy and to consider opportunities for improving services in the promotion of PA.

1.7 Purpose Statement

The risks associated with PI are well-documented and high levels of PI at population level contribute to it being recognised as a contemporary public health priority. It is acknowledged that interventions must occur across a range of systems, including healthcare settings (Sallis *et al.*, 2006). There is a significant opportunity to promote health through PA within healthcare settings. However, little is known about the extent to which UK physiotherapists integrate PA promotion into practice, the factors that influence this or how this area of practice can be improved in line with the aspirations of current healthcare and public health guidance.

This programme of research explores contemporary issues in relation to the evolution of healthcare in the light of changes in population health. It considers the needs of the workforce to deliver more evolved services. It seeks to better understand current practice, it considers what optimal practice might look like and it maps out key issues in moving forwards.

This programme of work will help to expose and exploit opportunities to further integrate PA promotion into physiotherapy practice. Insights gained have the potential to inform and direct professional practice in this area. This in turn, has the potential to contribute to the more distal aim of reducing the impact that PI has on the quality of lives of individuals, healthcare utilisation and cost to society.

1.8 Research Aim and Objectives

The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin patterns of current practice.

The above research aim is underpinned by several specific objectives:

1. To explore the existing evidence base related to physiotherapy and PA promotion.

2. To describe current PA promotion practice in the UK.

3. To measure and report Physiotherapists' knowledge of PA guidelines.

4. To measure and report Physiotherapists' own PA behaviours.

5. To use the quantitative findings to inform an in-depth qualitative explanatory follow up.

6. To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.

7. To generate evidence-based recommendations for education, research, policy and practice.

1.9 Scope of Research

This programme of research draws widely on relevant international literature. The systematic scoping review identifies and maps global literature. The mixed-methods study involves physiotherapists from across the UK. The political context is based on devolved healthcare systems and as such the policy background is determined by country-specific bodies including NHS England, Public Health England and Health Education England. The complexities within, and vast differences between, healthcare systems are recognised and therefore the implications of this programme of research are specific to English NHS systems. It is recognised that much can be learned from the work of other health systems in terms of their health-system-wide approaches to embedding PA, and also on their focus on health equity. In particular, the comprehensive responsive of NHS Scotland to PI shows a level of integration and development that can inspire and inform widescale change elsewhere. NHS Scotland's National Physical Activity Pathway, in particular acts as a blueprint for embedding evidence-based PA promotion into a complex organisation in a systematic and meaningful way.

Having acknowledge that the primary focus of this programme of research is the English healthcare system, it is hoped that findings will have resonance beyond England and that the commonality and shared interest across professional networks will transcend the organisational and geographical barriers.

1.10 Overview of Programme of Research

In order to meet the objectives outlined above and to achieve the overarching aim, a programme of research was developed, comprising three linked studies. This is represented graphically in Figure 3, it comprises an initial systematic scoping review, followed by a mixed

methods study. The mixed methods study has a sequential explanatory design and is formed of a national cross-sectional survey and a qualitative follow-up study.

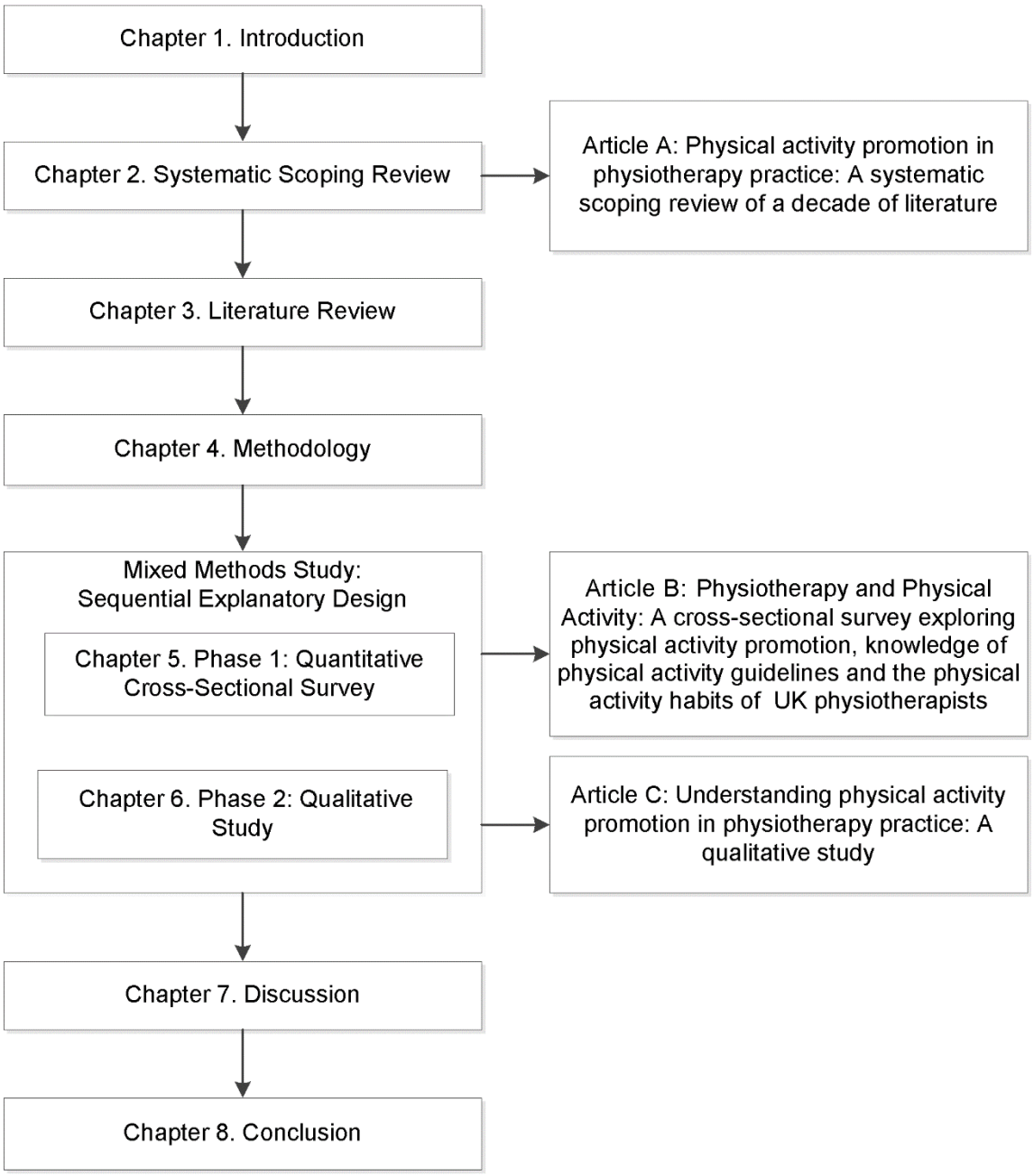

Figure 3. Overview of Programme of Research.

1.11 Thesis Structure

Chapter 1 sets out the context for this programme of research. It highlights the purpose, aims and objects of the programme of research and gives an overview of the studies in diagrammatic form. It clearly outlines the anticipated contribution of new knowledge and it details the content of each thesis chapter.

Chapter 2 contains the Article A "Physical activity promotion in physiotherapy practice: A systematic scoping review of a decade of literature." This was accepted for publication in British Journal of Sports Medicine in December 2016.

Chapter 3 provides a comprehensive review of the relevant literature including critique of methods and identification of gaps in the existing evidence. This situates the current research within the wider, global evidence base.

Chapter 4 explains the methodology that underpins the mixed methods approach, and more specifically it describes and justifies the use of a sequential, explanatory design.

Chapter 5 includes Article B, the published output from Phase 1 of the mixed methods study "Physiotherapy and physical activity: A cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists". This was accepted for publication in the British Medical Journal Open Sports and Exercise Medicine in August 2017. This chapter details the ways in which the findings from this study inform and guide the subsequent qualitative study.

Chapter 6 includes Article C, the third and final output from this programme of research "Understanding physical activity promotion in physiotherapy practice: A qualitative study". This was accepted for publication in Musculoskeletal Science and Practice in January 2018. This chapter details the meta inferences that were drawn from the mixed methods study.

Chapter 7 is the thesis discussion, it includes learning from the systematic scoping review, the literature review and the mixed methods study. Key findings are reviewed and

discussed, over-arching strengths and limitations are described, and implications and recommendations are made.

Chapter 8 is the thesis conclusion; it reviews the findings from this programme of research and summarises the relevance of these insights. The aims and objectives of the programme of research are reviewed and the contribution of new knowledge is clearly highlighted.

References are presented at the end of the thesis in the Harvard format (cite them right version 10). The references from the three published articles are positioned alongside the article within their respective chapters.

Appendices are referred to throughout the thesis and are collated at the end of the thesis document in the order in which they were cited within the thesis.

1.12 Anticipated Contribution of New Knowledge

It is anticipated that this programme of research will generate new knowledge in the several areas, and these are mapped to the specific research objectives, phase of study and output in Table 1.

Firstly, it will collate the global literature related to PA and physiotherapy and provide the most up to date summary of the state of the global evidence in this area. This will highlight trends and gaps in the evidence base that may not have been formerly recognised and can thus inform the direction of future research.

Secondly, knowledge of the current practice of UK physiotherapists in relation to PA promotion is opaque. It is anticipated that the picture of current practice generated by this research will be the most comprehensive and current of its kind. As such it will identify opportunities for improvement and areas of good practice, both of which can inform future strategies to promote PA through healthcare.

Thirdly, UK physiotherapists' knowledge of PA guidelines has not previously been reported. Developing a better understanding of knowledge of the PA guidelines will give an indication of how well-equipped the workforce is to deliver evidence-based PA interventions and may indicate areas for improvement in relation to education and training.

Fourthly, the PA behaviours of UK physiotherapists have not previously been reported. Developing a better understanding of the extent to which the workforce engages in PA will give a fuller picture of potential barriers and opportunities.

Finally, the mechanisms that underpin current UK PA promotion practice have not been explored in a physiotherapy context. This information will allow a better understanding of the barriers specific to physiotherapy settings and may assist in the future development of effective interventions that are feasible and acceptable for clinicians.

These contributions will be highlighted throughout the thesis and will be comprehensively discussed in the conclusion in Chapter 7.

Table 1. Mapping Objectives with Study, Output and Anticipated Contribution of New Knowledge.

Objectives	Study	Output	Anticipated Contribution of New Knowledge
1. To explore the existing evidence base related to physiotherapy and PA promotion.	Scoping Review	Article A	The scoping review will provide the most up to date review of global literature related to PA and physiotherapy.
2. To build a picture of current PA promotion in physiotherapy practice in the UK.	Mixed Methods Phase 1	Article B	Current practice of UK physiotherapists in relation to PA promotion in routine healthcare has not been explored, documented or reported.
3. To measure and report physiotherapists' knowledge of PA guidelines.			UK physiotherapists' knowledge of PA guidelines has not been explored to date.
4. To measure and report physiotherapists' own PA behaviours.			The PA behaviours of UK physiotherapists have not previously been reported.
5. To use the quantitative findings to inform an in-depth qualitative explanatory follow up.		Thesis	

6. To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.	Mixed Methods Phase 2	Article C	Currently unexplored in relation to PA promotion in physiotherapy practice
7: To generate evidence-based recommendations for education, research, policy and practice based upon the combined quantitative and qualitative findings.		Thesis	

1.13 Chapter Summary

Chapter 1 has set the scene for this programme of research. PI has been outlined including consideration of the scale of the problem and its implications. This creates a compelling rationale for research which seeks to explore and understand the key issues and ultimately engage physiotherapists in tackling PI. The three studies within this programme of research have been outlined and the anticipated contribution of new knowledge has been clearly identified. In addition, the content of the subsequent chapters has been described in order to help with the navigation this thesis.

Chapter 2: Systematic Scoping Review

Containing Article A: Physical activity promotion in physiotherapy practice: A systematic scoping review of a decade of literature.

2.1 Introduction

This chapter summarises the rationale for the systematic scoping review. It explains the context for the review and the subsequent measurable impact. Following this, the full published version of the review is included. The chapter concludes with a summary of key points and a discussion of the implications for the thesis.

As identified in Chapter 1, there are clear political and economic drivers to embed PA promotion into healthcare yet the extent to which these drivers have influenced UK physiotherapy practice is unknown. It has been suggested that the importance of PA for health might well be underrated and undervalued by physiotherapists (Wittink, Engelbert and Takken, 2011). In order to ascertain the state of the evidence globally in relation to physical activity promotion in physiotherapy practice an international, systematic scoping review was performed. This reconnaissance of the literature aims to identify and map the research explicitly related to PA promotion and physiotherapy and relates to research objective 1 as detailed in Table 2.

Table 2. Research Aims and Objectives, Chapter 2.

Research Aim

The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.

1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.

5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.
7.	To generate evidence-based recommendations for education, research, policy and practice.

2.2 Context and Impact

This scoping review was accepted for publication in the British Journal of Sports Medicine in December 2016. The British Journal of Sports Medicine British Journal of Sports Medicine publishes authoritative, original research, systematic reviews and consensus statements. It serves 25 sports medicine and sports physiotherapy societies who collectively have over 12,000 members. It has an impact factor of 6.6 making it a credible journal with extensive reach across relevant workforces (British Journal of Sports Medicine, 2018). Since online publication the abstract has been downloaded 9380 times, and the full text article has been downloaded 971 times. Google Scholar reports 5 citations of this work. The abstract has been shared on social media via Twitter by more than 160 individuals (accurate at 1.7.18).

2.3 Published Paper: Article A

The paper is reproduced here, with the publisher's permission, in the format that it was published online. Published supplementary materials to accompany the article can be found in Appendix 1.

Physical activity promotion in physiotherapy practice: a systematic scoping review of a decade of literature

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► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bjsports-2016-096735).

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ABSTRACT

Background The health benefits of physical activity (PA) have been extensively documented. Globally PA levels are low with only a small proportion of the population reaching recommended levels. Insufficient PA is seen as a major public health problem with high cost to society. Physiotherapists work with people to manage long-term conditions and are well placed to deliver individual interventions to increase PA. Despite this, little is known about the evidence that exists in this field.

Methods This scoping review comprises a comprehensive search of key databases using predetermined search terms. This is supplemented with a parallel search that incorporated novel social media strands. In line with current guidance, a robust screening process took place using agreed inclusion and exclusion criteria.

Results 31 studies met the inclusion criteria. The number of studies published annually increased over the decade. Ireland and USA yielded the largest number of publications with only 1 study from the UK. The target populations included physiotherapists and service users from a range of clinical populations. The studies were mainly quantitative and observational in design with a predominance of studies that scoped attitudes, perceptions, barriers and current practice.

Conclusions This reconnaissance has shown the state of the evidence to be sparse and disparate. However, the sharp rise in published work in recent years is encouraging. The predominance of scoping studies and the clear social, economic and political drivers for change in this area highlights a need for more pragmatic, interventional studies that can inform clinical practice.

BACKGROUND

The positive effects of physical activity (PA) on physical and mental health,[1 2] health-related quality of life,[3] and healthy ageing[4] have been extensively documented. Many of the leading causes of ill health could be prevented if more inactive people were to become active.[5]

Insufficient PA is seen as a major public health problem, which puts a high demand on society due to the high costs it generates.[1] In developed countries physical inactivity (PI) accounts for 1.5–3.0% of total direct healthcare costs.[6] In the UK in 2006–2007, PI cost the National Health Service (NHS) an estimated £0.9 billion.[7]

PA is described as any body movement produced by the skeletal muscles that results in a substantial increase over resting energy expenditure.[8] PI is described as doing no or very little PA at work, at home, for transport or during discretionary time and not reaching PA guidelines deemed necessary to benefit public health.[9]

In 2010, the WHO published global recommendations on PA for health.[5] These were followed, in 2011, by UK guidelines for participation in PA across the life course.[10] Despite the well-reported health and economic benefits of PA, levels of participation are low. Globally in 2010, around 23% of adults aged 18+ years were insufficiently physically active.[5] In the UK, fewer than 40% of men and fewer than 30% of women met the recommended PA guidelines across England, Scotland, Wales and Northern Ireland.[11]

In order to increase PA worldwide, it has been identified that a systems approach is required that focuses on populations and the complex interactions among the correlates of PI, rather than solely on a behavioural science approach focusing on individuals.[12]

Healthcare is part of this system and within healthcare there is a need for organisational, environmental and individual approaches promoting PA. Current UK guidance recommends that behaviour change is promoted by all health and social care professionals who have contact with the general public.[13] It has been identified that opportunities exist to promote the benefits of healthy lifestyles (including increasing PA) through routine contacts that people have with health services, by engaging individuals in conversations which support them in the steps they wish to take towards a healthier lifestyle.[14]

However, despite these aspirations, it has been suggested that there is little evidence that PA is being comprehensively promoted in healthcare settings.[15] The barriers to increasing health promotion and preventative care in healthcare settings are consistent across professional groups and include lack of time, perceived lack of knowledge, lack of confidence and lack of organisational support.[16–18]

It has been suggested that physiotherapists have a professional and ethical responsibility to ensure that health promotion opportunities are maximally exploited.[19 20] The opportunities are significant with physiotherapy outpatient contacts numbering three million in 2012 in the UK alone.[21] However, little is known about the extent to which physiotherapists embed PA promotion in routine/usual care. This type of PA promotion has been termed 'non-treatment' PA promotion, highlighting that PA is unlikely to be the main focus of the contact but

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acknowledging that the contact represents an opportunity for PA behaviour change.[22]

To date, published reviews in this field have focussed on:

i. Programmes commissioned with the primary aim of increasing PA (as opposed to integration of PA promotion into existing healthcare infrastructure). Orrow *et al*[23] concluded that promotion of PA to sedentary adults recruited in primary care significantly increased self-reported PA levels at 12 months.
ii. Other healthcare professionals. A recent global review of PA counselling in primary care included studies involving physicians, counsellors, exercise professionals, health visitors, nurses, activity coaches; none of the included studies involved physiotherapists.[24]
iii. Broader prevention themes of which PA is a subtheme. In a narrative synthesis of the literature related to allied health professionals (including physiotherapy) and health promotion, Needles *et al*[25] concluded that interventions were focused on individuals with identified 'target' pre-existing conditions rather than approaches that identify risk factors. In 2012, Frerichs *et al*[26] published a systematic review of the literature exploring whether physical therapists can effectively counsel patients for lifestyle-related health conditions, the seven studies included the provision of additional PA interventions as well as PA promotion integrated into usual practice. The authors concluded that health counselling delivered by a physical therapist has the potential to be effective, at least in the short term. Finally Taukobong *et al*[27] performed a systematic review of the literature related to health promotion and physiotherapy (of which PA was a component) identifying a lack of PA promotion in the educational literature.

To summarise, despite the compelling rationale for promoting PA and the opportunities that physiotherapy practice presents, little is known about the extent to which PI is addressed in current physiotherapy practice.

The overarching aim of the review is to identify and map literature related to PA promotion in physiotherapy practice. Specific aims were to:

1. Ascertain the extent of the literature that explicitly relates to PA promotion in physiotherapy practice.
2. Explore the key characteristics of the body of evidence.

METHODS

Design

This review uses the scoping review design described by Peters *et al*[28] and is further informed by additional relevant guidance.[29–31] Scoping reviews are indicated when the nature and extent of the available evidence is unknown and they have been increasingly used in response to demand for effective and timely summaries of primary research.[28]

SEARCH METHODS

The search strategy was developed by principle investigator (AL) and information scientist (MG).

The strategy was deliberately narrow, with the aim of retrieving articles that explicitly mention physiotherapy and PA (and synonymous terms) in the title or abstract. Appropriate search terms were identified from relevant literature known to the author and from exploring the National Library of Medicine Medical Subject Headings. See table 1 for the search parameters.

The search was carried out in December 2015 and the database date parameters were set from 2005 to 2015. Search terms were combined using Boolean logic and used to perform searches of key databases (MEDLINE, CINAHL complete, PsychINFO, Web of Science, Cochrane Central Register for Controlled Trials, Applied Social Sciences Index and Abstracts (ASSIA)).

A parallel search was also carried out, this included using key search terms in Google; the top 100 results were scanned for relevance. The allied health professions research network CHAIN was used to circulate a request for information and an abbreviated message was circulated on Twitter. The reference lists of included articles were checked, publications of particular relevance were hand searched and publication lists of key authors were manually checked for relevant articles.

Table 1 Search parameters

Descriptor	Where	Search term
Physiotherapy	Title	physiotherap*, "physical therap*"
Exercise/PA	Title/abstract	"physical activit*", exercis*, "general health", wellbeing, "physical fitness", sedentar*, inactiv*, "exercise therap*",
Intervention	Title/abstract	Interven*, program*, promot*, encourag*, advi*, counsel*
Date limit 2005–2015		
Exclusions NOT comment or editorial or letter as publication type		
Language abstract available in English		

PA, physical activity.

Screening

The references from the above search strands were imported into Refworks reference management software and all duplicates were removed. AL read all the titles and excluded overtly irrelevant articles. All three reviewers then conducted a small pilot test of the inclusion/exclusion criteria; this was an iterative process that required several amendments before an agreement was reached. All potentially eligible abstracts were then reviewed independently by CL and SE who applied the inclusion/exclusion criteria, AL arbitrated in the event of disagreement. In line with the aim of identifying articles explicitly relating to physiotherapy and PA screening and data extraction were from the abstracts only.

Inclusion and exclusion criteria

Studies that met the following criteria were included in the review:

1. Studies focussed on the physiotherapy workforce (physiotherapists, assistants, students) or physiotherapy service users.
2. Interventions were related to PA promotion in a physiotherapy context. Articles were excluded if they pertained only to specific, targeted or 'therapeutic' exercise.
3. Studies were available in English; studies were excluded if the abstract was not available in English.
4. Primary research of any design. Secondary research, including reviews were excluded but relevant studies from these reviews were included if they met the criteria. Editorials and commentaries were excluded.
5. Published 2005 onwards. This date was chosen because it corresponds with increased global interest in PA following the adoption by WHO of the global strategy on diet, PA and health.[32] It also allowed for mapping of a full decade of activity.

Table 2 Summary of included studies (full details of data extraction can be seen in online supplementary table 3)

	Author	Year	Title
1	Aweto HA *et al*[22]	2013	Knowledge, attitude and practice of physiotherapists towards promotion of physically active lifestyles in patient management.
2	Bodner ME *et al*[36]	2013	Benchmarking curriculum content in entry-level health professional education with special reference to health promotion practice in physical therapy: a multi-institutional international study
3	Christian A *et al*[37]	2015	Designing a wellness programme for rural community physical therapy clinics based on a needs assessment
4	de Vries NM *et al*[38]	2013	Development and acceptability of an individually tailored physical therapy strategy to increase activity levels in older adults with mobility problems
5	de Vries NM *et al*[39]	2015a	Personalized physiotherapy in frail older adults with mobility problems is (cost)-effective in improving physical activity and frailty: a RCT
6	de Vries NM *et al*[40]	2015b	Patient-centred physical therapy is (cost-) effective in increasing physical activity and reducing frailty in older adults with mobility problems: a randomized controlled trial with 6 months follow-up
7	Frantz JM *et al*[41]	2013	Physical activity and health promotion strategies among physiotherapists in Rwanda
8	Healey WE *et al*[42]	2013	Creating a community-physical therapy partnership to increase physical activity in urban African-American adults
9	Holm I, *et al*[43]	2015	Does outpatient physical therapy with the aim of improving health-related physical fitness influence the level of physical activity in patients with long-term musculoskeletal conditions?
10	Langhammer B *et al*[44]	2014	Physiotherapy and physical functioning post-stroke: exercise habits and functioning 4 years later? Long-term follow-up after a 1-year long-term intervention period: a randomized controlled trial
11	Lau C *et al*[45]	2015	Facilitating community-based exercise for people with stroke: a cross-sectional e-survey of physical therapy practice and perceived needs
12	McPhail S[46]	2015a	Multi-morbidity, obesity and quality of life among physically inactive Australians accessing physiotherapy clinics for musculoskeletal disorders
13	McPhail S[47]	2015b	Patient-perceived barriers and facilitators to increasing physical activity among patients with musculoskeletal disorders receiving outpatient physiotherapy: a qualitative investigation
14	Messner T[48]	2012	Change in the activity behavior in the context of outpatient physiotherapy treatments Effects of planning and action control intervention
15	Mulligan H *et al*[49]	2012	Promoting physical activity for people with neurological disability: perspectives and experiences of physiotherapists
16	O'Donoghue G *et al*[50]	2011	Physical activity and exercise promotion and prescription in undergraduate physiotherapy education: content analysis of Irish curricula
17	O'Donoghue G *et al*[51]	2012	Contemporary undergraduate physiotherapy education in terms of physical activity and exercise prescription: practice tutors' knowledge, attitudes and beliefs
18	O'Donoghue G *et al*[52]	2014a	Assessment and management of risk factors for the prevention of lifestyle-related disease: a cross-sectional survey of current activities, barriers and perceived training needs of primary care physiotherapists in the Republic of Ireland
19	O'Donoghue G *et al*[53]	2014b	Physical activity and exercise promotion and prescription: recommendations for contemporary professional entry-level physiotherapy education
20	Radež P *et al*[54]	2015	The physiotherapy and physical activity components within the antenatal classes in Slovenia
21	Sandström K *et al*[55]	2009	Prerequisites for carrying out physiotherapy and physical activity—experiences from adults with cerebral palsy
22	Sheridan C *et al*[56]	2008	Do physiotherapy-led exercise classes change activity levels and weight parameters in children attending a weight management clinic?
23	Shirley D *et al*[57]	2010	Physical activity promotion in the physical therapy setting: perspectives from practitioners and students
24	Smith CM *et al*[58]	2013	Participant perceptions of a novel physiotherapy approach ("Blue Prescription") for increasing levels of physical activity in people with multiple sclerosis: a qualitative study following intervention
25	Snodgrass SJ *et al*[59]	2014	Weight management including dietary and physical activity advice provided by Australian physiotherapists: a pilot cross-sectional survey
26	Soundy A *et al*[60]	2014a	Barriers to and facilitators of physical activity among persons with schizophrenia: a survey of physical therapists
27	Soundy A *et al*[61]	2014b	The value of social support to encourage people with schizophrenia to engage in physical activity: an international insight from specialist mental health physiotherapists
28	Stretton C *et al*[62]	2013	Activity coaching to improve walking is liked by rehabilitation patients but physiotherapists have concerns: a qualitative study
29	Tovin M *et al*[63]	2014	Parent perspectives on physical activity and the role of physical therapy in children with autism spectrum disorder
30	Walkeden S *et al*[64]	2015	Perceptions of physiotherapists about their role in health promotion at an acute hospital: a qualitative study
31	Zalewski K *et al*[65]	2014	Identifying barriers to remaining physically active after rehabilitation: differences in perception between physical therapists and older adult patients

Search outcome

Articles that met the above criteria were included in the review. The process of identification, screening, eligibility and inclusion has been documented in accordance with PRISMA guidance and is represented in figure 1.[33]

Quality appraisal

In line with current guidance, as this is a preliminary reconnaissance, quality appraisal was not considered necessary to achieve the aims of the study.[28]

Data extraction

A database in Microsoft Excel was created for data entry and management; it was developed iteratively. When consensus was reached on database design, CL and SE extracted data from all studies independently. Data were extracted from abstracts only as this was deemed sufficient to gain the required information based on the pilot exercise and with reference to other similar reviews.[34 35]

Collation and synthesis

The data extraction spreadsheets were collated by AL. All studies meeting the inclusion criteria were summarised numerically in the first instance. This included the overall number of studies, year of publication, geographical location of study, study design, aims and study populations used, which can be seen in table 3.

RESULTS

A total of 2050 records were identified through the searches. Following the screening process, 31 records met the study

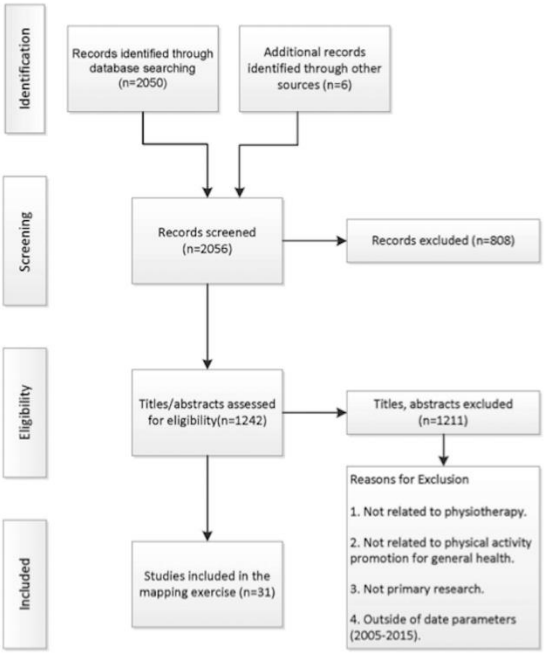

Figure 1 Flow chart of the study selection process.

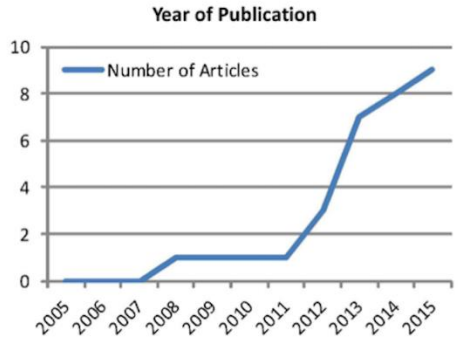

Figure 2 Year of publication of records.

inclusion criteria, these are summarised in table 2. Reasons for exclusion are listed in figure 1.

Year of publication

Figure 2 shows the results by year of publication. It demonstrates a steady increase from 2008 onwards with more than 50% (n=17) of the studies published in 2014 and 2015.

Geographic location

Ireland and USA have produced the largest volume of the literature with five studies each per country. This is followed by Australia which yielded four studies; there were also three international studies where data collection occurred in more than one country. Only one study from the UK met the inclusion criteria.

Populations

The focus populations in the included studies were physiotherapists, students, associate/support works, service users and a number of literature-based educational studies. Several of the included studies focussed on more than one population.

The service users included in the studies were from a variety of clinical groups including musculoskeletal, older adults, stroke, general adults, cerebral palsy, and children with obesity, multiple sclerosis, autistic spectrum disorder and long-term neurological conditions.

Study design

The design of the included studies was categorised according to a research design framework by Littlewood and May.[66] All included studies were primary research as per the inclusion criteria. The most frequently employed design was quantitative, observational studies, followed by mixed-methods and qualitative studies. The smallest category was quantitative interventional studies.

Focus/theme of the studies

The included studies fell broadly into five categories:

i. Scoping of barriers, current practice, knowledge and attitudes. This included scoping of physiotherapists and/or service users (n=17).
ii. Identifying the need for PA promotion (n=1).
iii. Development or evaluation of a specific PA promotion initiative (n=2).
iv. Educational studies (n=3).
v. PA promotion intervention (n=8).

DISCUSSION

The key aims of this review were to identify and map the body of literature related to physiotherapy and PA promotion. To the best of our knowledge, this is the most up to date published review of existing literature that explicitly relates to PA promotion in physiotherapy practice thus providing an important springboard for discussion and research.

This study returned 31 studies globally from the previous decade; it is important to recognise that this is not a large body of the literature. This could be due to the way in which PA promotion is recorded in the research literature; it may be 'packaged' as part of a broader 'health promotion' or 'making every contact count' approach, for example, and may therefore not have been returned in the search. It was the intention of this research to identify articles in which there was explicit reference to physiotherapy and PA either in the title or abstract. The vast majority of studies were excluded because of a lack of specific reference to physiotherapy. It is also important to note that some studies were excluded despite having a physiotherapy and PA component. Reasons for this include (1) usual physiotherapy being compared with a non-physiotherapy PA intervention (2) PA approaches were developed with physiotherapists involved but were not explicitly labelled as physiotherapy. The above points raise questions for the physiotherapy profession about the terminology used and the visibility of PA promotion within professional practice.

The search strategy incorporated novel social media strands; although the additional strands did not yield any included studies, they highlighted a number of relevant protocols and helped develop international networks. The impact of this is hard to measure but Twitter impressions can be used as a guideline for reach within the Twitter community. Basic analytics on

the original tweet show that it was retweeted 21 times and had 8388 'impressions' (ie, was seen by 8388 Twitter users). This suggests that incorporation of Twitter may be a useful, cheap and accessible means of increasing the reach of a search.

The overall trend shows an increase in research outputs over time; this is consistent with the increased awareness of the impact of PI globally and the corresponding increase in focus on PA in public health policy, and consequently, as a research priority. The overall volume of the literature, however, remains small and the geographical location of the studies shows that large areas of the global physiotherapy community were not represented.

Fewer than half of the included studies focussed on service users, with most focussing on physiotherapists; this may be indicative of an immature field of research or may be a reflection of the fact that accessing healthcare professionals for research purposes can be quicker and more straightforward than accessing service users.

In terms of the aims of the included studies, over half of all included studies focussed on scoping, which may suggest that there is an appetite for development in this area and a rationale for further interventional research. Only eight interventional studies were identified, these included testing the acceptability of PA interventions[62] and the effectiveness of specific physiotherapy-related PA promotion programmes.[38–40 43 44 48 56] This includes examples of projects that have been developed specifically with the purpose of increasing PA in a specific population, (eg, a physiotherapy-led service for obese children[56]) and examples of existing physiotherapy services that have evolved to incorporate effective PA promotion interventions.[43] Both are important and viable future research strands.

One notable study focussed on highlighting the need for PA promotion (and other lifestyle interventions) among physiotherapy service users by quantifying the prevalence of comorbidities among inactive musculoskeletal service users.[46] This Australian study provides an important rationale for physiotherapy action in this area suggesting that:

> Interventions in ambulatory hospital clinics for people with musculoskeletal disorders primarily focus on their presenting musculoskeletal complaint with cursory attention given to lifestyle risk factors; including physical inactivity. This missed opportunity is likely to have both personal costs for patients and economic costs from downstream healthcare utilisation.

Only two studies described the development of physiotherapy/PA interventions and both were community partnerships.[37 42] This highlights an important area for future research; it is essential that physiotherapy PA promotion interventions dovetail with community services and meet the needs of local populations. Without this any benefit from physiotherapy interventions is likely to be short lived.

Three studies focussed on pre-registration physiotherapy education.[36 50 53] None of the educational literature focuses on postregistration education highlighting a gap concerned with the educational needs of the current workforce.

Despite the small volume of identified research, these studies add to the body of literature around barriers to change, and provide examples of physiotherapy-led PA promotion initiatives and examples whereby PA promotion is integrated into existing practice.

Physiotherapists are part of the multiagency workforce required to influence system-wide PA change. It is essential that physiotherapists recognise their potential contribution, particularly in relation to using PA as a way of reducing and managing long-term health conditions.[21] Access to this growing and increasingly costly population of people with long-term conditions should be viewed as a significant health promotion opportunity. To have impact, physiotherapists need to be equipped to capitalise on these opportunities at scale. This requires recognition of PA promotion opportunities, knowledge skills and confidence to deliver PA promotion that is acceptable and effective in a PT context and robust recording and evaluation processes.

STRENGTHS AND LIMITATIONS

This comprehensive and systematic scoping review followed good practice guidance and robust, clearly reported methods.

Novel, social media strands were incorporated into the search strategy to increase the reach of the search.

The aim of identifying and mapping the literature that explicitly relates to PA promotion and physiotherapy meant that the focus of the search was relatively narrow and information was extracted from titles and abstracts only.

CONCLUSION

This is the most up to date scoping review that identifies, collates and maps the literature on physiotherapy and PA promotion. The review shows an increasing research interest in physiotherapy and PA although it remains an immature field of research. This review highlights an appetite for engagement in this area; this should be cultivated to increase the impact on PI through individual approaches. In addition to individual approaches highlighted in this review, there is scope for physiotherapists to be involved in more systems-based approaches including promoting healthy environments, healthy workforces and creating connections with community assets. This would enable physiotherapists to promote PA on a much larger scale and thus increase their impact on PI.

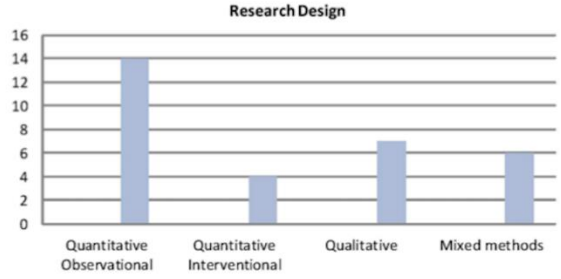

Figure 3 Study type by research design.

What are the findings?

- Research in the area of physiotherapy and PA promotion has increased significantly in the past few years.
- More interventional studies are needed to understand the best way for PA promotion to be effectively integrated into practice in a way that is acceptable and effective.
- Educational research in this field focuses on pre-registration curricula. The educational needs of the current workforce warrant further investigation.

How might it impact on clinical practice in the future?

- Despite the guidance that physiotherapists should promote PA in routine clinical practice yet there is insufficient evidence to identify the best approaches.
- As this field of research grows Physiotherapists should be supported to deliver PA interventions that are based on the best available evidence.

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Contributors AL, MG, SE and CL were involved in the process as described in the manuscript. SM and CL oversaw the entire research process and ensured ethical governance as doctoral supervisors. All authors contributed to the development of the manuscript for publication.

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***Erratum**

Figure 1 “Flowchart of the study selection process” on page 4 of 7 in the above published paper contains an error. In the screening section of the flowchart the right-hand box reads “Records excluded (n=808)”. This is incorrect and should read “Records excluded (n=814)”.

2.4 Summary and Implications for Thesis

The systematic scoping review achieved its aim of identifying and mapping a decade of global literature in order to better understand the current state of the evidence. It was carried out using appropriate, robust methods and was reported in a transparent manner in line with current reporting standards for systematic reviews.

The findings from this exploratory work extend current understanding of the global literature by identifying that the available evidence is sparse yet increasing over time. Included studies are disparate in that they cover various related areas with no obvious convergence on the most viable avenues for future enquiry. The research methods employed are largely observational with a paucity of interventional studies resulting in little evidence being available to guide practice in this area. The interventional studies that were included were based on high-intensity interventions that may not be compatible with routine practice.

Since publication this article has been shared broadly, and it has informed the subsequent phases within this programme of research. It has also confirmed a need for a focus on pragmatic interventions that can be integrated into practice. In line with current guidance on scoping reviews, evidence was identified and mapped but findings were not comprehensively explored. Chapter 3 builds on the scoping review with a broader exploration of the findings from this body of literature and other related areas.

Chapter 3: Literature Review

3.1 Introduction

This chapter provides an in-depth review of the relevant literature, and it further explores the literature identified in Chapter 2 and supplements the systematic scoping review by including the most recent publications. Key contextual factors are considered, and international literature is drawn upon, however the focus is on UK physiotherapy practice. This chapter critically reviews specific aspects of the existing evidence base and provides a rationale for the proposed programme of research. Together with Chapter 2, it contributes to the first objective in this programme of research as highlighted in Table 3.

Table 3. Research Aims and Objectives, Chapter 3.

Research Aim

The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.

1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.
5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.
7.	To generate evidence-based recommendations for education, research, policy and practice.

3.2 Physical Activity Promotion and Healthcare

The rationale for embedding PA promotion into healthcare was introduced in Chapter 1 and is further developed here. In 1986, the Ottawa Charter called for health services to be reoriented to support a broader definition of health. It described health as;

> *"…being created and lived by people within the settings of their everyday life; where they learn, work, play and love. Health is created by caring for oneself and others, by being able to take decisions and have control over one's life circumstances, and by ensuring that the society one lives in creates conditions that allow the attainment of health by all its members."*

The charter championed a move towards healthcare systems which actively contribute to the pursuit of health, rather than focusing solely on the eradication of disease. It advocated for the inclusion of health promotion in healthcare in addition to maintaining its traditional responsibility for providing clinical and curative services (World Health Organisation, 1986).

Promoting PA is an integral part of promoting health and Kohl *et al.*, (2012) recommended that addressing PI is a priority for any NCD strategy. The later Toronto Charter (2010) focused specifically on PI; it identified that there is no one, single solution to increasing PA and that effective approaches would require multiple concurrent strategies. It highlighted many actions that are required to make significant and sustainable changes in global PA levels. This included the integration of screening for PA levels at every healthcare consultation, and the delivery of brief, structured counselling and referral to community support for all insufficiently-active patients (Global Advocacy Council for Physical Activity and International Society for Physical Activity and Health, 2010).

In a further development, approaches that were considered to be the best investments for reducing PI were identified and published by global PA advocacy agencies. Integrating PA promotion into healthcare systems was described as one of the "seven best investments" for reducing PI (International Society for Physical Activity and Health and Global Advocacy for Physical Activity, 2011). The authors acknowledged that healthcare professionals are important influencers of patient behaviour. Furthermore, as key initiators of NCD

prevention actions within the healthcare systems, they can influence large proportions of the population. They recommended that healthcare systems should include PA as an explicit element of regular behavioural risk factor screening for NCD prevention, patient education and referral (International Society for Physical Activity and Health and Global Advocacy for Physical Activity, 2011).

In the UK, it is widely recognised that the health, public health and social care systems are unsustainable without radical transformation. A recent report on the long-term sustainability of the NHS and social care system concluded:

> *"Our conclusion could not be clearer. Is the NHS and adult social care system sustainable? Yes, it is. Is it sustainable as it is today? No, it is not. Things need to change."* (House of Lords, 2017)

This has led to urgent calls for a shift in focus to prevention and the seminal strategy document, the Five Year Forward View, clearly outlines the need for a radical upscale in preventative care (NHS England, 2014). Investment in public health is seen as essential in reducing the burden of avoidable ill health in the future. The idea that public health is everyone's business and not the responsibility of the small public health workforce was articulated in 2012 (NHS Future Forum, 2012). This idea has gained traction as understanding of the wider public health workforce has grown (Royal Society of Public Health, 2015).

Thus, the moral imperative to increase PA as a conduit to improve the lives of individuals is met with a financial imperative to embed prevention into healthcare, in order to reduce downstream healthcare costs and improve the long-term sustainability of health and social care systems. This is borne out in UK national, clinical guidance from the National Institute for Health and Clinical Excellence (NICE); they recommend that all inactive adults accessing NHS services should be identified and should receive advice on increasing their activity levels (National Institute for Health and Care Excellence, 2013).

3.3 Physiotherapy and Physical Activity

There are more than 55,000 physiotherapists registered in the UK (Health and Care Professions Council, 2018). Physiotherapists work across the spectrum of healthcare settings and have a major role to play in helping people to manage long-term conditions and maintain function. In 2015-16 there were over five million outpatient physiotherapy contacts (comprised of over one million new patient contacts and over three million follow up appointments). For each first physiotherapy clinical contact, the average number of follow up appointments is three, meaning that a physiotherapist could expect to have approximately four contacts with every new patient (NHS Digital, 2016). Each contact is an opportunity to influence a patient's long-term health & wellbeing in addition to the assessment and management of the complaint with which a patient presents.

Physiotherapists work extensively with people with long-term conditions, and health status is recognised as a key correlate of physical activity, meaning that people who have healthcare needs are more likely to be inactive than those who experience good health (Bauman *et al.*, 2012; Hallal *et al.*, 2012). Low levels of PA have been reported in many clinical populations, including patients following orthopaedic injury (Ekegren *et al.*, 2018), brain injury (Driver *et al.*, 2012), spinal cord injury (Rauch *et al.*, 2016), stroke (West and Bernhardt, 2012) and musculoskeletal disorders (Moseng *et al.*, 2014).

Evidence suggests that a large proportion of inactive patients accessing outpatient physiotherapy services have multiple comorbid health conditions. McPhail (2015) identified a sample of 110 inactive patients attending outpatient physiotherapy for a musculoskeletal complaint. Of this sample 73% were overweight (24%), or obese (49%), and in addition to their presenting condition, 21% of patients reported comorbid diabetes, 23% reported hypertension and 13% reported an existing heart condition. This suggests that patients attending physiotherapy might have an increased risk of being inactive and an increased risk of having related co-morbidities.

The changing demography of the UK combined with financial constraints on the health and social care services, means that physiotherapists need to consider their ability to respond to contemporary healthcare needs. Physiotherapists have been encouraged to consider the balance in their practice between the traditional "diagnose and treat" paradigm and a more contemporary "predict and prevent" paradigm (Needle *et al.*, 2011).

Public health priorities have been identified and are categorised in different ways; in 2014, Public Health England identified seven overarching, national public health priorities including obesity, smoking, harmful-drinking, ensuring that every child has the best start in life, dementia, antimicrobial resistance and tuberculosis (Public Health England, 2014). The Making Every Contact Count (MECC) approach, identifies health behaviours that are modifiable in nature. It highlights mental health, PI, harmful drinking, smoking and poor nutrition as priorities (Public Health England *et al.*, 2016).

Physiotherapy might have a role to play in addressing all of these priorities but it has been postulated that physiotherapists have a particular role in addressing PI. "Exercise and movement" is one of the four pillars of practice as described by the Chartered Society of Physiotherapy and physical rehabilitation is firmly embedded in the identity of the profession (Chartered Society of Physiotherapy, 2013). It has been suggested that physiotherapists should take a lead role in the prevention and management of all conditions that are associated with low levels of PA (Dean, 2009). Physiotherapists have been described as experts in functional ability, movement, exercise, the pathophysiology of inactivity and its effects on all systems (Wittink, Engelbert and Takken, 2011). Furthermore, physiotherapists are considered to be experts in PA and credible messengers of PA advice by patients with long-term conditions (Macmillan Cancer Support, 2014).

3.4 Physical Activity Guidelines

The UK Department of Health describes the rationale for government PA guidelines and the duty that governments have to inform their citizens about the relationship between lifestyle and health. This includes the need for people to be aware of the levels of PA that deliver

health benefits and the health impacts of leading an inactive lifestyle (Department of Health, 2011).

PA guidelines have evolved significantly since their first iteration in 1975 (American College of Sports Medicine., 1975). In 1995, American adults were advised to accumulate at least 30 minutes of moderate to vigorous PA on preferably every day each week (Pate, Pratt and Blair, 1995). In 1996, in England, the Department of Health followed a similar approach and recommended 30 minutes of moderate to vigorous PA on at least five days per week (Department of Health, 2004). Since then, there has been a shift towards more concordant guidelines. In 2008, the first guidelines to be issued by the Federal Government in the United States of America were published following a comprehensive scientific review of the evidence. These guidelines were the first to state recommendations as specifically 150 minutes of moderate or vigorous PA per week (US Department of Health and Human Services., 2008). In 2010 global recommendations on PA for health were published and contained the following guidance:

> *"For physical activity, it is recommended that individuals engage in adequate levels throughout their lives. Different types and amounts of physical activity are required for different health outcomes: at least 30 minutes of regular, moderate-intensity physical activity on most days reduces the risk of cardiovascular disease and diabetes, colon cancer and breast cancer. Muscle strengthening and balance training can reduce falls and increase functional status among older adults. More activity may be required for weight control." (World Health Organization, 2010)*

In the UK up to that point, guidelines had been produced and disseminated separately in the four home countries, and in 2011 the Chief Medial Officers from all four nations published the first UK-wide PA guidelines (Department of Health, 2011). The Department of Health described how the guidelines could assist with the work of policy makers, healthcare professionals and others who support health improvement, in addition to helping individuals to take responsibility for their own lifestyle choices (Department of Health, 2011). The current UK guidelines include specific age-related guidance for early years (under 5s), children and young people (5–18 years), adults (19–64 years) and older adults (65+ years). The guidance contains recommendations on aerobic exercise, strength

exercise, sedentary behaviour, frequency, intensity, time and types of suitable PA. The adult and older adult guidelines were updated and formatted into a combined infographic in 2015 (see Figure 4).

Figure 4. Physical Activity Infographic (Public Health England, 2015).

Evidence suggests that these guidelines are not being successfully disseminated (Knox *et al.*, 2013; Hunter *et al.*, 2014). Psychological theories such as the protection motivation theory suggest that individuals must be accurately aware of their current actions in order to be able to intimate a change to more desirable actions (Knox *et al.*, 2013). The protection motivation theory suggests that individuals balance the appraisal of a threat (for example threat of cardiovascular disease due to inactivity) with an appraisal of their ability to cope (consideration of tools and skills to build coping strategies). This coping appraisal is influenced by the belief that a certain behavioural response can reduce the threat. Therefore, understanding the response required (that is, the amount of PA) to reduce the threat (cardiovascular disease) is a key factor in success (Bui, Mullan and McCaffery, 2013).

A lack of knowledge of PA guidelines has been identified in trainee doctors (Dunlop and Murray, 2013). A recent study explored knowledge of the PA guidelines amongst GPs in England and found that 30% (n = 301) said that they had not heard of the guidelines and 51% (n= 514) had heard of the guidelines, but were broadly unfamiliar or very unfamiliar with their content (Chatterjee *et al.*, 2017).

The awareness and knowledge of UK physiotherapists in relation to the PA guidelines has not been explored. A survey-based study from the Republic of Ireland reported that 51% (n=45) of physiotherapists were able to accurately state the current minimal PA guidelines for healthy adults. Where recall was inaccurate physiotherapists tended to report PA levels that were below the recommended minimum suggesting that PA promotion may fall short of the actual recommendations (Barrett, Darker and Hussey, 2013). More recently, (Freene *et al.*, 2017) reported that only 10% of physiotherapists accurately recalled all aspects of the current Australian guidelines. Furthermore, they report that when healthcare professionals had knowledge of the PA guidelines it doubled the likelihood of them encouraging patients to increase their PA (odds ratio 2.01, 95% confidence interval 1.18-3.43).

This creates a rationale, as a starting point, for ensuring that healthcare professionals know the current guidelines, yet the existing evidence suggests that healthcare professionals have

insufficient knowledge. To date, no studies have been identified that assess UK physiotherapists' knowledge of the PA guidelines.

3.5 Making Every Contact Count

The Making Every Contact Count (MECC) approach is currently one of the key mechanisms for achieving the aspiration to embed health promotion into healthcare. This approach has highlighted how a relatively low-cost programme that capitalises on the opportunity that practitioners in health care settings have to support behaviour change in their patients can improve population level behaviour change. It is endorsed by Public Health England, NHS England and Health Education England who have programmes to support its uptake and adoption into practice.

MECC focuses on five key modifiable health behaviours one of which is PI (Public Health England *et al.*, 2016). It is an approach to behaviour change that uses existing clinical contacts to encourage and support service users to make positive changes to their physical and mental health and wellbeing. It is described as follows:

> *"MECC supports the opportunistic delivery of consistent and concise healthy lifestyle information and enables individuals to engage in conversations about their health at scale across organisations and populations. For staff, MECC means having the competence and confidence to deliver healthy lifestyle messages, to help encourage people to change their behaviour and to direct them to local services that can support them."* (Public Health England *et al.*, 2016)

The implications for physiotherapists include the expectation that routine appointments will be used to address health behaviours that influence long-term health and wellbeing, in addition to addressing the primary issue for which a patient was referred. Issues that predicate a need for physiotherapy are frequently accompanied by other comorbidities and the prevalence of multimorbidity in the general population is increasing over time (Barnett *et al.*, 2012; McPhail, 2015). Thus, a strong rationale exists for equipping clinicians with a pragmatic approach for addressing health behaviours.

The MECC approach advocates the use of brief interventions (BIs) or very brief interventions (VBIs) during routine clinical contacts as described in Table 3 (Public Health England *et al.*, 2016). It differentiates BIs and VBIs from specific, high-intensity behaviour change interventions which are more time and resource intensive. Brief advice does not feature in the MECC model although it forms the foundation of current, PA specific, NICE guidance (National Institute for Health and Care Excellence, 2013).

Table 3. Behaviour Change Terminology (adapted from National Institute for Health and Care Excellence, 2013, 2014)

Brief Advice	Verbal advice, discussion, negotiation or encouragement, with or without written or other support or follow-up. It can vary from basic advice to a more extended, individually focused discussion.
Very Brief Intervention	A very brief intervention can take from 30 seconds to a couple of minutes. It is mainly about giving people information, or directing them where to go for further help. It may also include other activities such as raising awareness of risks, or providing encouragement and support for change. It follows an 'ask, advise, assist' structure. For example, very brief advice on smoking would involve recording the person's smoking status and advising them that stop smoking services offer effective help to quit. Then, depending on the person's response, they may be directed to these services for additional support.
Brief Intervention	A brief intervention involves oral discussion, negotiation or encouragement, with or without written or other support or follow-up. It may also involve a referral for further interventions, directing people to other options, or more intensive support. Brief interventions can be delivered by anyone who is trained in the necessary skills and knowledge. These interventions are often carried out when the opportunity arises, typically taking no more than a few minutes for basic advice.
Extended Brief Intervention	An extended brief intervention is similar in content to a brief intervention but usually lasts more than 30 minutes and consists of an individually-focused discussion. It can involve a single session or multiple brief sessions.

High Intensity Interventions	Typically last more than 30 minutes and are delivered over a number of sessions.

MECC interventions are based on an 'Ask, Advise, Assist' model but there is not explicit guidance on what actions should occur within the intervention (Public Health England, NHS England, 2016). Whilst this gives flexibility for the approach to be tailored to suit individual clinicians and practice settings, it can also be problematic as discussed in the next section.

3.6 The Effectiveness of Healthcare-based Physical Activity Interventions

As the scale and impact of PI has become increasingly apparent, there has been a corresponding increase in interest in the field of PA behaviour change. Behaviour change is complex and vast, in order to reflect the focus of this Ph.D. this section is not an exhaustive discussion of PA behaviour change approaches, rather an overview of the evidence related to specific PA behaviour change approaches within healthcare.

3.6.1 High-Intensity Interventions

The PA interventions that have dominated to date have largely been resource-intensive programmes that would be classified as high-intensity behaviour change programmes by NICE (National Institute for Health and Care Excellence, 2014). There are examples of such interventions in a physiotherapy setting; in a cohort study, Holm *et al.*, (2015) integrated a comprehensive PA and exercise programme into physiotherapy care for 190 people with chronic musculoskeletal conditions. They reported positive findings including a significant increase in activity levels from baseline to the end of the treatment period ($P = 0.021$), a 12% reduction in the proportion of patients with a low level of PA and an increase in the proportions with moderate and high levels of PA (of 4% and 8%, respectively). These findings are initially encouraging however, the mean number of additional, physiotherapy-led, exercise intervention sessions per patient was 17.5. With finite healthcare resources it

may be difficult to justify the incurred costs and this model may not be scalable within current healthcare systems. Additionally, measurement was taken at baseline and at the end of the 12-week treatment period. The self-report measures used require recall over a two-week period which suggests that participants may have included their intervention exercise in the post-test measurement. Longer-term follow up would be required to show any meaningful change in activity after an intervention ended. It is also important to note the pre-test post-test design and limited detail on recruitment make it difficult to establish and meaningful intervention effects.

Despite these limitations Holm *et al.*, (2015) provides an example of a model whereby physiotherapy practice becomes a provider of PA opportunities. This is an important differentiation from a model in which PA is promoted during physiotherapy and integrated into treatment.

A systematic review of PA interventions in primary healthcare included 15 randomised controlled trials, 13 of which were included in a meta-analysis (Orrow *et al.*, 2012). Small to medium positive intervention effects were seen at 12 months (odds ratio 1.42, 95% confidence interval 1.17 to 1.73; standardised mean difference 0.25, 0.11 to 0.38). The authors reported that the number needed to treat with a PA intervention for one sedentary adult to meet PA guidelines at 12 months was 12 (7 to 33). This result has been widely reported, and a comparison to estimates of the number needed to treat with smoking cessation interventions has been made into an infographic; this has become campaign material for initiatives to promote PA in healthcare (see Figure 5).

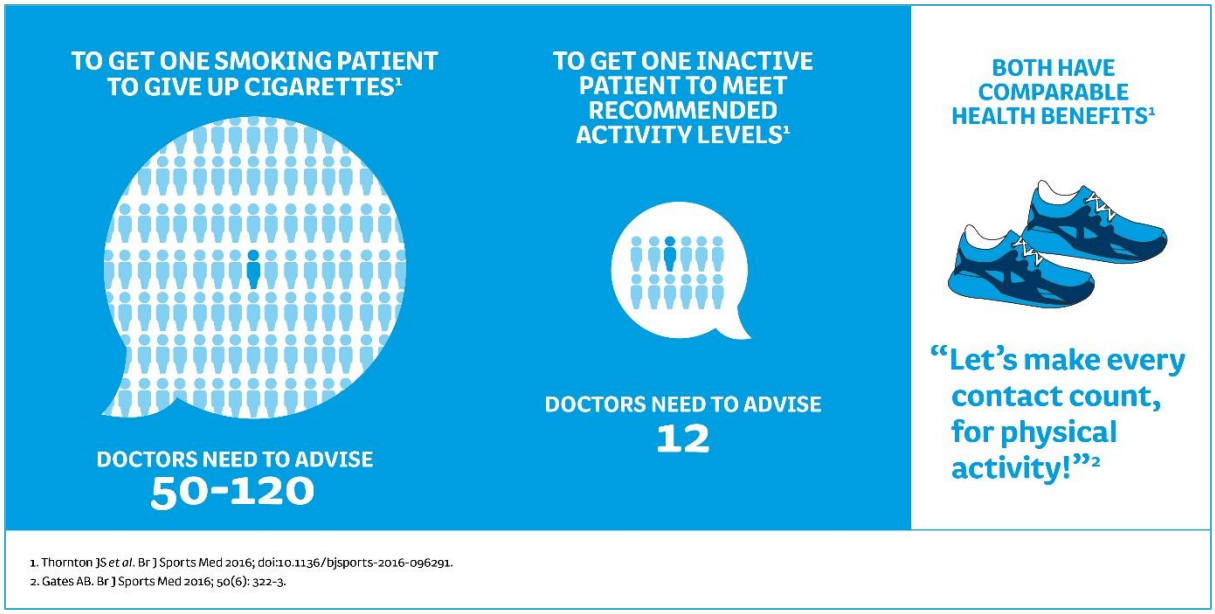

Figure 5. Number Needed to Treat Comparisons (reproduced with permission from Totes Health 2016).

Similarly, in a review of systematic reviews of the evidence for the effectiveness of PA promotion interventions in primary care, Sanchez *et al.*, (2015) reported that high-quality causal evidence of a positive effect was shown in five of the included systematic reviews (Foster *et al.*, 2005; Lin *et al.*, 2010; Conn, Hafdahl and Mehr, 2011; Campbell *et al.*, 2012; Orrow *et al.*, 2012).

In a physiotherapy-specific systematic review, Kunstler *et al.*, (2017) concluded that physiotherapy-led PA interventions are effective at increasing PA in adults, although improvements did not last for more than one year. They report that interventions increased the odds of achieving the minimum recommended PA levels at final follow-up (OR = 2.15, 95% CI, 1.35-3.43, P = 0.001) (Kunstler *et al.*, 2017). The eight included studies varied significantly in terms of the time/cost burden of the interventions, for example one included intervention involved 18, 30-minute sessions within the first 12 weeks followed by an additional seven sessions delivered in weeks 18-55 (Pisters *et al.*, 2010). This has a significant cost burden and may not be feasible to fund such extensive interventions within stretched healthcare systems. Whilst Kunstler *et al.*, (2017) extends available knowledge by

systematically collating and reviewing physiotherapy-led PA interventions, it does not differentiate between pragmatic and high-intensity interventions. Thus, it includes a wide range of delivery models from brief interventions to lengthy face-to-face interventions over protracted time frames.

In fact, the majority of the included PA promotion interventions are high-intensity interventions which might not be compatible with integration into routine healthcare contacts in the UK. For example, in Sanchez *et al's.*, (2015) review of reviews, the inclusion criteria for the PA intervention was "any intervention performed or initiated in a primary care setting with the goal of increasing the PA level or participation of sedentary or insufficiently active adults." Thus, no time or resource limitations were applied through the inclusion/exclusion criteria meaning that many of the individual studies included in the reviews were high-intensity.

3.6.2 Pragmatic Interventions

There is a need for cost-effective, scalable interventions to enhance the adoption and maintenance of regular PA (Lamming *et al.*, 2017). Failure to integrate PA interventions into routine clinical practice is a missed opportunity that warrants further attention. Sanchez *et al.*, (2015) highlighted the fact that the majority of evaluated PA interventions were difficult to integrate into routine primary care services and thus the desired "scaling-up" failed to occur.

In order to be compatible with integration into healthcare, it is essential that brevity is acknowledged, alongside effectiveness, as a key requirement. Integrating pragmatic interventions for PA into routine practice has been identified as the most feasible and acceptable form of PA promotion for physiotherapists in principle (Shirley, van der Ploeg and Bauman, 2010; Aweto *et al.*, 2013). Identifying pragmatic PA interventions that demonstrate clinical effectiveness represents an opportunity to achieve levels of integration within healthcare that have remained elusive thus far.

Pragmatic interventions are central to MECC approaches (Public Health England *et al.*, 2016) and NICE recommends that primary care practitioners deliver tailored, brief PA advice to inactive adults, and follow this up at subsequent appointments (National Institute for Health and Care Excellence, 2013). Much of the academic literature that supports pragmatic interventions is actually based on interventions that are up to 30 minutes in duration (Lamming *et al.*, 2017). Consensus has been called for, and Pears *et al.*, (2016) suggests five minutes as a threshold for what could reasonably be integrated into healthcare. Given the assumption that physiotherapy contacts are approximately 25 minutes in duration across an average of four sessions per episode of care (NHS Digital, 2016), it could be reasonable to suggest that a five-minute tailored intervention is feasible within the confines of routine practice as suggested by Pears *et al.*, (2016).

The most comprehensive systematic review of the evidence for pragmatic interventions to date was carried out in 2012, using the term "brief advice" to describe pragmatic interventions in healthcare (Campbell *et al.*, 2012). Within this review a narrative synthesis reported that six studies (including five randomised controlled trials) found a significant positive effect of brief advice in promoting physical activity; seven studies (including four randomised controlled trials) found a non-significant benefit of brief advice over usual care and two studies found no difference between brief advice and usual care.

In the same study, meta-analysis of continuous PA data (including eight effectiveness studies six of which were randomised controlled trials and two non-randomised controlled trials) identified that brief advice produced a small effect size (SMD 0.17, 95% CI 0.06 to 0.28). Furthermore, meta-analysis of dichotomous PA data revealed that the relative risk of meeting recommended PA levels was 1.30 (CI 95% 1.12 to 1.50) in favour of brief advice (Campbell *et al.*, 2012).

In a recent review of reviews, Lamming *et al.*, (2017) concluded that BIs increased self-reported physical activity in the short-term (4–12 weeks), but evidence for their

effectiveness beyond this time frame is inconclusive. Lamming *et al.*, (2017) highlighted the need for future reviews, as well as future individual studies, to evaluate different methods of tailoring BIs and the use of different tailoring variables, to compare BIs that use different behaviour change techniques, and for the effects of different types of providers and settings to be considered (Lamming *et al.*, 2017).

Only one physiotherapy-specific study investigating pragmatic PA interventions was identified. The intervention consisted of one single five-minute counselling session in addition to receiving treatment for a musculoskeletal issue, followed by encouragement in two additional follow-up sessions (Sheedy *et al.*, 2000). The study found significantly greater likelihood of the intervention group increasing PA levels by 60 minutes or more per week, compared with the control group, based on PA performed in an average week (OR 2.97, 95% CI 1.36- 6.46). High risk of bias is acknowledged in relation to lack of randomisation and small sample size in this pilot study.

To summarise this section, the research evidence to date suggests that healthcare interventions directed at increasing PA are promising. However, these interventions largely focus on high-intensity interventions that might not be compatible with routine healthcare. This, along with many other factors might explain the lack of uptake of such programmes. Physiotherapy-related studies are largely absent from this body of evidence despite the particular features of physiotherapy practice that position it well to contribute to addressing PI.

3.7 Content of Interventions for PA

A review of pragmatic interventions for PA concluded that the content and delivery of interventions was generally poorly specified with a lack of detail and consistency regarding the actual behaviour change techniques (BCTs) included (Lamming *et al.*, 2017).

A BCT is described as an observable, replicable, and irreducible component of an intervention designed to alter or redirect causal processes that regulate behaviour; that is, a

technique is proposed to be an "active ingredient", and these have been mapped in a comprehensive taxonomy (Michie *et al.*, 2013). For example, "specific goal setting" is a BCT identified as important in PA behaviour change, this might include a detailed plan of exactly what a person might do and a detailed description of the behaviour including the frequency, intensity and duration of a planned activity. Details such as where, when, how and with whom would also be included. It is acknowledged that many behaviour change interventions fail to give such details of the actual BCTs involved rendering them hard to describe, measure and repeat (Michie *et al.*, 2013).

Foster *et al.*, (2005) identified a series of BCTs (exploring beliefs about the costs and benefits of PA, bolstering confidence to engage in PA, prompting goal setting, encouraging self-monitoring and providing reinforcement of change) which were more frequently found in effective PA interventions. Further to this, a 40-item taxonomy of BCTs to help people change their PA and eating behaviours was published in 2011 (Michie *et al.*, 2011).

A more recent meta-analysis of PA interventions indicated that the following BCTs that are effective in increasing PA; intention formation, self-monitoring, goal setting and review of behavioural goals (Pears *et al.*, 2016).

The BCTs used in physiotherapy-led interventions were mapped out and of the possible 93 BCTs identified by Michie *et al.*, (2013), 32 were used across both experimental and observational studies (Kunstler *et al.*, 2017). Thirty of these BCTs were used by physiotherapists in experimental studies, compared to only seven in observational studies. Social support was the most frequently identified BCT across all included studies (Kunstler, Cook, Freene, Finch, Kemp, OHalloran, *et al.*, 2017). Conversely, a recent descriptive study identified seven BCTs (goal setting (behaviour), goal setting (outcome), feedback on behaviour, instruction on how to perform the behaviour, information about health, prompts/cues and behavioural practice/rehearsal) were used clinically by physiotherapists when prescribing exercise for pain management (Emilson *et al.*, 2016).

This evidence highlights the lack of consensus on the content of pragmatic PA interventions. Whilst it is identified that the actual BCTs are likely to be dependent on contextual factors (Kunstler *et al.*, 2017) further exploration of the BCTs that are present within existing effective PA interventions could lead to consensus on a core set of BCTs that should be included in pragmatic PA interventions.

3.8 Current Physiotherapy Practice

A number of international studies report on how PA promotion is integrated into routine physiotherapy practice. O'Donoghue *et al.*, (2014) reported high levels of PA promotion amongst physiotherapists working in primary care in the Republic of Ireland, with 76% "always" assessing PA levels at either initial assessment or follow up appointments and 96% reporting that they give written PA advice to patients. Similarly, in Rwanda, 65% of physiotherapists described their own PA promoting practice as "good" (Frantz and Ngambare, 2013).

Conversely, Barrett, Darker and Hussey, (2013) reported that only 34% of physiotherapists screened for levels of PA in all of their patients in the Republic of Ireland. Levels of PA promotion amongst Nigerian physiotherapists are described as "low" (Aweto *et al.*, 2013), a finding echoed in studies from Slovenia (Radež, Šćepanović and Juričan, 2015), Canada (Lau *et al.*, 2015) and Australia (Shirley, van der Ploeg and Bauman, 2010).

These studies are largely questionnaire-based and therefore rely on self-report which may be subject to recall bias and social desirability bias. Self-selection bias might also influence findings, with engaged physiotherapists more likely to respond than non-engaged peers (Althubaiti, 2016). Sample sizes are generally small, and areas of practice are diverse in terms of location and clinical speciality. Finally, some of the measurements and judgements are arbitrary with little commonality between studies. For example, what constitutes high levels, low levels or indeed sufficient levels of PA promotion, is unclear making comparison between studies difficult. To summarise, the findings are mixed, and studies show

consistent limitations, with a notable absence of studies exploring current practice in the UK.

Many barriers to PA promotion within general healthcare have been cited in the literature (Mckenna, Naylor and Mcdowell, 1998; Douglas *et al.*, 2006; Rubio-Valera *et al.*, 2014). Further to this, physiotherapy-specific barriers have also been identified. Professional identity is a recurrent theme and findings suggest that physiotherapists may not see PA promotion as part of their role. For example, O'Donoghue, Doody and Cusack, (2011a) report that following their qualitative investigation, the majority of the physiotherapists did not agree that health promotion and disease prevention are within the remit of the physiotherapists' existing role.

Conversely, in a qualitative study Smith *et al.*, (2013a) report feelings of moving away from a traditional physiotherapy identity and becoming broader and more holistic in their approach. Mouton *et al.*, (2014) reported that 99% of physiotherapists agreed that they should contribute to the promotion of PA with their patients. Similarly, Shirley, van der Ploeg and Bauman, (2010) reported that 96% (n=305) of physiotherapists surveyed agreed with the following statement; "Discussing the benefits of a physically active lifestyle with patients is part of the physical therapist's role".

A lack of knowledge is a frequently-cited barrier (O'Donoghue, Doody and Cusack, 2011b; Aweto *et al.*, 2013; Smith *et al.*, 2013b; Mouton *et al.*, 2014; Walkeden and Walker, 2015; Lau *et al.*, 2016). Mouton *et al.*, (2014) also highlighted a lack of knowledge of the definition of PA and a lack of awareness of the various dimensions with a predominance of answers relating to sport. Furthermore, a survey of physiotherapy practice tutors in the Republic of Ireland found that 66% were unhappy with their own knowledge and felt that they required further training in the areas of changing PA behaviour, exercise promotion and prescription (O'Donoghue, Doody and Cusack, 2011b).

A lack of time is identified as a barrier in a number of studies (Shirley, van der Ploeg and Bauman, 2010; Aweto *et al.*, 2013; Walkeden and Walker, 2015). A lack of perceived patient

interest and feelings that PA promotion is not acceptable to patients were both reported as barriers to PA promotion (O'Donoghue *et al.*, 2014; Soundy *et al.*, 2014; Walkeden and Walker, 2015). In addition, a lack of belief by clinicians in the effectiveness of PA interventions was identified (Shirley, van der Ploeg and Bauman, 2010; Walkeden and Walker, 2015). Finally, barriers specific to the acute setting were identified, including the acutely unwell nature of the patients and the immediate focus on discharge (Walkeden and Walker, 2015).

3.9 Physical Activity Levels of Healthcare Professionals

Interacting with patients about PA in a way that will facilitate behaviour change is complex and is influenced by many factors. One factor that has been identified in the literature as having a significant influence on this interaction is the PA habits of the healthcare professionals. A number of studies report consistent findings of significant positive association suggesting that clinicians' PA habits are a consistent and independent correlate of PA (Lobelo and de Quevedo, 2016).

This suggests that any initiatives aimed at increasing clinicians' PA habits (in itself a critical current issue for the NHS) may influence the amount that those clinicians promote PA within their clinical roles. The relationship between PA habits and PA promotion is explained in part by Rogers *et al.*, (2005, 2006) who reported that when healthcare professionals were physically active on a regular basis, they were more confident in guiding their patients through a PA regimen and felt more effective in doing so.

A small number of studies have explored the PA habits of the physiotherapy workforce. Black *et al.*, (2012) gathered self-report information on physiotherapists' PA habits and found that 81% were engaging in "regular physical activity", although the amount or type of PA was not explored so it is unclear whether the levels were sufficient in relation to current guidelines. McPhail and Waite, (2014) examined the self-reported PA levels of Australian physiotherapists and concluded that almost all respondents exceeded the minimum recommended PA as outlined in the guidelines. This finding was echoed in a study of

Latvian physiotherapists, approximately 90% of whom engaged in either moderate or high levels of weekly PA (Mihailova, Kaminska and Bernane, 2014). When self-reported PA data from physiotherapists was compared to self-reported PA data gathered from the general population it was found that 67% of physiotherapists were meeting the US PA guidelines compared with 36% of adults from the general population (Chevan and Haskvitz, 2010).

This small body of evidence tentatively characterises physiotherapists as an active workforce. However, the limitations of self-report methods of PA have long been recognised with a consistent over-reporting trend observed (Ainsworth *et al.*, 2015). Only one study of physiotherapists' PA habits using an objective measure of PA was identified. Canadian physiotherapists across different practice settings were asked to report their own PA levels using the widely-recognised International Physical Activity Questionnaire (long form); 99% reported sufficient PA to meet current Canadian PA guidelines. However, when a sub-sample wore an accelerometer and objective PA data was gathered, only 58% of the sample was sufficiently active to meet the PA guidelines (Neil-Sztramko *et al.*, 2017). This demonstrates a substantial disparity between results from self-report and objective measures which represents a significant methodological limitation.

To summarise this section, there is a small body of international evidence that suggests that a substantial proportion of physiotherapists are likely to be sufficiently active for good health (that is, they meet the respective guidelines) and are more active than the general public. Based on the robust relationship between clinicians PA levels and their PA promotion practices, it could be hypothesised that physiotherapists are high promoters of PA within clinical contacts. However, this hypothesis is based on small, non-representative samples, unreliable measurement methods and does not include studies of the UK physiotherapy population.

3.10 Summary and Implications for Thesis

PI is a public health priority and there are growing calls for the promotion of PA to be integrated into routine healthcare contacts (Sallis, 2015; Cowan, 2016; White and Nash,

2016). Physiotherapists work across many healthcare settings and spend relatively long periods of time with patients thus creating enhanced opportunities for behaviour change. Furthermore, a large proportion of patients attending physiotherapy appointments is likely to be physically inactive and is also likely have co-morbidities and are therefore likely to gain significant benefit from increasing their activity levels (Hallal *et al.*, 2012; McPhail, 2015). Most of the evidence to date focuses on high-intensity behaviour change interventions; despite promising findings in clinical trials, these have not been scaled-up or adopted into routine clinical practice.

The evidence related to behaviour change interventions that are both effective and pragmatic is incomplete and further development and testing of interventions is required. Despite this, these approaches are already strongly advocated within UK clinical best practice guidance and policy (National Institute for Health and Care Excellence, 2013; Public Health England *et al.*, 2016). There is an opportunity to expand this area of enquiry further and to support widespread adoption of refined approaches.

PA promotion in physiotherapy practice is poorly understood, and UK studies are largely absent from the literature. Little is known about the extent to which physiotherapists promote PA or the structure or content of the approaches that they use. In addition, physiotherapists' own PA habits and any potential influence on PA promotion are unreported.

Chapter 1 set out the broad context for this programme of research and Chapter 2 provided a systematic scoping review of the global literature which has been further explored and expanded upon in this chapter with a description of the key contextual factors and a critical review of the evidence. Together, these first three chapters situate this programme of research within the current context of what is known, and provide a rationale for the proposed enquiry.

Chapter 4: Methodology

4.1 Introduction

This chapter considers the relevant research paradigms and explains the theoretical perspectives that underpin this programme of research. Key methodological concepts are defined, described and appraised in relation to the proposed study. The selection of mixed methods research and the sequential explanatory design is explained and justified. A visual overview of the mixed methods design within this programme of research is included. More detail regarding the methods within each phase of the research is included within the published papers in Chapters 5 (quantitative) and 6 (qualitative).

The specific research objectives of the programme of research (re-stated in Table 4) require the collation of a large volume of data information and also an in-depth exploration of some specific aspects of practice. Any single research method would be insufficient to meet the requirements for both and therefore a mixed methods approach was selected, more specifically a sequential explanatory design (Ivankova, Creswell and Stick, 2006).

Table 4. Research Aims and Objectives, Chapter 4

Research Aim

The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.

1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.

5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.
7.	To generate evidence-based recommendations for education, research, policy and practice.

4.2 Key Concepts: Ontology and Epistemology

Methodology refers to the beliefs and processes that underpin the choice of specific research methods (Glogowska, 2011). It links the choice of methods to the desired outcome, and it gives context to the research and explains methodological choices. It is informed by a range of factors including ontology and epistemology. Ontology relates to beliefs about the nature of the social world and what can be known about it. Epistemology relates to the nature of knowledge and how it can be acquired (Ritchie and Lewis, 2003).

Research philosophies relate to different views of the world and different beliefs about how it can be studied (Ritchie *et al.*, 2013). Ontology is described in simple terms as beliefs about what there is to know about the world. A fundamental ontological issue is concerned with whether the social and natural worlds exist in a consistent way or whether the social world is different because it is open to interpretation (Ritchie *et al.*, 2013). This led to the development of distinct and conflicting schools of thought that can be visualised as a spectrum with realism at one extreme and constructivism at the other (Creswell and Plano Clark, 2011).

Realism claims that there is an external reality that exists independent of peoples' beliefs or understandings about it. It makes a clear distinction between the way the world actually is and the meaning and interpretation of that world by individuals. Realism also proposes a

singular reality, the one and only truth that is out there waiting to be discovered by objective and value free enquiry (Feilzer, 2010).

Conversely, constructivism suggests that there is no such thing as a single objective reality and it privileges subjective enquiry. These positions represent relative extremes and they have been subject to much discussion and modification with each stance giving rise to derivatives. One of these is critical realism (Bhasker, 1978) which possets that social phenomena exist independent of people's representations of them, but they are only accessible through those representations.

Epistemology is concerned with the nature of knowledge, its possibilities, scope and general basis (Ritchie *et al.*, 2013). It provides philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that these are adequate and legitimate. It offers a theoretical perspective or a philosophical stance, and it informs methodological decisions thus providing a context.

This relates back to ontological considerations and the nature of reality where idea of that truth is an independent reality (realism) is at one end of the spectrum and the opposing view that a truth is a representation of a socially-constructed reality (constructivism) is at the other. A third view suggests that actually it does not matter, and that an interpretation is true if it leads to or contributes to actions that produce the desired results; this approach is termed pragmatism (Andrew and Halcomb, 2009).

Epistemological stances and beliefs vary and are underpinned by, and aligned with, ontology. The positivist school of thought (underpinned by realism) suggests that we "know truths" by formal testing, by using the scientific method, constructing hypotheses, deducing and testing and confirming, and as such this approach is clearly aligned with quantitative methods. This may be through induction, that is, looking for patterns and associations derived from observations of the world. Or it may be through deductive processes, whereby hypotheses are reached through logical processes (Glogowska, 2011).

The opposing view, interpretivism (underpinned by constructivism), is that there is no one, singular truth; truth is plural and socially constructed. This naturally leads on to qualitative methods and inductive enquiry which is often described as inductive enquiry (Glogowska, 2011). This is a simplistic overview of the extreme philosophical stances, and many more nuanced positions exist within this broad framework. However, these two positions continue to dominate epistemological debates in the social sciences (Ritchie *et al.*, 2013).

In a traditional scientific method (underpinned by realist values), the phenomena being researched are independent of and unaffected by the researcher. The researcher can be independent in their approach and the investigation is unaffected by their views, values, experience (Andrew and Halcombe, 2009). Qualitative approaches (underpinned by constructivist values) differ in that they acknowledge that in the social world most people are affected by the process of being studied. Findings are either mediated through the researcher or agreed between researcher and participant.

Decisions about research questions and methods have been described as a reflection of the researcher's epistemological understanding of the world (Mills, 1959). This suggests that decisions about research processes are not made from a neutral stance. An individual's philosophical stance will underpin their epistemological beliefs, which will in turn influence their research questions and choice of methods (Feilzer, 2010). Thus, understanding these issues is essential in order to inform decisions and to understand the impact that these decisions may have. Empathic neutrality has been proposed as a position that recognises that research cannot be value-free but advocates that researchers should make their assumptions transparent (Berger, 2015). This is one aspect of reflexivity which is discussed in more detail in Chapter 6.

4.3 Research Paradigms

A paradigm can be regarded as an accepted model or an organising structure (Kuhn *et al.*, 1970). It is a deep philosophical position relating to the nature of social phenomena and social structure (Feilzer, 2010). An individual's philosophical stance will underpin their

epistemological beliefs, which will in turn influence their research questions and choice of methods. A traditional approach suggests that research paradigms direct research efforts and are adopted at the exclusion of other paradigms (Kuhn *et al.*, 1970). Thus, traditionally, paradigms underpin and direct and can also be interpreted as prescriptive in that they require particular methods and exclude others (Feilzer, 2010). There is a long-held belief that decisions about research questions and methods are a reflection of the researchers' epistemological understanding of the world (Mills, 1959), and an alignment of methods, methodology, epistemology and ontology is expected.

There is growing recognition that qualitative and quantitative approaches need not be mutually exclusive and that whilst they reveal different perspectives, more than one perspective can be beneficial particularly when tackling complex research questions. (Andrew and Halcombe, 2009). This has led to the rise in popularity of mixed methods research. The paradigms of constructivism/interpretivism are traditionally presented as being fundamentally opposed (Creswell and Plano Clark, 2011), and this is borne out in the conflict between qualitative and quantitative approaches. Mixed methods approaches have been seen as a response to the enduring, circular debates about the relative strengths and weaknesses of qualitative and quantitative approaches (Feilzer, 2010).

Proponents of mixed methods research strive to integrate quantitative and qualitative research strategies. This does not fall comfortably within either of the accepted paradigms, and consequently alternative frameworks have been constructed to accommodate the diverse nature of such research (Meissner *et al.*, 2011). The alternative approach most commonly associated with mixed methods research is pragmatism, as this focuses primarily on the problem to be researched and the consequences of the research (Ritchie *et al.*, 2013).

There has been a greater acceptance of the pragmatic issues that influence the choice of method alongside the influence of underlying philosophical debates (Andrew and Halcomb, 2009). It has been suggested that purist debates about epistemology may overshadow and ultimately stymie practical decisions about how best to answer a given research question.

Furthermore, a more useful balance might be struck between underpinning philosophy and the practicalities of doing the research (Silverman, 2004).

Pragmatism recognises the ongoing 'realism versus constructivism' debate but chooses instead to focus on the purpose and consequence of research (Andrew and Halcombe, 2009). Pragmatism offers a different way of conceptualising epistemology and definitions of knowledge, and it rejects the idea that the mind is the basis of all knowledge. Its key tenets are firstly, that practical activity is the bedrock and the test of knowledge, and secondly that knowledge is judged according to its consequences in practice (Andrew and Halcombe, 2009). It is pluralist in that it accepts the variety of competing interests and forms its own knowledge. In terms of research method, it views the traditional hierarchy of evidence in a way that accepts that different methods achieve different ends and that relative merit cannot be assessed without consideration of context (Glogowska, 2011). The pragmatism approach rejects the idea that research questions, methods and methodology, epistemology and ontology should be aligned according to a particular paradigm. Conversely, pragmatism suggests that research questions should be the impetus for choosing a particular research design, rather than this being dictated by a paradigm (Andrew and Halcombe, 2009).

Pragmatism is the theoretical perspective that underpins this programme of research, as it allows for consideration of accepted key philosophical standpoints, yet balances this with a need to work with finite resources and the necessity to explore and combine both quantitative and qualitative data in order to answer research questions. Critically, it facilitates an approach in which both quantitative and qualitative approaches are valued.

4.4 Mixed Methods Research

Mixed methods research has been defined in general terms as the combination of qualitative and quantitative approaches in the methodology of a study (Tashakkori and Teddlie, 1998). The core characteristics of mixed methods research have been described as follows by Creswell and Plano Clark, (2011);

1. It collects and analyses rigorously both qualitative and quantitative data.

2. It mixes the two forms of data.

3. It gives priority to one form or both forms of data.

4. It can be a single phase or in multiple phases of a programme of study.

5. It frames the procedures within philosophical worldviews.

6. It combines procedures into specific research designs that direct the plan for conducting the study.

Over recent decades, the use of mixed methods research has increased dramatically and is becoming an increasingly accepted research approach (Bryman, 2006). Proponents of mixed methods research suggest that quantitative and qualitative paradigms can be mixed to develop a better understanding of research problems than what would be achieved by using either approach alone. (Creswell and Plano Clark, 2011). Promotion of PA in clinical practice is a complex social interaction that is influenced by many factors. Complex, real-world issues require nuanced research approaches that can deal with complexity and mixed methods approaches offer such an approach.

Enhanced understanding of complex issues is a key strength of mixed methods research (O'Cathain, 2010). Chapters 2 and 3 highlight the fact that PA promotion in physiotherapy practice is poorly understood, with little known about both current UK practice and the perspectives of physiotherapists. It was clear that gathering data in order to describe current practice would be best achieved through a quantitative approach. It was also apparent that this data may require further exploration and explanation which would best be achieved through qualitative methods.

Hence a mixed methods research approach was chosen in this study for a number of reasons, firstly, because of the complementarity of the quantitative and qualitative methods (Andrew and Halcombe, 2009). Complementarity refers to a situation in which two or more different things improve or emphasise each other's qualities. In this study the quantitative and qualitative strands are interdependent and mutually illuminating. The objectives of the study include describing current practice (which required a quantitative approach) but critically understanding the mechanisms that shape current practice (which required a qualitative approach). The final research objective is to generate evidence-based recommendations based on the cumulative learning from each phase. Thus, the specific objectives of the study rely on quantitative, qualitative and the cumulative learning from both approaches in order to answer the overarching research question and specific research objectives, rendering any single data source insufficient.

Secondly, using a mixed methods research approach gives a unique opportunity to enhance understanding of the mechanisms that underpin the quantitative findings in a meaningful way. That is, the initial quantitative phase allows for the identification of specific groups based on key characteristics. Establishing these groups guided purposeful sampling to ensure that the most insightful range of perspectives was gained in the qualitative study.

4.5 Sequential Explanatory Design

A sequential explanatory design was identified as the most suitable mixed methods approach, as this consists of a quantitative followed by a qualitative phase (Ivankova, Creswell and Stick, 2006). In this approach, a researcher collects and analyses the quantitative data, and following this, qualitative data are collected and analysed second in the sequence and helps to explain, or elaborate on, the quantitative results (Pluye and Nha Hong, 2014). The second, qualitative, phase builds on and is influenced by the first, quantitative, phase, and the two phases are connected at predetermined points in the study (Ivankova, Creswell and Stick, 2006). These phases are represented visually in Figure 6, the quantitative Phase 1 takes the form of a national, cross-sectional survey and Phase two is a qualitative, explanatory study. The analysis of the quantitative survey data provides a

general understanding of the research problem, and critically, provides a picture of current practice thus achieving a specific research objective. The qualitative data and its analysis refine and explain those findings by exploring participants' views on PA promotion in more depth, thus achieving specific study objectives (Cotten, Tashakkori and Teddlie, 1999). Together these methods allow the over-arching aim of exploring and understanding PA promotion in physiotherapy practice to be achieved.

The participant selection variant of the sequential explanatory design was used in this study (Creswell and Plano Clark, 2011). This is a specific type of sequential explanatory design in which the characteristics of the quantitative participants are used to guide purposeful sampling for the qualitative phase (Tashakkori and Teddlie, 1998). Key features of participants' self-reported PA promotion activity were used to guide the sampling for Phase 2 in order to ensure that a range of opinions was sought and that participants who could best illuminate the quantitative findings were identified.

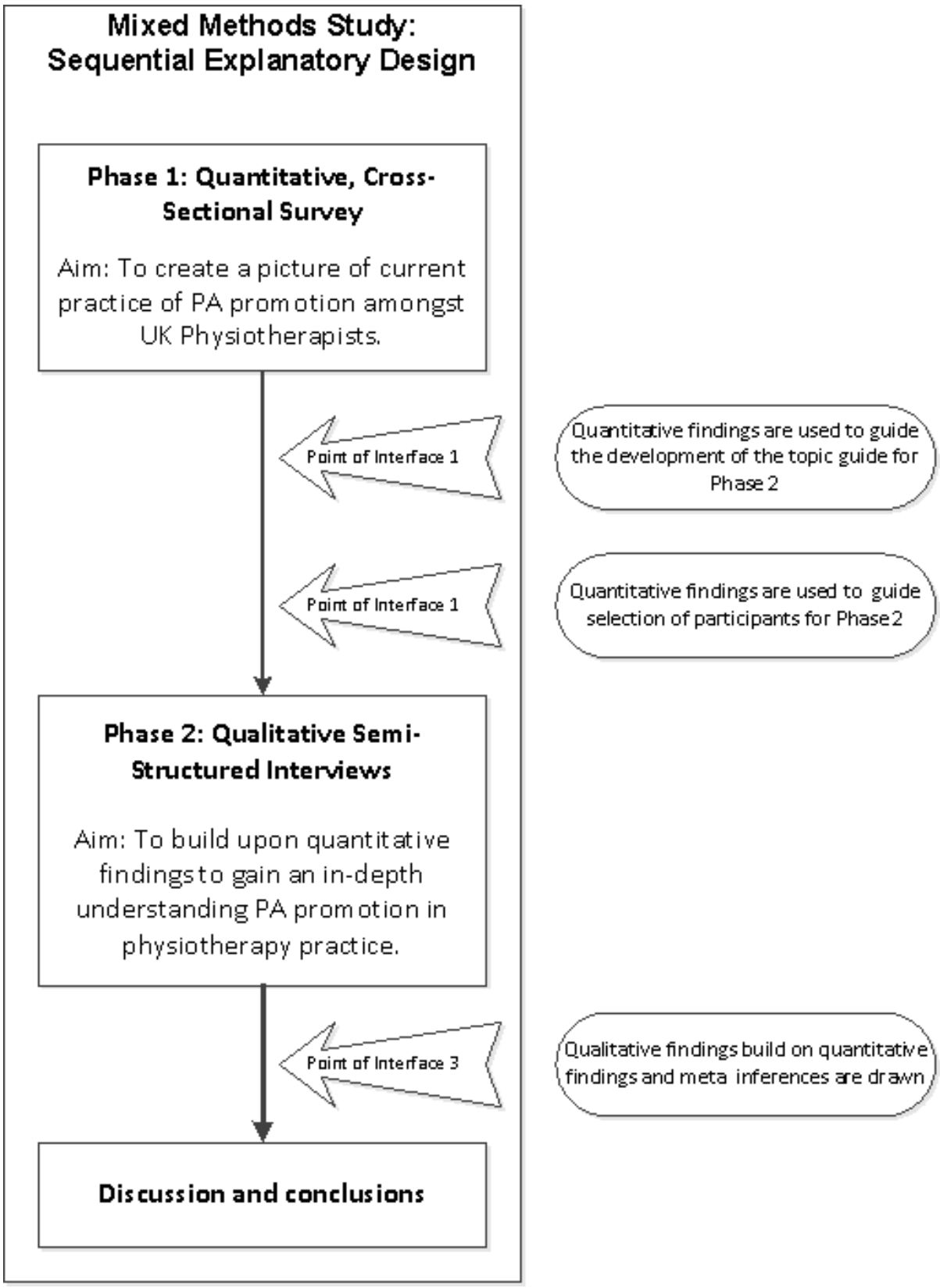

Figure 6. Flowchart Showing Phases of the Mixed Methods Study with Points of Interface Highlighted.

4.5.1 Priority in the Sequential Explanatory Design

Priority refers to the strand, quantitative or qualitative (or both), that a researcher gives more weight or attention to throughout the data collection and analysis process in the study (Meissner *et al.*, 2011). In this mixed methods study, priority is given to both quantitative and qualitative components; both the quantitative survey data and the qualitative interview data are required to achieve specific research objectives. Furthermore, these strands are interdependent, that is, the quantitative survey data would give a very limited advancement of knowledge without further qualitative explanation of the underlying mechanisms that influence practice. Similarly, the qualitative phase is dependent on the quantitative phase to guide the sampling process, to ensure that the participants who can best illuminate the research questions are recruited.

This approach has been criticised in that a dominant theoretical drive should be identified and respected (Morse, 2010). Furthermore, it has been suggested that any mixed methods research should have a dominant qualitative or quantitative focus in alignment with the theoretical drive. This is based on the assertion that using conflicting philosophical paradigms to underpin one study erodes the credibility of the underpinning theory and philosophical assumptions. These criticisms are rejected on the basis that pragmatism is the theoretical perspective for this study; qualitative and quantitative approaches complement one another and are required to answer the research questions. Consequently, priority is shared across quantitative and qualitative strands.

4.5.2 Integration of Quantitative and Qualitative Findings in Sequential Explanatory Design

In sequential explanatory studies, integration refers to the stages in the research process where the mixing or integration of the quantitative and qualitative methods occurs (Greene, Caracelli and Graham, 1989; Tashakkori and Teddlie, 1998; Creswell and Clark, 2011). Potential integration points include mixing in the opening stage of the study while formulating its purpose and research questions (Teddlie and Tashakkori, 2009), the

intermediate stage when the results of the data analysis in the first phase of the study inform the data collection in the second phase (Hanson et al. 2005), and finally the integration of the quantitative and qualitative findings can occur at the interpretation stage of the study (Onwuegbuzie and Teddlie, 2003). In this mixed methods research study there are 3 clear points of interface, and these are represented in Figure 6.

Point of Integration 1: The first point of interface occurs when the quantitative survey data are used to guide the development of the protocol for the qualitative phase. The qualitative phase explores and elaborates on the results from the quantitative phase of the study, hence the content of qualitative protocol and interview topic guide are grounded in the quantitative findings (Ivankova, Creswell and Stick, 2006).

Point of Integration 2: The second point of interface occurs when the quantitative data is used to guide the participant selection for the qualitative study. Quantitative findings enable the allocation of respondents into distinct groups based on their self-reported PA promotion activity. The two groups were "high PA promoters" and "low PA promoters", and this information was used to guide a quota sampling approach for the qualitative study. The rationale for this approach is to ensure that perspectives from both groups are captured to enable a richer understanding of underlying mechanisms, which is essential in identifying opportunities for change.

Point of Integration 3: The third and final point of interface occurs when meta inferences are drawn following the qualitative study (that is, point of interface 3). These meta inferences are the result of cumulative learning from both phases of the mixed methods study. This approach contrasts with other mixed methods approaches that employ discrete, concurrent methods which remain separate until they are integrated in the final analysis phase (Creswell and Plano Clark, 2011). Integration in the context of a sequential explanatory study is concerned with the ways in which each phase informs the next and is dependent on cumulative learning throughout the process. This approach to integration in sequential explanatory mixed methods studies is described in the literature (Ivankova, Creswell and Stick, 2006; Creswell and Plano Clark, 2011). In addition, many published

examples of this approach, whereby studies have points of interface between studies as well as narrative interpretation at the conclusion of studies have informed the methods for this Ph.D. (Ivankova, Creswell and Stick, 2006; Lamont *et al.*, 2015; Bowen, Rose and Pilkington, 2017).

4.6 Rigour in Mixed Methods Research

The need to limit threats to validity extends from the individual quantitative and qualitative strands to include the process of connecting of the data. Validity in mixed methods research has been defined as:

> *"employing strategies that address potential issues in data collection, data analysis and interpretations that may compromise the merging or connecting of the qualitative and quantitative strands of the study and the conclusions drawn from the combination." (Creswell and Plano Clark, 2011)*

Creswell and Plano Clark (2011) identified a number of potential threats to validity when connecting data in mixed methods research. These must be considered in addition to the threats to validity inherent in any single research method. The specific threats related to integration of mixed methods data are described here along with details of the strategies employed to reduce the threat.

It has been identified that inappropriate individuals are frequently selected for the quantitative and the qualitative data collection. In order to limit this issue, sampling strategies for both phases were carefully considered and justified. The decision to select qualitative participants from the pool of quantitative respondents enabled the purposive selection of participants who were best able to answer the research questions. Participants were selected for the qualitative follow-up based on key characteristics (specifically whether they were a high PA promoter or a low PA promoter), and this quota sampling approach allowed for the selection of the individuals who could best illuminate research questions and thus achieve research objectives.

Using inappropriate sample sizes for the data collection is a frequently-cited threat to the quality of qualitative research. In line with guidance, the quantitative sample was large and the qualitative sample was small (Creswell and Plano Clark, 2011). Sampling strategies are discussed in detail within chapters 5 (survey) and 6 (qualitative).

Choosing inadequate participants for the follow-up phase that cannot help explain significant results is also a frequent threat to the overall quality of qualitative research. As explained above, qualitative participants were drawn from the same pool and were carefully selected based on key characteristics to give a range of perspectives.

Creswell and Plano Clark (2011) identify that the actual mechanisms of integrating data are often inappropriate, for example comparing data that should in fact be merged. Points of integration are clearly described, firstly, the intention to build upon the quantitative findings with the subsequent qualitative findings was established a priori and is documented throughout the thesis. Secondly, the narrative interpretation method is a widely-accepted means of integrating qualitative and quantitative findings within a sequential explanatory design.

4.7 Summary and Implications for Thesis

This chapter has introduced the key concepts that underpin this programme of research including relevant philosophical stances and research paradigms. The principles of mixed methods research are described, and their selection for use is justified. Key methodological considerations are described, and decisions related to the selection of a mixed methods research approach have been justified. The concept of validity in relation to mixed methods research has been considered, and the strategies employed to uphold rigour are also outlined. This sets the scene for the specific methods related to each phase that are described within the published articles within Chapters 5 and 6.

Chapter 5: Mixed Methods Phase 1.

Containing Article B: Physiotherapy and Physical Activity: A cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists.

5.1 Introduction

Chapter 5 describes Phase 1 of the mixed methods study, this was a national, cross-sectional survey that was undertaken in May 2016. The chapter begins with an introduction to the context for this study and the subsequent impact. The full publication is included and this is followed by an extended discussion of the salient points that arose from this study including key findings, strengths, limitation and implications. Finally, the ways in which this phase informed the development of the subsequent qualitative phase are reviewed.

This is the first, quantitative phase of the mixed methods study, as such the aims of this study map to the overall thesis aims. A cross-sectional, online survey was undertaken, and this formed the initial phase of a mixed methods study using a sequential explanatory design. A cross-sectional survey was deemed the most suitable approach because data gathered at a single time point was sufficient to meet the specific objectives (Nardi, 2006) as outlined previously in Chapter 4. The aims of this thesis are stated in Table 5, the objectives that are specifically related to the cross-sectional survey are objectives 2, 3, 4 and 5.

Table 5. Research Aims and Objectives, Chapter 5.

Research Aim	
The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.	
1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.

5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.
7.	To generate evidence-based recommendations for education, research, policy and practice.

5.2 Context and Impact

Following the decision to undertake a cross sectional survey, an opportunity arose to collaborate with a wider concurrent survey. In May 2016, Public Health England commissioned a national survey of the allied health professions with the aim of exploring current practice in relation to health promotion. The author led this project during a secondment with Public Health England. The inclusion of additional survey sections was negotiated with the express purpose of collecting, analysing and publishing this data independently of the Public Health England survey. The full Public Health England survey can be seen in Appendix 5.

This process was completed, and the findings were accepted for publication in in British Medical Journal Open Sports and Exercise Medicine in August 2017. BMJ Open Sport & Exercise Medicine is an open access, peer-reviewed journal that has a broad, multidisciplinary, global audience (BMJ Journals, 2018) .

Since publication in October 2017 the full-text article has been downloaded 3262 times (accurate at 1.7.18) and has been shared widely on social media. Google Scholar reports 1 citation.

5.3 Published Paper: Article B

Article B is reproduced here, with the publisher's permission, in the format that it was published online. Published, supplementary files can be found in Appendix 2.

Physiotherapy and physical activity: a cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists

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Physiotherapy and physical activity: a cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists

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ABSTRACT

Objective Physical inactivity is a public health priority and embedding promotion of physical activity (PA) within healthcare systems is an important lever for change. Many factors influence PA promotion in routine healthcare practice; these include the PA habits of healthcare professionals and also their knowledge of the PA guidelines. Little is known about the extent to which PA is currently promoted in physiotherapy practice or the factors that influence it.

Methods Following ethical approval, a cross-sectional survey of UK physiotherapists was conducted. Findings were analysed and reported in accordance with STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) guidelines.

Results There were 522 respondents, 514 of whom were physiotherapists. Seventy-seven per cent of respondents routinely discussed PA with patients and 68% routinely delivered brief interventions. Assessment of PA status was not routine practice, neither was signposting to further sources of PA support. Only 16% of respondents correctly answered questions about the content of the PA guidelines. Only 38% of respondents met current PA recommendations. Clinicians' PA levels were not associated with PA promotion activity.

Conclusion Despite the promising finding that some form of PA promotion is integrated into most respondents' practice, we report a poor understanding of brief interventions and poor knowledge of the PA guidelines. Additionally, the majority of respondents were not sufficiently active to meet current PA recommendations.

What are the new findings?

- Discussions about physical activity (PA) were integrated into the majority of physiotherapy contacts.
- Brief interventions may not be carried out optimally.
  - PA status of patients was not routinely assessed.
  - Although 60% of physiotherapists knew that 150 min of moderate PA per week is recommended, only 16% of physiotherapists successfully answered all three questions relating to the PA guidelines.
  - Physiotherapists did not routinely signpost to further sources of PA support.
- The majority of physiotherapists were not sufficiently active to meet the current PA guidelines for adults.

How might it impact on clinical practice in the near future?

- To maximise the potential impact of physiotherapy on physical inactivity we recommend.
- Further efforts to disseminate the current PA guidelines.
- Targeted knowledge translation of brief interventions for PA in a physiotherapy context.

BACKGROUND

Physical inactivity (PI), defined as achieving less than 30 min physical activity (PA) per week,[1] has a significant impact on morbidity and mortality which leads to economic burden on healthcare systems and wider society.[2 3] Inactive people spend 38% more days in hospital and use significantly more healthcare resources than active people.[4] Accordingly, there is national and international guidance on how PA can be promoted.[5–7]

Many factors influence PA at population level and meaningful change requires sustained efforts across multiple systems.[8] Healthcare is one such system and integrating PA promotion into healthcare is one of the seven 'best investments' for reducing PI.[9]

Every healthcare contact is an opportunity to positively influence a patient's health and this is often done pragmatically through brief interventions. Brief interventions for PA can be delivered in routine healthcare consultations; they have the potential to reach a large proportion of the adult population and have been shown to be cost-effective.[10 11] Clinical guidance recommends the use of brief interventions in routine clinical contacts and this forms part of a wider Making Every Contact Count approach which is now embedded within National Health Service (NHS) delivery in the UK.[12 13]

Physiotherapists are well placed to promote PA. There are over 51 000 physiotherapists registered in the UK working across health and social care, often supporting people with long-term conditions.[14] In 2015–2016, there were over 5 million physiotherapy outpatient contacts[15]; a large proportion of patients accessing outpatient physiotherapy services are either overweight or obese, have multiple comorbid health conditions and are physically inactive.[16]

Little is known about the extent to which PA promotion is currently integrated into physiotherapy practice. Several international studies suggest that levels of PA promotion in physiotherapy practice are low.[17–21] One study from Ireland presented more positive findings[22] and we identified no studies that explore the extent of PA promtion in a UK setting in a 2016 scoping review.[23]

Delivering brief interventions for PA requires healthcare professionals to have knowledge of PA guidelines. Specifically, healthcare professionals must ascertain whether a patient is in a risk category and know how to make evidence-based recommendations. The first UK-wide PA guidelines were published in 2011[5]; these were updated and formatted into an infographic in 2015.[24]

Previous studies suggest PA guidelines are insufficiently taught in undergraduate medical curricula and there is lack of knowledge of them among final year medical students.[25–27] A survey of physiotherapists in Ireland reported that only 51% of participants were able to accurately state the current PA guidelines.[17] No studies have been identified that explore knowledge of PA guidelines among UK physiotherapists.

A healthy and productive NHS workforce is critical to the sustainability of the NHS and PA is an important means of improving workforce health.[28] NHS organisations are encouraged to support employees to be more physically active[29 30] yet little is known about the PA habits of the physiotherapy workforce. In addition, PA habits are a consistent and independent correlate of PA promotion in other healthcare professions.[31] There is preliminary evidence that this relationship also extends to physiotherapists,[18 21 32] but this has not been explored in the UK.

Hence, the aim of this study was to explore PA promotion in routine physiotherapy practice in the UK. Specific objectives were to:

1. Understand the frequency with which physiotherapists:
   i. initiate conversations about PA;
   ii. formally assess PA status;
   iii. deliver brief interventions for PA;
   iv. signpost patients to other PA services.
2. Assess physiotherapists' knowledge of the PA guidelines.
3. Measure the PA habits of physiotherapists and evaluate whether this is associated with PA promotion in clinical practice.

METHODS

Ethics

Ethical approval was granted from the Health & Wellbeing Faculty Ethics Committee at Sheffield Hallam University (reference 2015–16/HWB-HSC-21). The approval was for a broader survey of allied health professionals' engagement with public health practice. The specific PA questions were included with prior consent of all parties with the intention of separate analysis and publication.

Design

A cross-sectional survey was undertaken.

Survey tool

A survey tool was developed using Survey Monkey software. Following a pilot (48 physiotherapists), a small number of minor changes were made to the wording of questions. All questions were closed with finite answer options; this was agreed in view of the anticipated volume of responses (survey questions can be seen in online supplementary file 1). The questions were designed specifically for this survey with the exception of measurement of clinicians' PA habits; a validated, single-item question was used to gather this information.[33] The full survey was approved by representatives from Public Health England and the Chartered Society of Physiotherapy.

Procedure

The survey was live in May 2016 and was available for 3 weeks; this was determined by the need to avoid periods of political sensitivity. The survey was promoted widely on social media and through the Chartered Society of Physiotherapy's member networks. To meet the eligibility criteria, respondents

Table 1 Frequency with which respondents act on physical inactivity when there is a clear indication to do so

	Never		Sometimes		Usually		Always	
	Count	%	Count	%	Count	%	Count	%
Do you initiate conversations about PA?	0	0	11	2.4	95	21	347	76.6
Do you assess PA status?	96	21.2	63	14	113	24.9	181	40
Do you deliver brief interventions for PA?	13	2.9	26	5.7	106	23.4	308	68
Do you signpost to other PA support?	18	4	83	18.3	152	33.6	200	44.2

PA, physical activity.

were asked to confirm that they were physiotherapists in the UK and had current patient contact.

Analysis

All returned surveys were included in the analysis regardless of missing data; consequently, the number of total responses for each survey item is varied. A decision was made to include the pilot data in analysis as only minor changes had been made to the survey following the pilot. All responses were exported into IBM SPSS V.24 and analysed using descriptive statistics. Associations between variables were assessed using χ^2 test.

Reporting is in line with the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) statement for cross-sectional studies (Supplementary file 3).[34]

FINDINGS

Participant characteristics

There were 522 responses to the survey; the physiotherapy population is estimated to be 51 000,[14] the sample is therefore approximately 1% of the estimated population.

Eighty-nine per cent (n=463) of the sample were qualified physiotherapists, 10% (n=51) were student physiotherapists and 1.5% (n=8) were support workers. Ninety-three per cent were from England and all four nations were represented (Scotland 3%, Wales 3% and Northern Ireland 1%).

Respondents reported a range of years of experience (see figure 1). The majority of respondents worked in the NHS (92%) and respondents worked across a range of settings (see figure 2).

Only findings from qualified physiotherapists and student physiotherapists are reported hereafter, they are reported together as 'physiotherapists' in line with the aims of the study. Full results are available in online supplementary file 2.

Current practice

Participants were asked to estimate the frequency with which they carried out a number of specific actions related to PA promotion in predefined categories in line with previous similar cross-sectional surveys.[22] The questions were worded such that it was clear that the question related to situations in which there was a *clear* indication to promote PA. Findings are presented in table 1.

Knowledge of PA guidelines

Eighty-eight per cent of respondents (n=382) reported that they were aware of the existence of PA guidelines. Knowledge of three specific aspects of the recommendations is detailed in table 2. Only 16% (n=83) of respondents answered all three questions correctly.

Table 2 Table showing correct answers to PA guideline questions

PAG questions	Number of correct responses	Percentage of respondents who answered correctly (%)
Q: How many minutes of moderate intensity physical activity is recommended per week for adults? A: 150	240	60
Q: How many minutes of vigorous intensity physical activity is recommended per week for adults? A: 75	122	33
Q: On how many days per week is it recommended that adults undertake strength training? A: 2	121	32

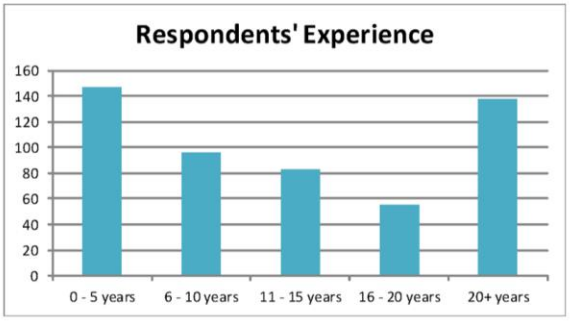

Figure 1 Years of experience of survey respondents.

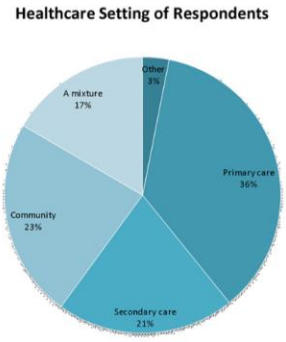

Figure 2 Healthcare setting in which respondents work.

PA habits of physiotherapists

The median number of sufficiently active days (ie, days on which respondents achieved at least 30 min of moderate PA)[33] was 4. The proportion of respondents who achieved the recommended 5×30 min of moderate intensity PA over a week was 38% (n=149).

The frequency with which respondents delivered brief interventions was not associated with years of experience (χ^2 p=0.429) nor was it associated with physiotherapists' own PA habits (χ^2 p=0.078).

DISCUSSION

The vast majority of respondents integrated some form of discussion about PA with their patients. However, levels of PA are not routinely assessed and brief interventions are not routinely delivered. Knowledge of all three elements of the PA guidelines is poor, and therefore when brief interventions *are* delivered they may not be based on the best available evidence. The majority of respondents do not themselves do sufficient PA to confer optimal health benefits although this was not associated with the likelihood of them promoting PA in practice.

How does this fit with previous research?

There is no existing evidence on the extent to which PA promotion is integrated into physiotherapy practice in the UK. As physiotherapists in other countries provide even lower levels of PA promotion,[17–21] our findings may reflect the growing awareness of PA as a major public health issue in the UK over time.

We find it encouraging that 68% of respondents report routinely delivering brief interventions for PA. This does, however, raise questions about why the other 32% do not. Barriers to delivering brief interventions for PA in a UK physiotherapy context have not been explored; related literature suggests that barriers may include (1) lack of time, (2) lack of belief in the effectiveness of brief interventions, (3) perceived lack of knowledge, and (4) a sense that it is not acceptable to patients.[21 22 35 36]

Only 40% of respondents reported that they routinely used some form of measurement tool to assess patients' levels of PA and thus identify inactive patients, in line with earlier findings.[17] Conversely, O'Donoghue *et al* found that 76% of physiotherapists always assessed PA levels.[22] The discrepancy between these studies may relate to the definition of 'assessment'; this term could be interpreted as use of either a formal or informal approach to assessment.

Formal assessment would involve use of a measurement tool; current clinical guidance recommends the use of the General Practice Physical Activity Questionnaire to assess PA levels in routine practice.[37 38] However, such measures take time to complete and interpret and therefore may not be practical in a busy clinical setting.

The alternative is to use informal approaches which, although quicker, are likely to be insufficient to accurately measure PA levels and inadequate as a baseline from which to measure change. Some may argue that formal assessment is unnecessary and beyond the scope of routine practice; however, delivering brief interventions indiscriminately regardless of risk has cost implications for services that could be avoided with a more targeted approach.[39]

As many as 56% of respondents did not routinely direct patients to further sources of support for PA, even when there was a clear indication to do so. In other areas of health promotion, uptake of further support has been shown to be enhanced when onward referral is facilitated by the system following a brief intervention, for example, by making a forward referral at that time, rather than leaving it to patients to initiate further action themselves.[40 41]

Despite 88% of respondents being aware of the current Chief Medical Officers' PA guidelines, only 16% answered the three specific questions correctly. This extends evidence from other professions which highlighted a lack of curriculum content and a lack of knowledge among students.[25–27] It adds weight to the recent assertion by Reid *et al* that that basic knowledge of the PA guidelines, and their components, remains consistently low across health professionals.[42]

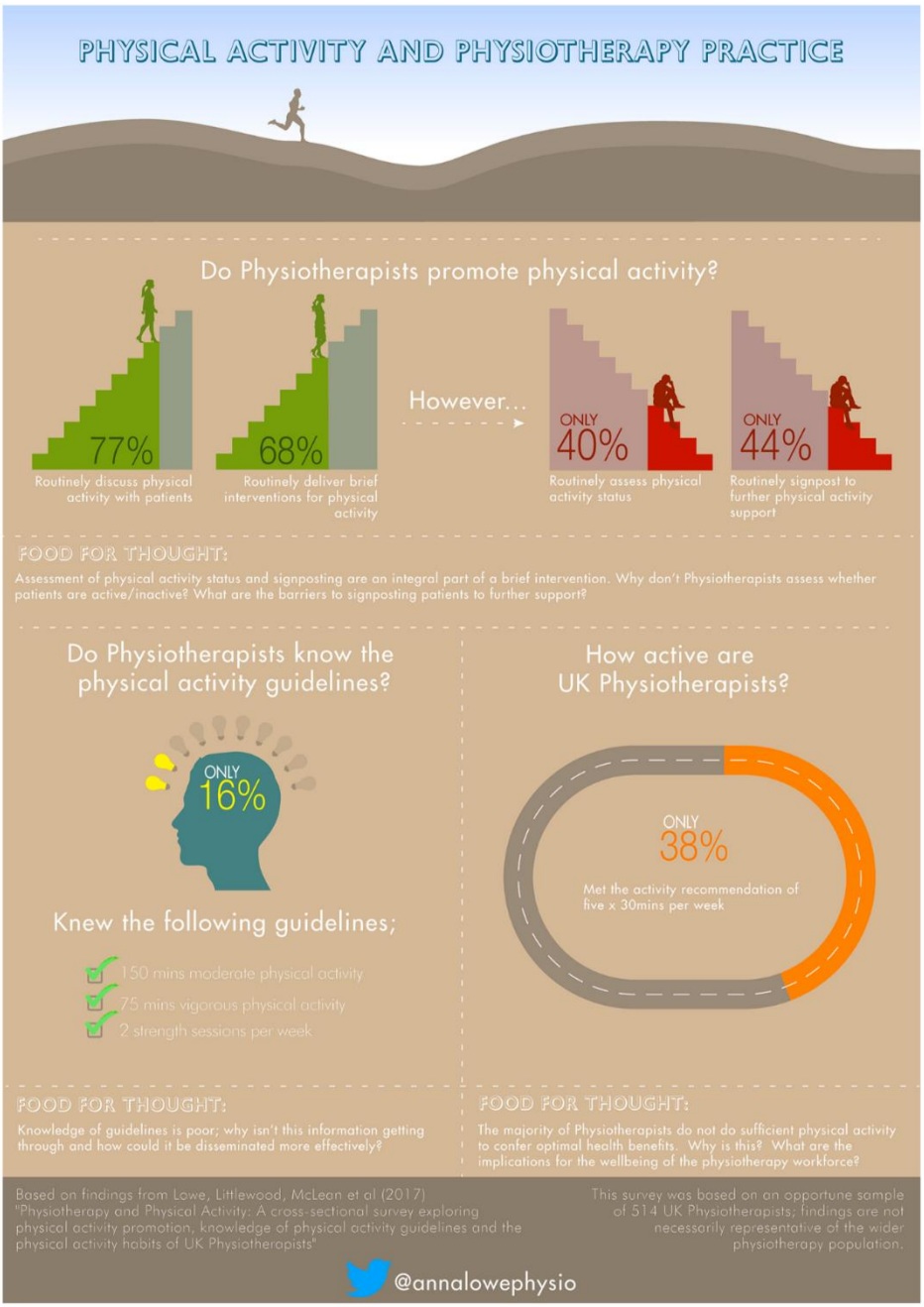

Figure 3 Physical activity and physiotherapy practice.

Only 38% of respondents achieved the recommended 5×30 min of moderate PA. This finding must be interpreted with caution due to the limitations inherent with any single-item, self-report measure.[43 44] The measure used in this study excludes the incidental PA that occurs through occupation or housework for example. It therefore does not reflect the most recent iteration of the PA guidelines which promote the accumulation of 150 min moderate PA in bouts of 10 min or more through any means.[5] In contrast to findings from other studies, physiotherapists' own PA levels were not associated with their PA promotion activity in our study.[18 21 32]

Suggestions for enhancing clinical practice

Knowledge of all three elements of the PA guidelines is limited, and this raises questions about the content,

quality and specificity of the brief interventions that are delivered in clinical practice. Additionally, assessment of PA status and signposting could be considered to be integral components of a brief intervention, yet these were delivered far less frequently. In practice, despite the number of PA measurement tools available, it is difficult to identify a tool that is sufficiently rigorous yet retains clinical utility in a physiotherapy setting. Consensus on the level of assessment of PA status that is appropriate and feasible may help improve the consistency of practice in this area. It may require a physiotherapy-led consensus statement on PA brief interventions to resonate more fully with the physiotherapy community than one led by physicians or public health experts.

The expectation that physiotherapists will signpost patients to further sources of PA support requires more investigation and mechanisms that could facilitate the sharing of PA information across sectors need to be explored.

Physiotherapists' understanding of brief interventions warrants further exploration as do the barriers to delivering them in the context of UK physiotherapy practice. In addition, further work is required to explore why the guideline specifics of training intensity and strength training are not reaching frontline clinicians. Effective dissemination of this information is required across the future and current physiotherapy workforce.

The majority of respondents to this survey were insufficiently active to gain optimum health benefits. The PA levels of the NHS workforce are an important consideration as part of a broader workforce well-being agenda. Thus, further investigation of the PA levels of the physiotherapy workforce using more robust, direct measurement techniques is warranted.

Strengths and limitations

This is the first cross-sectional survey that explores current practice in relation to PA promotion in physiotherapy practice, knowledge of PA guidelines and PA habits of physiotherapists. It has generated a preliminary picture that can inform practice developments and future research.

The UK PA guidelines contain several important messages and not all of these were tested. There are also specific PA guidelines for early years, children and older adults; only the adult guidelines were considered in this study.

The non-probability (self-selected) sampling strategy means that care must be taken when interpreting findings. The survey may have been subject to self-selection bias, with engaged physiotherapists responding more readily than those who do not have an interest in this area. This could have led to an over-representation of the extent to which PA is currently promoted for example. However, in addition to budget constraints, it would be challenging to obtain a national random sample of UK physiotherapists due to a lack of availability of essential demographic data, and thus an inability to define the population.

CONCLUSION

We identified positive findings in that *most* respondents integrate discussions about PA into *most* of their patient contacts. Further investigation is needed relating to the lack of formal assessment of PA status, relatively poor knowledge of the PA guidelines and a lack of consistent signposting to further PA support. Physiotherapists are ideally placed to contribute to the global efforts to reduce PI. However,support is required to ensure that effective and feasible PA interventions are integrated into routine care in order to maximise potential impact. To improve the reach of our study we have created a summary infographic (figure 3).

Twitter @annalowephysio

Contributors This study was led by AL under the supervision of SM and CL. KK contributed to the data analysis and interpretation. All members of the team were active in preparing and revising the manuscript.

Competing interests AL is a Physical Activity Clinical Champion for Public Health England

Ethics approval Sheffield Hallam University, Faculty of Health & Wellbeing Ethics Committee.

Provenance and peer review Not commissioned; internally peer reviewed.

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5.4 Additional Information

This section comprises a more detailed exploration of salient points that arose in this study. These points were highlighted in the published article but the discussion was limited by the need for concision. Issues that warranted expansion and further discussion here were identified as;

1. Physiotherapists own PA levels.
2. Strengths and limitations of the cross-sectional survey.
3. How the quantitative phase informed the qualitative phase.

5.4.1 Physiotherapists' Own PA Levels

The discussion relating to physiotherapists' own PA levels was condensed significantly in the published article, it is therefore included here in more detail. The proportion of respondents who achieved the recommended 5x 30 minutes of moderate intensity PA over a week was 38%, suggesting that 62% of physiotherapy respondents were not sufficiently active to confer optimum health benefits.

This contradicts the majority of existing evidence related to the PA levels of physiotherapists which suggests that self-reported levels of PA are generally very high; Black *et al.*, (2012) reported that 81% of American physical therapists were engaging in "regular physical activity". McPhail and Waite, (2014) examined the self-reported PA levels of Australian physiotherapists and concluded that almost all respondents exceeded the minimum recommended level. A finding echoed in a study of Latvian physiotherapists, approximately 90% of whom engaged in either moderate or high levels of weekly PA (Mihailova, Kaminska and Bernane, 2014). None of the existing literature is UK-based and it is important to note that activity levels were defined and measured differently in all these studies making comparisons between individual studies difficult which makes it difficult to draw conclusions.

The low levels of recorded PA within this study may be related to issues with measurement. The wording of the question is as follows;

> *"In the past week, on how many days have you done a total of 30 min or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job?"* (Milton, Bull and Bauman, 2011)

Firstly, this particular single-item question, although, valid, reliable and widely used, does not include incidental activity that occurs through housework or occupation (Milton, Clemes and Bull, 2013). As such it does not reflect the most recent iteration of the PA guidelines which recommends 150 moderate activities accumulated over a week in bouts of 10 minutes or more. It is plausible that a respondent could have accumulated extensive active minutes through their occupation which would not have been captured by the tool. Furthermore, respondents could have exceeded the current recommendation of 150 minutes (for example by cycling for 50 minutes 4 times in the previous week) yet be classified as insufficiently active because this activity only occurred over 4 days. There are clear limitations with the single-item tool which has implications for the interpretation of findings.

The second issue is inherent in all subjective (self-report) PA measurement tools; over-reporting is a well-documented limitation of such measures (Ainsworth *et al.*, 2015; Neil-Sztramko *et al.*, 2017). Thus, limitations with this particular single-item question and limitations with self-report measurement mean that caution is required when interpreting findings. They provide preliminary data to suggest that respondents were active (median number of sufficiently active days was 4) but only 38% were active enough to get maximum health benefits.

The data was explored in order to establish whether clinicians own PA habits (measured by the single-item question) were associated with their PA promotion practices (measured by self-reported frequency with which BIs were delivered). There was no association between these variables either (chi squared p=0.078). This conflicts with existing evidence; a

relationship between PA habits and PA promotion has been shown to exist in physiotherapists (Aweto *et al.*, 2013), in line with previous findings from other professional groups (Lobelo and Garcia De Quevedo, 2014). The limitations of the PA assessment tool mean that the validity of the findings in relation to physiotherapists own PA levels may be limited.

The PA levels of the physiotherapy workforce remains an important issue in view of workforce wellbeing which has been identified as a critical factor in the sustainability of the NHS (NHS England, 2014). In view of the measurement issues discussed further enquiry using direct measurement techniques is warranted.

5.4.2 Survey Strengths and Limitations

Sampling Strategy

For practical reasons a non-probability sampling approach was used in this study, meaning that every person within the sampling frame does not have an equal chance of being selected for the study (Nardi, 2006). Data gathered using a non-probability method can only be used to describe, explain or predict information about only those who completed the survey and findings must be qualified as applicable only to those within the sample. Care was taken in the published article and infographic to underscore that findings related to respondents only and were not necessarily generalisable.

One of the major consequences of using a non-random sampling strategy is that it is predicted that people interested in the topic will be overrepresented among respondents relative to those uninterested (Burke and Hodgins, 2015) which represents a major source of bias.

However, it is widely acknowledged that random selection is rarely possible in healthcare studies (Burke and Hodgins, 2015). Non-probability sampling methods are widely used for

practical and efficiency reasons (Nardi, 2006). The rationale for use of a non-probability sample is based on an inability to define the physiotherapy population. All practicing physiotherapists are required to have professional registration with the Health and Care Professions Council, thus the Health and Care Professions Council is the definitive professional register. In addition to the Health and Care Professions Council many physiotherapists will be members of the Chartered Society of Physiotherapy, although this is not a legal requirement and therefore is not a complete register of practising physiotherapists. Neither the Health and Care Professions Council nor the Chartered Society of Physiotherapy share registrants contact information for research purposes, it is therefore impossible to gain a national random sample of the physiotherapy workforce. Previous physiotherapy surveys have been able to use a random sampling approach if the target population is much more specific, a single NHS employer for example or a single special interest group (Donnelly *et al.*, 2010; Arithoppah, Caldwell and Smith, 2016; Bishop *et al.*, 2016). Whilst sample sizes may be representative of the physiotherapy population within that organisation or group, findings can still not be generalised to the wider physiotherapy population. In addition, response rates in these smaller random samples vary and findings may ultimately be based on very small, albeit random, sample.

Survey Response Rates

Evidence suggests that response rates to healthcare surveys are declining. (VanGeest and Johnson, 2011; Glidewell *et al.*, 2012). Several strategies were employed in order to enhance survey response rates.

The leverage-salience theory suggests that perceived salience is an important predictor of response rates (Groves, Singer and Corning, 2000) and this is widely referred to in the literature (Ulrich *et al.*, 2005; Peytchev, Baxter and Carley-Baxter, 2009). The perceived salience of the topic was enhanced by the close association with reputable organisations and this was a key driver for collaborating with the larger, concurrent survey. The collaboration with Public Health England, the Chartered Society of Physiotherapy and the

Council for Allied Health Professions Research was made clear through the use of prominent logos in the marketing materials, the emails and in the survey, itself. This was a means of appealing to individuals sense of professional identity to enhance response rates.

The credibility of the research was enhanced through NHS England support. All NHS England regional Allied Health Professions managers were asked to circulate the link to their teams, thus acting as credible gate-keepers. The overt collaboration with national bodies also enhances credibility.

Pre-notification can enhance response rates (Burke and Hodgins, 2015), therefore a press release was circulated to all collaborating organisations one week before the survey went live. This highlighted the survey to potential respondents, showed organisational support and "primed" individuals to respond. Lack of time is a frequently cited issue to response rates (Asch *et al.*, 2000). Efforts were made to keep the survey short in order to make completion feasible for busy clinicians.

Reports suggest that gaining public support and publicity can help to raise awareness of surveys and appeal to collegiality in peer-recognised forums (Asch *et al.*, 2000). Use of contemporary media was key in disseminating the survey. Collaborating organisations were active in disseminating information, this was included in their member bulletins both online and in print. Relevant social media forums were used extensively to circulate messages about the survey. Key individuals were also involved including the Chief Allied Health Professional at NHS England and the Lead Allied Health Professional at Public Health England were active in circulating messages about the survey through social media routes.

Finally, altruistic motivations and belief systems can make healthcare professionals more inclined to participate (Nakash *et al.*, 2006; Clark *et al.*, 2014), the need for this research and the potential benefit to the profession and ultimately to patients was outlined in the introduction to the survey.

5.4.3 How the Quantitative Findings were used to Guide the Qualitative Phase

There are two main ways in which the quantitative findings were used to inform the qualitative phase. These represent the first and second point of interface between quantitative and qualitative strands.

Point of Interface 1: The development of the topic guide

The key findings outlined above provided a framework for the interview (see Table 6). These were developed into a topic guide (see Appendix 9).

Table 6. Ways in Which the Quantitative Findings Informed the Topic Guide.

Key Quantitative Findings	Development of Qualitative Questions
Physiotherapists frequently initiate conversations with patients about PA	Our survey findings told us that most physios have a conversation about PA with most of their patients; • does that resonate with your experience? • do you see PA fitting into physiotherapy practice broadly? • why is this important to you, to the profession, to patients? • Do you talk about PA physical activity with patients? • what determines whether you do or don't? • what's your approach? • have you always done this? • why do you think it's important? When you do promote PA, what prompts you to raise the issue/start that conversation? • tell me more about that

	• any there any other factors that prompt or remind you to do this? When you don't, what stops you? • tell me more about that • are there any other things that make you less likely to raise the issue? Are you expected to discuss PA? • by your employer/organisation? • by your profession? • is part of "core" role/professional identity How do your patients respond/react to these discussions? • why? • tell me more
The exact mechanism through which PA is promoted is unclear	Following on from this, how would you describe your approach to promoting PA? We asked about Brief Interventions in the survey. Is this term familiar to you? Do you deliver BIs?
PA status is not routinely assessed	Survey findings suggest that generally physios don't assess whether someone is active/inactive • what are your thoughts on this? • does it resonate with your own experience?
It is not routine to signposting to further sources of PA support	In the survey we asked about signposting patients on to other PA support services outside of the NHS. Can you talk to me about if/how you do this?

	• what makes this possible? • what makes it difficult
Knowledge of the PA guidelines is poor	You may remember that in the survey we asked about the PA guidelines. Do these influence your practice at all? • in what ways? • tell me more/can you expand on that? • could they be useful? • how could these be disseminated/shared?
Further enquiry needed on physiotherapists PA levels	We also asked about your own PA behaviours. Do you think that your own PA choices influence how if/how you discuss PA with patients? • why do you think that is? • can you expand? • tell me more • role model?

Point of Interface 2: Guiding the qualitative sampling strategy

The over representation of respondents with high perceived salience toward the key issues could have led to an under representation of physiotherapists who are not as engaged. This is borne out in the data from Phase 1; when respondents are categorised based on their PA promotion behaviour (based on their self-reported frequency with which they deliver BIs) into a high PA promotion category and a low PA promotion category there was a substantial difference in numbers. A total of 146 participants agreed to future contact and were therefore eligible for inclusion in the qualitative follow-up study. Of these 77% (n=113) were classified as high promoters and 23% (n=33) were classified as low. Thus, responder bias may be twofold, firstly more engaged individuals complete the survey and secondly only particularly engaged respondents agree to future contact. For this reason, it was deemed

essential to gain the views of low promoters and thus a purposive, quota sampling approach was used for the explanatory follow-up study, and this is described in detail in Chapter 6.

5.5 Summary and Implications for Thesis

The finding that PA promotion is part of most physiotherapy contacts is encouraging in that it suggests that it may be feasible and acceptable to integrate some level of PA promotion into physiotherapy practice. This represents a major opportunity and warrants further exploration. Exploration of the actual mechanism through which PA is currently promoted in practice is warranted. Conflicting findings regarding delivery of BIs require elucidation. Survey findings also suggest a need for a better understanding of methods to asses PA status and methods of signposting. Enhancing understanding of the factors that facilitate and constrain practice in these areas has the potential to improvement practice.

This cross-sectional survey was successfully completed and disseminated. The limitations inherent in the chosen methods have been reported and discussed. This survey provides a large data set from an opportune sample and provides the most current and detailed picture of current practice. Survey findings have informed the subsequent explanatory follow up phase in line with thesis objectives.

Chapter 6: Mixed Methods Phase 2.

Containing Article C: Understanding Physical Activity Promotion in Physiotherapy Practice: A qualitative Study.

6.1 Introduction

This chapter reports on the findings from the qualitative, sequential explanatory follow-up study that forms Phase 2 of the mixed methods study. These findings were published as a qualitative article but in fact represent the mixed methods findings as the qualitative findings build on the foundation of the quantitative study. As such this represents the third and final point of interface between the quantitative and qualitative strands as shown in figure 7.

This is followed by additional information, firstly to expand on the mixed methods findings and describe the emergent themes in more detail. Secondly, additional information is provided on the research process including a section on the steps that were taken to enhance credibility and concluding with a section on reflexivity. This is followed, in Chapter 7, with a comprehensive discussion of the over-arching findings from this programme of research.

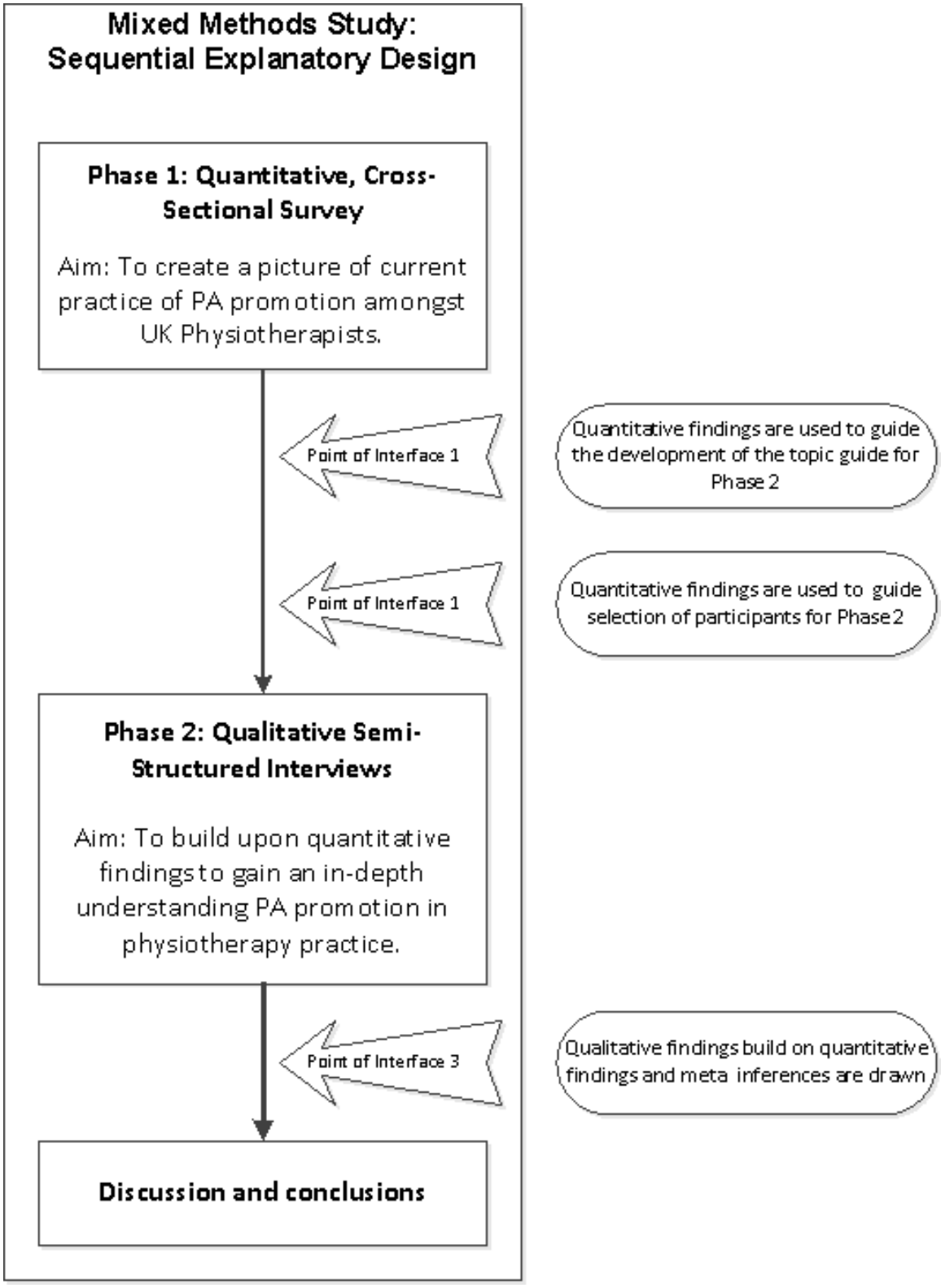

Figure 7. Diagram Highlighting the 3 Points of Interface in the Mixed Methods Study.

The qualitative part of the mixed methods study that is described in this chapter relates to research objectives 5 and 6 as detailed in Table 7.

Table 7. Research Aims and Objectives, Chapter 6.

	Research Aim The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.
1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.
5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.
7.	To generate evidence-based recommendations for education, research, policy and practice.

6.2 Context and Impact

Article C was accepted for publication in Musculoskeletal Science and Practice in January 2018. Musculoskeletal Science and Practice is a peer-reviewed international journal publishing high quality original research. Papers published in Musculoskeletal Science & Practice are of international relevance and have an over-arching applied clinical focus or serve to inform clinical approaches (Elsevier, 2018).

Altmetric data is not available for this article. Google Scholar reports that it has been cited once.

6.3 Published Paper: Article C

Article C is reproduced here, with the publisher's permission, in the format that it was published online. Published, supplementary files can be viewed in Appendix 3.

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Original article

Understanding physical activity promotion in physiotherapy practice: A qualitative study

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ABSTRACT

Objective: Physical inactivity is a major public health issue and healthcare professionals are encouraged to promote physical activity during routine patient contacts in order to reduce non-communicable diseases and enhance individuals' quality of life. Little is known about physical activity promotion in physiotherapy practice in the UK. The aim of this study was to better understand physiotherapists' experience of physical activity promotion in clinical practice.

Design: A qualitative study was undertaken comprising 12 telephone interviews with participants using a quota sampling approach. The qualitative data was analysed using a thematic analysis approach and written up according to COREQ guidelines.

Findings: Four themes were identified (1) Current physiotherapy practice (2) Barriers to, and facilitators of physical activity promotion, (3) Exercise or physical activity? and (4) Functional restoration versus general wellbeing.

Conclusions: Physiotherapists use routine clinical contacts to discuss physical activity. However, brief interventions are not consistently used and no common framework to guide physical activity promotion was identified. Approaches appear to be inconsistent and informal and focus largely on short-term restoration of function rather than health promotion. There is scope to improve practice in line with current guidance to maximise potential impact on inactivity.

1. Background

Physical activity (PA) is described as any bodily movement produced by skeletal muscles that requires energy expenditure. Exercise is a subgroup of PA where the activity is planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness (World Health Organisation, 2017).

The impact of physical inactivity (PI) on health has been extensively documented, it has been described as the biggest public health issue of the 21st century (Blair, 2009) and the fourth largest cause of death worldwide (Kohl et al., 2012). It is postulated that if PI decreased by 25% then more than 1.3 million deaths could be averted every year (Lee et al., 2012).

PI places substantial economic burden on healthcare systems and wider society. Inactive people spend 38% more days in hospital and use significantly more healthcare resources than active people (Sari, 2009). It is estimated that in 2006–7, £0.9 billion of NHS money was spent on PI-related ill health (Scarborough et al., 2011). Hence, there is guidance on how PI be addressed both nationally and internationally (Department of Health, 2011; International Society for Physical Activity and Health, 2016). Within this guidance, health services are acknowledged as a key lever for change and integrating PA promotion into primary healthcare systems has been described as one of the seven "best investments" for reducing physical inactivity (Global Advocacy for Physical Activity IS for PA and H, 2011).

Physiotherapists work extensively with people with long term conditions, a large proportion of whom are either overweight or obese, have multiple comorbid health conditions and are physically inactive (McPhail, 2015). The Making Every Contact Count (MECC) approach supports clinicians to embed prevention (including PA promotion) into routine practice using brief interventions (Public Health England and NHS England HEE, 2016). Physiotherapists have extensive opportunity to promote PA, yet little is known about the extent to which this is integrated into physiotherapy practice. The physiotherapy literature is sparse (Lowe et al., 2016) and evidence from other healthcare professions describes rates of PA promotion as unacceptably low (Lobelo and

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Garcia De Quevedo, 2014).

A recent, national cross-sectional survey of PA promotion in physiotherapy practice generated a preliminary picture reporting that a large proportion of survey respondents routinely delivered brief interventions for PA (Lowe et al., 2017). The purpose of this qualitative study is to build on the survey findings to further develop our understanding of physiotherapists' experience of PA promotion in UK physiotherapy practice.

2. Method

2.1. Theoretical framework

This qualitative study is the final part of a broader programme of research comprising a scoping review, a quantitative survey and this qualitative follow-up. The research paradigm that underpins the programme of research is pragmatism which allows relative theoretical freedom. Quantitative and qualitative strands are not viewed as fundamentally opposed and can be mutually illuminating (Andrew and Halcomb, 2009).

2.2. Ethical approval

Ethical approval was granted by the Faculty Research Ethics Committee at Sheffield Hallam University (Research proposal: 2016-7/HWB-HSC-16).

2.3. Design & setting

This qualitative study used semi-structured, telephone interviews.

2.4. Sampling

Respondents from the previous survey (all UK physiotherapists with current patient contact) were asked if they consented to future contact from the research team. Those who agreed were emailed with an invitation to participate (including participant information sheet and consent form). A purposive, quota sampling method was used to ensure that key groups were represented (Robinson, 2014). Survey data was used to identify high promoting respondents and low promoting respondents (based on self-report). Approximately 40 physiotherapists were emailed (10 at a time to avoid over-recruitment). No one refused although some did not respond to emails. The first 6 from each quota to respond were interviewed (see flowchart in Supplementary file 1). Sampling ceased after 12 interviews when there was consensus that theoretical saturation had occurred.

2.5. Data collection

An interview guide was developed based on the key survey findings, this was pilot tested by AL in one face to face, semi-structured interview with a physiotherapist from the high-promoting category. It was then subject to peer review by CL and SM and was refined and agreed (see appendix 1). Following this, 12 individual telephone interviews were conducted by AL and recorded using an encrypted digital recording device with a telephone adaptor. The duration of the interviews was approximately 45 min.

2.6. Data analysis

Audio files were transcribed, checked for accuracy and imported into Quirkos (2017), qualitative data was analysed using the following 6-stage thematic approach detailed in Table 1 (Braun and Clarke, 2006).

An inductive approach was taken in that codes and themes developed from the data without an existing framework. Initial coding was performed on 2 transcripts within Quirkos by AL, these were then independently coded by CL and SM. This process was discussed and the process was refined. AL coded the remaining 10 transcripts and these were reviewed collectively by AL, CL and SM. Candidate themes were reviewed and refined by AL, SM and CL and final themes were agreed by all. Detailed information on the analysis process was recorded in an audit document. Findings were written up in line with reporting guidelines for qualitative research (Tong et al., 2007).

3. Findings

Characteristics of the 12 participants can be seen in Table 2.

A number of themes developed, including semantic themes which were directly linked to the quantitative findings, these involve "the surface or semantic appearance" of data (Braun and Clarke, 2006).

Additionally, a higher order of latent themes which represent overarching concepts, patterns and assumptions. Latent themes move away from description to interpretation and a wider framework of meanings and connotations (Javadi and Zarea, 2016).

Four themes can be seen in Fig. 1 and are described below;

1. Current physiotherapy practice.
2. Barriers to, and facilitators of PA promotion.
3. Exercise or physical activity?
4. Functional restoration versus general well-being.

3.1. Theme 1: current physiotherapy practice

This theme responds to many of the key issues that arose from the survey findings. It describes features of current practice and elucidates survey findings. As the most semantic of the 4 themes, data is represented literally and does not go beyond surface meaning within this theme.

Participants described how they discuss PA in routine practice and referred to the existing assessment framework common across many areas of physiotherapy. They described how they integrate questions about PA into the subjective assessment and specifically into the social history. It was described as an "automated" part of the assessment and participants explained that the framework was a useful prompt to elicit information from patients on PA particularly in relation to hobbies and employment.

> *"well it makes up part of the subjective assessment that I go through. I'll always specifically ask someone as part of the social history if they have any sport or exercise interests or any physical activity hobbies." P3*

Participants described their approach in general terms emphasising how they grade, tailor and personalise their approach to PA promotion.

The importance of good communication skills and an ability to connect with patients was consistent in the data, participants conveyed a sense that personalisation and empathy were central to their approach. Their role in educating patients came through strongly as a means of supporting self-management. The importance of building confidence and managing fear were highlighted as important factors.

> *"It's starting off at a level that's appropriate for them without making it scary really. Then from there, because you've got to build….. if they go out of the room thinking I'm weak and I don't do this and they haven't listened to me, you won't get anywhere really. It's trying to show them what they can do to start with and how making small changes throughout the day can make a big difference and then building from there as best they can. It can take quite a long time, but certainly it's about the everyday changes."* P5

Participants had difficulty characterising their actual approach, the terms brief advice, brief intervention, cognitive behavioural therapy, motivational interviewing and MECC were used but confusion was expressed over some of the terminology.

Table 1
Six Stages of Thematic Analysis (based on Braun and Clarke, 2006).

Stage	Activity
1. Familiarisation with the data	This phase involves reading and re-reading the data, to become immersed and intimately familiar with its content.
2. Coding	This phase involves generating succinct labels (or codes) that identify important features of the data that might be relevant to answering the research question. It involves coding the entire dataset, and after that, collating all the codes and all relevant data extracts, together for later stages of analysis.
3. Searching for themes	This phase involves examining the codes and collated data to identify significant broader patterns of meaning (potential themes). It then involves collating data relevant to each candidate theme, so that you can work with the data and review the viability of each candidate theme.
4. Reviewing themes	This phase involves checking the candidate themes against the dataset, to determine that they tell a convincing story of the data, and one that answers the research question. In this phase, themes are typically refined, which sometimes involves them being split, combined, or discarded.
5. Defining and naming themes	This phase involves developing a detailed analysis of each theme, working out the scope and focus of each theme, determining the 'story' of each. It also involves deciding on an informative name for each theme.
6. Writing up	This final phase involves weaving together the analytic narrative and data extracts, and contextualising the analysis in relation to existing literature.

Table 2
Characteristics of Participants.

Characteristic		Count	%
Gender	Female	7	58%
	Male	5	42%
Years of Experience	0 - 5 years	3	25%
	6 - 10 years	2	17%
	11 - 15 years	3	25%
	16 - 20 years	3	25%
	20+ years	1	8%
Healthcare Sector	National Health Service	12	100%
Nation	Scotland	1	8%
	Northern Ireland	0	0
	Wales	0	0
	England	11	92%
Healthcare Setting	Primary care	3	25%
	Secondary care	3	25%
	Community	2	17%
	A mixture	4	33%
PA Promotion Status	High	6	50%
	Low	6	50%

"What is meant by brief intervention? What would that look like in practice?" P7

"It wouldn't be something I would normally use as terminology I don't think. How would you describe what you mean by brief intervention?" P9

There was little detail regarding the structure and specific content of PA promotion interventions and little commonality between participants.

When asked specifically about assessment of PA status participants conveyed a sense that this was important. They described how they would use an informal approach, rather than a formal measure to assess activity levels. These were often recorded in relation to hobbies or activities that patients want to return to.

This was recognised by some participants as different to formal measurement, use of formal measurement was largely absent, with one notable exception that is discussed later.

"Yes, I would say up to a point we tend to be asking patients what they do, but it tends to be based very much on a functional report from them, rather than on using any particular tools to measure that." P9

"Physical activity isn't routinely measured in any of our outcome measures in outpatients." P12

Questions related to the PA guidelines elicited a variety of responses, predominantly conveying a lack of awareness;

"I can't say that either myself or my colleagues necessarily refer to those guidelines in our daily work." P4

Yet there was acknowledgement of the potential value of the PA guidelines amongst participants and evidence that they are integrated into practice by some clinicians.

When asked if and how participants signpost their patients onto further PA support, participants described difficulties in knowing what services are available and the lack of straightforward referral pathways.

"I guess on the whole physios, or any profession, don't want to spend too much time finding out where someone can go or where you can signpost, but if those things are overt and clear, then I guess naturally that's more likely to happen." P12

These difficulties were off-set by some participants by developing partnerships with delivery services and finding ways to collate and share information on services available.

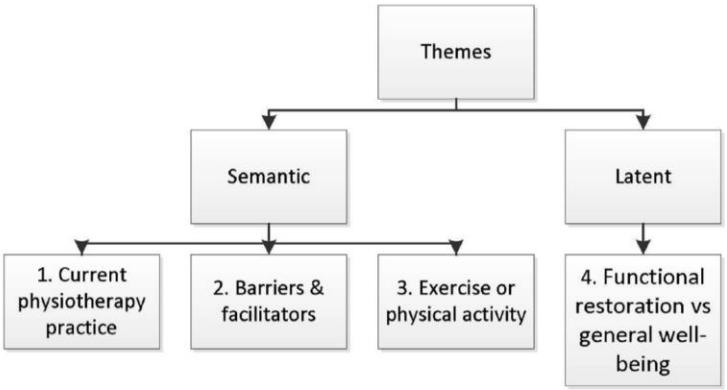

Fig. 1. Organisation of Themes.

"We've gone and done a bit of training with some of our partners and they've come in and trained, so having that two-way relationship then reminds them that you're there, and them coming to see you reminds you that they're there, if that makes sense……we use the wellbeing walls for things like that….we've got the diabetes wall up as well at the moment and the next one is going to be men's health." P6

3.2. Theme 2: barriers to, and facilitators of PA promotion

Several barriers to PA promotion were identified, firstly the complexity of patients was identified as a factor that makes PA promotion more challenging. Complexities were described mainly in terms of co-morbidities but also in terms of wider social and economic factors.

"we come across so many cognitive difficulties and memory issues, and it's perhaps partly because of the patient population that it's harder to have those conversations with people in terms of being able to utilise it for them to retain that information." P8

"The thing is our patient population at this centre has over the past couple of years also changed to the slightly older, the slightly less fitter than the population that we used to treat a couple of years back. It's got to do with how the contracts across the Trust have changed over the years, so it's an economic, political change that has affected us." P4

Some participants identified that the culture within their team hindered change and expressed a sense that PA promotion just wasn't the "done thing"

"I'm not really sure why – whether it's just partly cultural as well in the sense that it's not something that I feel like has been a focus when I've seen other people perhaps doing assessments and things." P8

The acute setting was identified by some participants as a barrier, although this was not unanimous so may be linked more to the culture within specific teams.

"Once they are conscious you're very much more focused on short-term goals, so it was less of an issue there." P7

Lack of time was identified as being a barrier by some participants although it is acknowledged that this may relate more to perceived clinical priorities.

"So, in that half an hour there are so many things you need to get done. With some patients, it's not... it's not that it's never the priority, but you have to let patients talk and then you have to try to fit in everything else." P5

"I think that's a case of integrating it into that routine practice and the physiotherapist seeing that as integral to their physiotherapy activity and feeling that there will be benefits to putting that into action. So, I think that's more the change of mindset, rather than a real-time barrier or difficulty with overload." P11

Several factors were identified as facilitating PA promotion, firstly repeat appointments were seen as facilitating flexible discussions about PA.

"Quite often it's doing the first assessment and then on the second or third appointment you can delve more into the other extra things." P5

Supporting resources were identified as facilitating PA promotion, these included smart phone apps, assessment tools (such as the GPPAQ (General Practice Physical Activity Questionnaire), wall displays and policy documents.

"Before, not having the GPPAQ, or not having that in front of you, either you'd forget because you're so busy and it's not written in front of you, or you may not know how to ask the questions. But because it's objective and it's there, it's easy." P6

As mentioned previously, collaborations with other services that support PA were described as facilitating PA promotion both in terms of raising awareness amongst physiotherapists and also creating accessible, easy pathways for onwards referral.

Participants consistently discussed their own PA experience as facilitatory in that it enabled them to empathise and connect with patients.

"I think because I've had a few injuries in the past I can sympathise with patients on how difficult it can be sometimes with the various limitations, say in terms of pain relief to get going and maybe other obstacles that people face, both known to themselves and unknown to themselves." P4

"For me personally I think it's good that I am more physically active and I can then draw on that experience when I'm with patients and that's how I can use it. Even when my physically activity levels go down a bit, again I can still draw on that and use that and say this is what I've done when I'm not as physically active as I should be. So, I think anything that can make you more relatable to patients is a good thing really." P7

In line with this a positive alliance between patient and clinician was also identified as being a facilitator.

"That just gives the patient a more personal touch. You're not just being told by your doctor you need to lose weight or do a bit more exercise. There's kind of a trusted relationship there of 'I trust you as my therapist, what you're saying to me – perhaps I should trust that'." P6

3.3. Theme 3: physical activity or exercise?

There was a lack of clarity and consistency over key terms "exercise" and "physical activity". Participants used the terms loosely, interchangeably or recognised confusion amongst their peers.

"Well I think exercise, I tend to think of something that's going to maybe do the cardiovascular system some good, whereas movement or activity I'm just literally wanting anything that will get some sort of joint movement going on really I suppose, because some of my patients are really quite inactive." P9

"I think a lot of physios would struggle to tell you the difference. I see that being a bit of a problem with maybe that ambiguity about what the difference might be between, say, a specific targeted exercise programme and a general physical activity." P12

In addition, participants identified that terminology can be important to patients and the potential negative connotations associated with the term "exercise" were highlighted.

"She doesn't do exercise, she can't do exercise, she's always been told she can't do exercise and as soon as we realised what she did and we switched it to talking about being active, she accepted that. In her head exercise was sports or competitive things, so I try and stick on the activity point of view rather than exercise." P1

"If you say to patients about exercise, they tend to think of more formal, like going to a gym or going to an exercise class or going running or something that's more formal, you know, you put sports clothes on and you go and do. Whereas I think if you talk about activity or movement they tend to just think about something that they can fit into their everyday, it's something that they're doing anyway and it's just trying to enhance that, rather than they're going to have to get changed and go and do." P9

3.4. Theme 4: functional restoration versus general well-being

Conceptually over-arching; this latent theme relates to the aims of physiotherapy. Participants consistently emphasised the notion of "getting people better" and restoring function.

Fig. 2. Relationship between Exercise and Physical Activity in Physiotherapy Practice.

"Also, I suppose sometimes we're very focused on what we're doing for the patient, rather than what's going to happen beyond that." P9

"I think it's more about aiming to return to where they were….it does tend to focus of course very much on recovery activity, rather than necessarily increasing or maintaining physical activity for the sake of wellbeing, if you can see the difference." P4

"I would probably say that I personally would find myself focusing on the here and now, rather than perhaps the future. It's almost like I guess where patients are at the time, it's about getting their function back." P8

This view is contrasted with a longer-term, health promotion approach that was less prevalent within the data.

"I think there are specific physiotherapy related issues that most people will want to tackle within their physiotherapy sessions and then there's a little bit more of a distinction between looking at the wider health benefits of being physically active, or signposting towards healthy eating or to other activities as well." P11

4. Deviant case analysis

Development of themes was an iterative process, deviant cases were examined in order to revise, broaden and confirm the patterns emerging from data analysis (Pope et al., 2000). P6 was considered to be a deviant case, contributions were anomalous in that PA promotion was clearly well integrated into practice and P6 was familiar with all terminology and policy documents and evidence. P6 reported a progressive and collaborative approach to PA and although barriers were acknowledged solutions had been identified. As such P6 was considered to be a deviant case representing an isolated pocket of good practice.

When findings from high promoters were compared to those from low promotors no substantial differences were found. This is in line with the fact that only one deviant case was identified, the findings were relatively homogenous with the exception of P6.

5. Discussion

This is the first exploration of PA promotion amongst UK physiotherapists and as such it expands our understanding of physiotherapists' experiences of PA promotion in practice.

There was a lack of cohesion in the ways in which participants described approaches to PA. There appeared to be no defined, common framework for promoting PA in practice. There was an assumption in the preliminary survey that brief interventions, as part of a wider MECC approach, were integrated into physiotherapy practice to some degree, as a mechanism for PA promotion. However, findings from the current study elucidate survey findings and suggest that this is not the case, this raises questions about the extent to which MECC approaches have been translated to clinicians and embedded within practice to date.

In line with this, exploration of specific components of PA promotion revealed firstly, that assessment of PA status was frequently informal or absent. Assessment of PA status is essential if change is to be measured and identifying inactive individuals facilitates a more economically viable, targeted approach to PA promotion (Bull and Milton, 2010). Secondly, findings suggest that in line with evidence from other health professions, PA guidelines are not widely used to inform clinical practice (Reid et al., 2017; Chatterjee et al., 2017). Finally on this point, findings suggest that signposting is often perceived to be time consuming, complex and difficult to do in routine clinical contacts.

The barriers and facilitators identified in Theme 2 are broadly in line with findings from other healthcare professions (Douglas et al., 2006; Barrett et al., 2013; Walkeden and Walker, 2015; Campbell et al., 2012). However, in contrast to reviews from other professions, lack of confidence in PA promotion and lack of knowledge related to PA promotion were not cited as barriers by physiotherapists in this study (Hébert et al., 2012). It could be hypothesised that because exercise and rehabilitation are central in physiotherapy practice it may naturally give rise to discussions about PA. Thus, confidence in raising the issue may be less of a barrier than it is for other healthcare professionals.

A lack of clarity around the central concepts of PA and exercise was apparent. The relationship between PA and exercise in a physiotherapy context is complex, an ideal progression would be for a physiotherapist to use exercise to improve components of physical fitness which enables people to become more physically active, which in turn improves wellbeing and quality of life (see Fig. 2). Findings suggest that current practice focusses on the initial 2 phases and may miss the opportunity to move into the realm of PA for longer-term health. Encouraging the use of universally accepted terminology may help to clarify the aims of physiotherapy interventions ensuring that PA is not overlooked as a key outcome.

Participants identified readily with the core aim of restoring function with a focus on targeted exercise and short-term goals. This has been a core aim of physiotherapy since its inception; "Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability" (Chartered Society of Physiotherapy, 2013). The idea of PA as a means of promoting general health across the life course is acknowledged but is much less prominent in the data. This may be partly explained by changes in population health; physiotherapy has been part of UK health care since the late 19th century, at this time life expectancy was less than 50 years of age and the major causes of death were infectious diseases (Griffiths and Brock, 2003; Thompson et al., 2012). Today non-communicable diseases (influenced by modifiable risk factors including physical activity) are responsible for a large proportion of ill health (Public Health England, 2014). This enormous change in patterns of health puts physiotherapists in a position to influence health in its broadest terms, through prevention rather than a narrow focus on restoration of function (Dean, 2009a, 2009b). Indeed encouraging healthcare professionals to embed prevention in frontline services is a central tenet of current policy (NHS England, 2014).

6. Reflexivity

As lead researcher, I am also employed as a Physical Activity Clinical Champion, thus my background and beliefs about PA are well known to many physiotherapists. Continual efforts were made to understand the role of the self in the creation of knowledge in this study (Baillie, 2014). Regular peer debriefs with CL and SM, a reflective journal and a detailed audit trail were used to monitor the impact of my biases (conscious and unconscious), beliefs, and personal experiences (Berger, 2015). The benefits of being an insider-researcher are also acknowledged in that I have a detailed understanding of key issues and frontline experience of the phenomena under scrutiny which facilitated many aspects of the research process.

7. Strengths and limitations

To our knowledge this is the first time that physiotherapists' experiences of promoting PA in the UK have been examined through qualitative enquiry, this extends our understanding of current practice and opportunities for improvement.

The sample was drawn from the large, self-selecting sample who completed the preliminary cross-sectional survey. Steps were taken to limit the bias associated with a self-selecting sample including the use of quotas to ensure that contributions from both high-promoters and low promoters were included.

Telephone interviews were used for practical reasons associated with having a sample from a large geographic area. There are inherent limitations with this approach including an inability to observe body language and facial expressions. Although field notes were taken, the lack of direct observation may have resulted in more subtle aspects of communication being missed.

Further testing of the interview guide in a telephone, rather than face to face, interview setting may have allowed for further changes to be made to enhance suitability for that particular medium.

8. Implications

Our findings suggest that there is scope to improve integration of evidence into practice in relation to brief interventions for PA as part of a broader MECC approach. This should include further consideration of assessment to identify inactive patients, targeted knowledge mobilisation of the PA guidelines and work to ensure that signposting is feasible for clinicians.

There are questions for the physiotherapy profession about how it evolves in response to the substantial changes in patterns of health. The prevailing view amongst physiotherapists in this study was that their interventions are short-term and restorative. Adopting a broader view that acknowledges the role of modifiable health behaviours on well-being across the life-course would help to align physiotherapy with the prevailing direction of travel of healthcare.

Pockets of good practice were identified, supporting efforts to share learning may facilitate practice developments in this area.

9. Conclusion

PI is a major threat to the health of the public, supporting healthcare professionals to promote PA to patients in routine clinical contacts is recognised as an important means of tackling inactivity.

Findings from this qualitative study suggest that physiotherapists discuss PA with their patients in relation to physiotherapy goals, however this is often inconsistent and informal with isolated pockets of good practice. Brief interventions are not well understood and no common framework to guide PA promotion is currently integrated into physiotherapy practice. There is scope for service improvement in this area to better align physiotherapy practice with current health policy.

Conflict of interest

Anna Lowe is a Physical Activity Clinical Champion for Public Health England.

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Authorship

This doctoral study was led by Anna Lowe under the supervision of Dr Chris Littlewood and Dr Sionnadh McLean. All authors contributed to preparing and revising the manuscript.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.msksp.2018.01.009.

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6.4 Additional Information

The following information is supplementary to the published article. The aim is to furnish the concise published information with more detail. Salient sections that particularly benefit from expansion have been identified as;

1. Clarification of how participants were classified.
2. Themes in more detail.
3. Strategies to ensure quality.
4. Reflexivity.

6.4.1 Classification of Participants by PA Promotion Activity

The non-probability sampling approach used in the survey meant that not everyone in the target population had an equal chance of responding. This has implications for the generalisability of the findings and also means that the sample was subject to bias. It is acknowledged that this was the only feasible way forwards and every effort has been taken to be transparent about the methods employed and to caution readers regarding interpretation of findings.

One of the considerations around bias was that self-selecting, engaged individuals were more likely to respond than others. In order to limit the impact of this bias, at least to some degree, respondents were classified as either high-promoters of PA or low-promoters of PA based on the self-reported frequency with which they deliver BIs. Those who reported that they delivered BIs “always” or “usually” were classified as high-promoters, those who reported delivering BIs “sometimes” or “never” were classified as low-promoters.

A total of 146 survey respondents agreed to future contact and were therefore eligible for inclusion in the qualitative follow-up study. Of these 77% (n=113) were classified as high promoters and 23% (n=33) were classified as low. This shows a clear predominance of high-

promoters and validates the decision to use a quota sampling approach to ensure that a range of opinions, from people across the PA promotion spectrum, were gained.

6.4.2 Themes in More Detail

This section describes and evidences the mixed methods findings in a more detail than was possible in Article C. The themes are described more explicitly and more supporting evidence, in the form of additional quotes, is provided.

A theme, in the context of thematic analysis has been defined as "a central organising concept" (Braun and Clarke, 2006). It is a coherent integration of disparate pieces of data that constitute the findings (Sandelowski and Leeman, 2012). The importance of a theme is not necessarily dependent on quantifiable measures, but rather on whether it captures something important in relation to the research aim (Braun and Clarke, 2006).

At the end of the thematic analysis process described within the article, four themes were identified:

1. Current physiotherapy practice.

2. Barriers to, and facilitators of PA promotion.

3. Physical activity or exercise?

4. Functional restoration versus general wellbeing.

Themes 1, 2 and 3 are semantic themes, which are closely linked to the data, directly linked to the quantitative findings and clearly aligned to the research aims. Semantic themes are common in a realist approach, and they are descriptive in nature and based on explicit meaning more than interpretation (Kingod *et al.*, 2017). In a sematic approach the themes are detected superficially and literally. As such it is the simplest and the most evident type

of theme. In semantic themes data is explained and organised in ways that show patterns that exist in the data (Javadi and Zarea, 2016).

Theme 4 is more latent and represents over-arching concepts, ideas and assumptions. Latent themes are more interpretive and therefore more common to a constructionist paradigm. Latent themes allow researchers to move away from the explicit and obvious content of the data to consider underpinning assumptions (Braun and Clarke, 2006). The latent approach requires moving from description, in which the data is just organised and summarised, to interpretation in which efforts are made to create a theory, based on the importance of the patterns and a wider framework of meanings and connotations (Javadi and Zarea, 2016).

Theme 1: Current Physiotherapy Practice

This theme is the most closely tied to the data, and it responds to many of the direct questions that were generated by the survey findings. It describes the features of current practice and explains the survey findings on a sematic level. The data segments included here are *additional* to those in Article C, and this section further explains and develops the theme.

The participants' role in educating patients came through strongly as a means of supporting self-management:

> *"also, from a management perspective we want people to take ownership of their lives. We don't want people to come in and be, like, 'I want you to fix me.' We want people to be better educated about their health." P5*

The importance of building confidence and managing fear were highlighted as important factors in restoring function:

> *"With that I now do a bit more health promotion because what we're wanting to do is get the children and adults active, because they are very much in the old-fashioned idea that if you've got a bad heart you can't do anything." P1*

The importance of good communication skills and an ability to connect with patients was consistent in the data, and the participants conveyed a sense that the personalisation of messages and empathy were central to their approach:

> *"There are always things we need to cover and there are other things, red flags or everything else, so therefore we don't want to bombard people with absolutely everything. If you're in a lot of pain, people are concentrating on that and everything is so heightened, that if you're talking about lifestyle changes some people might think, 'Oh great, he didn't listen to what I was saying,' and it can get lost potentially." P5*

Participants conveyed a variety of opinions about how central PA is to physiotherapy practice and acknowledged that it isn't always appropriate to initiate a discussion about PA. Discussing PA was described as something that was ingrained, natural and core by some participants but described very differently by others:

> *"So, it fits in every category really…. I think it fits into all different areas." P1*

> *I also think from the CSP, the NICE guidelines, everything points towards this as well. I'd say almost certainly you can't get away from that side of things as well." P2*

> *"I think it should be a core part of our role. We're probably best placed to give the advice on exercise out of all health professionals." P3*

Participants frequently referred to the existing assessment framework common across many areas of physiotherapy and described how they would integrate questions about PA into their subjective assessment and specifically into their social history. It was described as an "automated" part of the assessment, and participants explained that the framework was a useful prompt to elicit information from patients on PA particularly in relation to hobbies and employment:

> *"There's partly an informal discussion, that's part of their subjective assessment, so for example we'll ask them if they've got any hobbies or activities. That can also then go on to consider maybe their goals, so for example, there was a patient discharged this morning who wanted to run nine miles before they got symptoms of pain, so that was their goal and obviously they reached that goal and that was brought up in their subjective assessment." P2*

"well it makes up part of the subjective assessment that I go through. I'll always specifically ask someone as part of the social history if they have any sport or exercise interests or any physical activity hobbies." P3

"I would say that personally I think that most of the time I would talk about physical activity and I guess predominantly I see a lot of patients with arthritis or pre-joint replacement, post-joint replacement patients. It comes up as a necessary part of their assessment and treatment I suppose." P12

Participants mentioned terms including "brief advice", "brief intervention", "cognitive behavioural therapy", "motivational interviewing", "health coaching" and "Making Every Contact Count", but there was no clear sense of what a PA promotion intervention in physiotherapy practice is.

When asked specifically about the assessment of PA status participants acknowledged the importance of informally capturing this information. This was recognised by some participants as different to formal measurement; the use of formal measurement was largely absent, with one notable exception that is discussed later:

"I've not used anything formal. I probably don't even refer to the 150 minutes, because I think, and again this could be my inexperience, I just imagine if you start getting people to breakdown, on this day I do this and, on this day, I do that, you could be wasting time that could be more valuable asking other questions." P7

PA was often discussed and recorded in relation to hobbies or activities that patients want to return to and this approach is described by participants as potentially problematic.

"That's the problem really. I think I would struggle to say yes, I'm actually measuring that effectively. With people who weren't doing something and now they are doing something, that's easier to measure, but people who…actually how much activity are they doing…and after seeing us or after seeing health professionals, are they doing more? It's difficult to know." P5

"The experience of most physios that are working with our teams is that it's not routinely done in practice." P11

Questions relating to the PA guidelines elicited a variety of responses, some which expressed a lack of awareness and reaffirmed the survey findings. Other participants described how they are embedded in practice by their teams:

> *"Yes, we do use the guidelines in our practice when we're talking with patients, when we're teaching other staff, yes we use them." P1*

However, there was a clear acknowledgement of the potential usefulness of the PA guidelines amongst participants, and evidence that these are integrated into practice by some clinicians. They were described as a useful way to start a conversation about PA and a means of encouraging patients:

> *"I think it's just making it relevant to the patient as well. I guess in my experience I've had patients come in and they really do consider themselves to be quite active because they swim for half an hour once a week. By highlighting what the recommendations are, what the guidelines are, it can really challenge that and make them see that from a different perspective. So, it's helpful in that approach." P11*

When asked about signposting, participants described their difficulties in knowing what services are out there and the lack of straightforward referral pathways:

> *"I think what often happens is that the services are there; it's just that the people aren't aware that those services are there and how to be able to get your patient referred to them as well." P2*

Ease of referral was identified as a factor by several participants:

> *"Because it's primary care and because we're the same trust, it means that it's seamless for us to be able to do it, so it means we don't have to be writing a specific referral." P2*

> *"The other thing within the Council we're in is services, apart from voluntary charities and so on, will come under the umbrella of a wellbeing service, so they should all be able to inter-refer." P6*

Difficulties were off-set in some cases by participants who had developed partnerships with delivery services and found ways to collate and share information on available services:

"As part of that as well, there also are people who come into the department and explain their services and advise us how to refer as well." P2

"the relationship we have with them in that we've got physios that are leads for an exercise service, physios that are leads with the health trainers and so on, that can come back and keep staff updated as best as possible. It just keeps it fresh in the minds of staff what is out there." P6

Theme 2: Barriers to, and Facilitators of PA Promotion

The following factors were identified as barriers to PA promotion, so this section develops Theme 2 by providing *additional* data segments to those cited in Article C. The complexity of patients was highlighted both in terms of complex co-morbidity and also a perceived lack of motivation:

"I think there are times when – I'm thinking specifically about when you can see that obesity is probably part of the problem – when it's a harder discussion to have." P10

"Certainly, people are talking about, 'I can't do this,' or I'm not working and everything else, and then you're trying to talk to them about, 'Oh, why don't you go to the gym for example. I think on the list of priorities it gets moved down." P5

Organisational culture was thought to influence PA promotion practice:

"I'm not really sure why – whether it's just partly cultural as well in the sense that it's not something that I feel like has been a focus when I've seen other people perhaps doing assessments and things." P8

The Acute Setting was identified as an influential factor by 2 participants, both in relation to an inpatient setting:

"so, I do think there is a role, but we're a little bit in between in that sense that is it to be done here or is that something that should be continued at home, because there's so much going on already." P8

Factors that were identified as facilitating PA promotion are described below. The facilitators relate to evolving practice and are described by participants who have taken

steps to improve practice in this area. As such the frequency with which facilitators are mentioned is less than the barriers and there is no sense of consensus. These facilitatory factors highlight isolated practice examples that could inform wider practice developments.

It was highlighted that the nature of many physiotherapy episodes of care can facilitate the promotion of PA in that physiotherapy care frequently involves repeat appointments which give an opportunity to be selective regarding when PA promotion is raised and also enables the subject to be introduced and revisited on multiple occasions:

> *"It's kind of a bit of a balancing act when you first meet somebody. You want to build that relationship with them and if you get too much too quickly into a mode of lecturing them about activity levels, I think you run the risk – certainly with some patients – of switching them off." P7*

> *"I think not always on initial assessment, but with some of my patients now towards the end of our assessment we will start talking about what activities they're managing to achieve now, what they aren't and talk about what might be limiting them from participating in more physical activity." P11*

Resources that support PA promotion were described extensively by one participant (this participants' contribution was discussed within Article C as a deviant case). P6 described how they had changed their practice and integrated the use of several resources into routine practice within their team. These included smart phone apps, formal assessment tools and wall displays. P6 described trying to create a culture of PA and felt that the use of resources had facilitated this:

> *"certainly, you've got behaviours where now the health tool is in place, staff are saying having something there, that I can ask directly and objectively, it's giving me the opportunity to have the conversation." P6*

Collaboration with other services that support PA was identified as a positive factor:

> *"What I would say is the initial partnering up and the initial partnership working that's really set the understanding of why we should do what we should do." P6*

Participants were asked about physiotherapists as role models for PA and about their own PA experience. It was suggested that if a physiotherapist engages in regular PA they may be more convinced of the benefits and therefore promote PA more readily:

> *"Because it's embedded in their own lives they see it as a positive thing from their point of view, so it's much easier to sell something that you are already on board with." P1*

There was also a sense of not wanting to be a hypocrite and that engaging in PA as a clinician enabled physiotherapists to give more authentic advice.

> *"So, I guess if you are actually undertaking a reasonable amount of physical activity, something that's normal for you, maybe it feels easier in that regard, so you can say, 'I know it's not always easy because I have barriers and distractions myself, but perhaps it's achievable.' It's something you would understand more if you're doing it." P12*

Participants generally concurred that using their own experiences as a means of connecting with patients over PA was a positive thing and something that could facilitate behaviour change:

> *"Sometimes I use maybe my own experiences to encourage patients and say that this is what you can do and this is how you can do it and make it a daily routine." P4*

> *"Again, I think being able to talk to people about when I do this, you know when you do it yourself it feels like this a bit, when it's a new activity you're working your muscles and it does get better. I think it does help to know a bit about what you're talking about from a personal experience of activity." P10*

Concern was also voiced that there may be a paradoxical effect with active clinicians whereby they lose the ability to connect with patients over activity:

> *"I guess for some people it could be intimidating if you can see that somebody is very muscle bound and very fit and healthy, I guess that could be for some people." P10*

> *"The only thing I would say is anecdotally I'd say that the people that I work with here, and I've got people at this work, one of them was a professional tennis player, we've got other people that have done Iron Man, and I think their sensitivity, how*

they look upon people who say maybe they don't do any exercise, that gap is very difficult for them maybe to fully comprehend as part of that." P2

Theme 3: Physical Activity or Exercise?

This section further develops Theme 3, and it includes further data segments which build on those included in Article C. PA and exercise were identified as distinct entities, but the terms were used inconsistently. It was highlighted that the choice of terminology can be an important factor in engaging patients:

"Well I think exercise, I tend to think of something that's going to maybe do the cardiovascular system some good, whereas movement or activity I'm just literally wanting anything that will get some sort of joint movement going on really I suppose." P9

Some comments concur with definitions:

"…but that that activity doesn't have to be really strenuous competitive sports, it could be walking." P1

"…a big part of what we do in outpatients is prescribing exercises, specific exercises which are a form of physical activity." P3

Negative connotations associated with the term "exercise" were highlighted:

"So yes, we do discuss with all our patients – we don't always call it exercise – we quite often refer to it as activity or movement, but yes, it's a big part of every patient's management really, so it's something that's getting promoted." P9

"To be honest I suppose in my own mind I don't really see them as that different. It's just different terminologies stop patients getting alarmed. Some of my patients if I mention exercise, they immediately say, 'Oh no, I can't exercise. I've got problems and I couldn't do exercise.' If you actually encourage them just to even be doing something in their chair or walking up and down the corridor a little bit more, they wouldn't see that as exercise as such. They would see that as something that they could take on; that would be something that they would be willing to have a go at, so just using different terminology to try and get the patient on board." P9

Interestingly, negative connotations associated with the "activity" were also noted:

> *"When people think of activity they might just think of sport and running, but actually there are lots of different things." P5*

Theme 4: Functional Restoration versus General Wellbeing

Conceptually over-arching, this theme relates to the underpinning aims of physiotherapy practice. This section provides additional information and data segments to further develop Theme 4.

Complexity in terms of co-morbidities and health behaviours appeared to influence if and how physiotherapists discussed PA:

> *"the problem often occurs that once you start delving into one problem that they're referred for, they've usually got a couple of other problems and generally not only are they linked to musculoskeletal, but they're also linked to their general poor fitness levels, or again comorbidities that affect it as well which makes their treatment harder." P2*

> *"I think to be fair their BMI probably has an impact on whether or not I go down that route as well. If it's quite high and if it's obviously having an impact on their specific problem then again, I will bring it up more specifically." P3*

> *"I think there are times when – I'm thinking specifically about when you can see that obesity is probably part of the problem – when it's a harder discussion to have." P10*

Participants consistently emphasised the notion of "getting people better" and restoring function:

> *"So, our focus tends to be quite a lot about getting their range of movement and their strength back on the ward and then if necessary with outpatient physio follow-up afterwards, where we hope, but I think that needs to be investigated, that outpatient physio takes over and helps to progress the patient to pace themselves to go back to the activities and the lifestyle that they were hoping to return to." P4*

"I guess it's implicit and inherent in the fact that the role is to get people back on their feet and very much in a functional way." P8

"There's almost a feeling, if you like, you're sort of saying people are going to be here for two to six weeks, say, on average, and you're looking at that short-term functional ability of can I toilet myself, can I get in and out of bed and those sorts of things. I would stand by that idea that it's what can we get done here and now and less on what's that going to be like at home and in the future." P8

"Also, I suppose sometimes we're very focused on what we're doing for the patient, rather than what's going to happen beyond that." P9

This view is contrasted with a more long-term 'promotion of lifelong wellbeing' approach that was acknowledged within the data but less prominent:

"Going back even a couple of years, when we were looking at how people discussed physical activity, it was in relation to functional goals of whatever a patient had at the time and what therapeutic exercise advice you may give that would facilitate that functional goal or return to that sport. Whereas actually now the trend has changed." P6

"Reading through other people's physiotherapy notes and reflecting on what I have done previously, it's been much more about I used to participate in a tap dancing class twice a week before I had a knee injury, and at the end of physio sessions we'll have a look at whether they're managing to get back to doing their tap dancing class. I wouldn't necessarily look at how many minutes of physical activity they were achieving each week. I think now I'm putting much more effort into actually looking at that in a wider context and working out whether prior to the physiotherapy problem that they've come to see me about, whether they were achieving that then and what we might be able to do to be able to support them to achieve that in the future." P11

"So, it's less about pushing on certain aspects and making the patient well. It's about trying to get that patient fitter and better and stronger and therefore able to deal with the problem themselves." P2

To summarise this section, four themes developed through the thematic analysis process. These were described in Article C and further supporting information is given in this section. A comprehensive discussion of these findings follows in Chapter 7.

6.4.2 Strategies to Ensure Quality

Quality issues in qualitative methods require different assessment criteria to those of quantitative research (Petty, Thomson and Stew, 2012a, 2012b). Commonly accepted criteria have been described by Robinson, (2014) and include confirmability, dependability, credibility and transferability.

Confirmability is the extent to which the findings reflect the focus of the enquiry and not the bias of the researcher (Lincoln and Guba, 1985). In this study confirmability was achieved by the use of a clear audit trail of the data analysis process. This was facilitated by the use of Quirkos software that enables transparency of these processes (Quirkos, 2017). A reflexive journal was also used to capture the salient points related to their role in, and potential influences on the research process. These documents were discussed as part of an ongoing peer review process with the supervisory team at key points during the research process.

Dependability relates to the idea of trackable variance (Guba, 1981), although variations between people and contexts is expected, enough information should be provided to enable a judgement to be made by an external person about whether the variance is acceptable (Petty, Thomson and Stew, 2012a). In this study, the clear audit trail of all processes and procedures helps to maximise transparency and allow variations to be understood.

Credibility relates to the degree to which the findings can be trusted or believed and this relies on the interpretation of complexity by the researcher (Guba, 1981). In this study the approaches are deemed adequate to enable credibility; this includes the actual methods chosen, for example interviews allow intense engagement with individuals and the semi-structured nature enables variations between participants to be explored. Similarly, the rigorous data analysis process requires immersion in the data enhancing the chances of the findings having credibility. Finally, the reflexive journal will enable the researcher to be aware of, and transparent about, their role.

Transferability is concerned with the extent to which the findings can be applied in other contexts (Petty, Thomson and Stew, 2012b). In qualitative research this relies on the collection of detailed "thick descriptive data" in order to develop an account of the phenomena in sufficient detail for others to determine the extent to which it may be applied to their own setting (Lincoln and Guba, 1985). Efforts were made throughout the research process to facilitate the collection of rich, thick descriptions that will help other researchers to understand the potential transferability. These include the clearly described methods throughout, understanding the participant characteristics and the methodological approach should help other researchers to position this study in terms of its potential transferability to other settings. It is also believed that gaining thick, rich accounts was facilitated by the lead researcher having a detailed knowledge and experience of the phenomena and thus being an insider-researcher.

A number of external quality frameworks were used during the process to ensure that the processes and reporting were in line with current recommendations for good practice. The 15-point checklist of criteria for good thematic analysis in Table 8 was used to guide the analysis in this study (Braun and Clarke, 2014). The published report was written up in accordance with the COnsolidated criteria for REporting Qualitative studies (COREQ) which comprises a 32-item checklist to ensure transparency and accuracy in reporting (Tong, Sainsbury and Craig, 2007) which can be seen in Appendix 3.

Table 8. 15-point checklist of criteria for good thematic analysis (Braun & Clarke, 2006).

	Phase	Criteria for Good Thematic Analysis
1	Transcription	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'
2	Coding	Each data item has been given equal attention in the coding process
3		Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive
4		All relevant extracts for all each theme have been collated
5		Themes have been checked against each other and back to the original data set
6		Themes are internally coherent, consistent, and distinctive
7	Analysis	Data have been analysed – interpreted, made sense of - rather than just paraphrased or described
8		Analysis and data match each other – the extracts illustrate the analytic claims
9		Analysis tells a convincing and well-organised story about the data and topic
10		A good balance between analytic narrative and illustrative extracts is provided

11	Overall	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly
12	Written report	The assumptions about, and specific approach to, thematic analysis are clearly explicated
13		There is a good fit between what you claim you do, and what you show you have done – i.e., described method and reported analysis are consistent
14		The language and concepts used in the report are consistent with the epistemological position of the analysis
15		The researcher is positioned as active in the research process; themes do not just 'emerge'

6.4.3 Reflexivity

The importance of reflexivity was highlighted briefly in the published article and more detail is added to the discussion here. Reflexivity is commonly viewed as the process of a continual internal dialogue and critical self-evaluation of researcher's positionality as well as active acknowledgement and explicit recognition that this position may affect the research process and outcome (Chesney, 2000)

Questions about reflexivity are part of a broader debate about ontological, epistemological and axiological components of the self, intersubjectivity and the colonisation of knowledge (Berger, 2015). It requires turning the research lens back onto the researcher to recognise and take responsibility for their "situatedness" within the research and the effect that it may have on the setting and people being studied, questions being asked, data being collected and its interpretation. As such, the idea of reflexivity challenges the view of

knowledge production as being independent of the researcher producing it and accepts that the researcher influences the research.

A broad range of researcher personal characteristics that may be relevant has been identified including: gender, race, affiliation, age, sexual orientation, immigration status, personal experiences, linguistic tradition, beliefs, biases, preferences, theoretical, political and finally, ideological stances (D'Cruz, Gillingham and Melendez, 2005; Bradbury-Jones, 2007).

Berger, (2015) grouped the factors that may influence the process, and therefore the product of research, into three main categories; the field, the relationship and the worldview. The relevant personal characteristics of the author are considered here in relation to these three areas of potential influence.

The Field

Firstly, access to *the field* may be affected because respondents may be more willing to share their experiences with a researcher whom they perceive as being sympathetic to their situation and the researcher may be more knowledgeable about the context and phenomena being researched.

The sampling frame for both the quantitative and qualitative components was Chartered Physiotherapists working in the UK who have current clinical contact with patients. I am a UK-based Chartered Physiotherapist and although I no longer have clinical contact with patients I remain closely connected to the profession. My area of interest is in PA and in particular how it is integrated into health systems. Some of the work I have done has been visible in that it has been reported in professional journals and on social media. It was reasonable to expect that potential respondents knew who I was, knew that I was interested in PA and knew that I had been linked to a number of related projects. The first request for survey participants were circulated in a number of ways including Twitter, Facebook, and through the Chartered Society of Physiotherapy member networks. I believe

that having an existing profile within physiotherapy may have enhanced the survey response rates and also enhanced qualitative recruitment.

Recruitment to qualitative study was particularly quick and easy, and the participants volunteered readily and expressed interest in being informed of the final research products. During the qualitative interviews several participants mentioned previous work that I have done and also assumed that I had detailed knowledge of the phenomena under scrutiny.

This seemed to have many positive effects. I understood the nuances of healthcare which meant that I need not spend time explaining and describing the context. I was able to ask pertinent questions and was able to be iterative and flexible in my approach, not being too reliant on the interview guide. I was able to relate to the barriers described, and I was sympathetic to the participants' situation based on my own experience.

The Relationship

Secondly the nature of researcher– researched relationship may be influenced, which, in turn, affects the information that participants are willing to share. The dynamics of the relationship with each participant was unique, and the participants varied in terms of their clinical specialty, healthcare setting, level of engagement with PA and amount of experience as a qualified physiotherapist. As identified above, several of the participants acknowledged that they knew me or were aware of some of my previous work during the interview, which may have impacted on the dynamic in several ways.

I had a sense that one participant in particular was trying to impress me by describing how proactive their team was. Whilst pleasing the interviewer is a common phenomenon in qualitative research, I felt that this effect may have been amplified because the participant perceived me as having expert knowledge.

As acknowledged above, being an "insider researcher", in that I have lived experience of clinical physiotherapy practice, enabled me to be interactive and flexible in the interviews.

Whilst this helped the flow, pace and depth of the interview at times it felt that we were moving from a semi-structured interview towards an informal chat between peers. I felt I was treading a fine line between encouraging the participants and making them feel at ease, and allowing the conversation to become too informal.

One participant had been a previous pre-registration student during my time working as a Senior Lecturer at a Higher Education Institution, and this participant openly acknowledged that they had volunteered to participate because they recognised my name. The power-balance in this particular interview felt different to the others, as I sensed that the participant was somewhat daunted and may have felt as though they were being tested. I opened each interview by thanking the participants and highlighting that there were no right or wrong answers to any of the questions, and that I was purely interested in their thoughts, experience and opinions. This may not have been sufficient to reassure this participant and the power balance may have affected the interview in that they were reticent, and I was trying to compensate by being encouraging and accessible.

A final negative consequence that may be related to my background was that participants who perceived that they were not at the cutting edge of clinical practice in this field felt embarrassed and defensive; this was openly acknowledged by one participant.

My Worldview

Lastly, the worldview and background of the researcher affects the way in which they construct the world, use language, pose questions, and choose the lens for filtering the information gathered from participants and make meaning of it. Thus, it may shape the findings and conclusions of the study (D'Cruz, Gillingham and Melendez, 2005). My own worldview has the potential to affect every stage of the research process from the development of research questions, selection of methods, data collection and analysis all of which will ultimately influence the end products. Continual efforts were made to understand the role of the self in the creation of knowledge throughout the research process (Baillie, 2014).

My worldview in relation to PA and physiotherapy have been influenced by my career to date. This includes 10 years in NHS clinical practice developing an in-depth working knowledge of frontline issues. This was followed by 10 years working in Higher Education during which time I completed further study and began to develop an awareness of the impact of self in the generation of knowledge.

Since then I have worked at both a national and a strategic level in public health often focussing on modifiable lifestyle behaviours including PA. Most recently this has been as a Physical Activity Clinical Champion with Public Health England. This has put me at the forefront of initiatives to engage healthcare professionals to promote PA. Working with an executive Government agency has enhanced my visibility and credibility in this field. Alongside these formal roles, I have developed a national profile as a proponent of PA. This is evident on social media, and I am frequently asked to speak at national conferences about PA and related public health issues.

Worldviews, of course, run deeper than work-related experiences and I acknowledge that key views such as liberalism, equality and social justice are key foundational principles upon which my actions and views are based. This means that I identify much more readily with a social model of health and a constructivist approach to knowledge.

Although these biases are considerable, they are very explicit and obvious rather than covert biases. As such, my own awareness of the biases and the awareness that other people have of my biases is overt and, I believe, therefore easier to remain alert to, to monitor and to temper. It is widely acknowledged that we cannot remove our own biases or fully mitigate for their potential, profound influence. We can, however, implement strategies that allow us to remain alert to such factors, acknowledge their potential impact and to some extent, manage or limit this. Deep reflection was used as a tool to facilitate the development of a fuller picture of my own biases, and this was facilitated and formalised through the use of a reflective journal. This was used to record the contact I had with participants, and entries were made immediately after each interview and at key points in the analysis process.

Regular peer debriefs with my supervisory team were essential in identifying and managing situations where my own biases were unduly influencing research proceedings. My supervisory team have extensive research experience and expertise, and both of them are physiotherapists. Their subject expertise however, is in other, related areas, and as such they retained a degree of removal which enabled them to be relatively impartial and objective.

Efforts were made throughout the data collection and analysis phases to monitor biases and these were strongly facilitated by the supervisory team. Examples of this include the discussion and negotiation of the coding framework (CL independently coded two transcripts, we compared notes and changes were made, this lead to explicit discussion about retaining equipoise within coding). A detailed audit trail was also used to document processes in a consistent and transparent way. The aim of this, with regard to reflexivity was to enable third parties to understand the process and to identify any potential sources of bias of which I may be unaware.

To conclude, I am mindful of my own biases and aware that I will have many more unconscious biases. I have acknowledged that personal, social, and cultural factors will have affected the conduct, interpretations, and representations of the research story (Braun and Clarke, 2006). There is no doubt that my own worldview has influenced the research, but I believe that our collaborative and consistent efforts to retain self-awareness as part of our ethical research conduct have resulted in the confirmability, dependability, credibility and transferability of the findings being upheld.

6.5 Summary and Implications for Thesis

To summarise, Chapter 6 gives a detailed review of Phase 2 of the mixed methods study. The published work is enhanced by an extended description of the four themes and an extended discussion of the key considerations of quality and reflexivity. Key findings from this study include the identification of four key themes which help to explain and elucidate the quantitative findings. This builds on the earlier exploration of PA in physiotherapy

practice that took place in the systematic scoping review and cross-sectional survey. In line with the overarching research aim of exploring and understanding current practice, this section seeks to explain the earlier findings, and in doing so, develop an enhanced understanding of relevant issues. The mixed methods findings are discussed further in Chapter 7.

Chapter 7: Discussion

7.1 Introduction

Chapter 7 provides an in-depth discussion of the findings from this programme of research. This chapter briefly reviews the findings from the systematic scoping review and Phases 1 and 2 of the mixed methods study. Following this, the strengths and limitations of the overall thesis are considered. The key findings are then organised and discussed in relation to the existing literature, implications are highlighted, and recommendations are made. This chapter addresses research objective 7 as detailed in Table 9.

Table 9. Research Aims and Objectives, Chapter 7.

Research Aim

The overarching research aim is to explore PA promotion in physiotherapy practice and to understand the factors that underpin current practice.

1.	To explore the existing evidence base related to physiotherapy and PA promotion.
2.	To describe current PA promotion practice in the UK.
3.	To measure and report physiotherapists' knowledge of PA guidelines.
4.	To measure and report physiotherapists' own PA behaviours.
5.	To use the quantitative findings to inform an in-depth qualitative explanatory follow up.
6.	To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice.

7. To generate evidence-based recommendations for education, research, policy and practice.

7.2 Review of Key Findings

The purpose of this programme of research was to explore PA promotion in physiotherapy practice and to understand the factors that underpin patterns of current practice. This was carried out through three linked studies, a systematic scoping review and a mixed methods study (comprising a quantitative survey and a qualitative study). Each method addressed specific objectives and the learning from each phase informed the next in a sequential manner.

The scoping review was a systematic exploration of the global evidence on physiotherapy and PA. It identified and mapped the relevant literature, and the resultant article is the most comprehensive report of the state of the evidence in relation to physiotherapy and PA promotion. The total volume of literature gained was limited although a notable increase over time was identified, suggesting that PA is an area of growing interest amongst the international physiotherapy community. There was a predominance of observational studies, frequently scoping the attitudes of physiotherapists towards PA. The findings from these studies highlighted an appetite for this area of practice, but the lack of interventional research means that there is currently little evidence to guide practice. The interventional studies that were identified included examples of physiotherapy interventions that were integrated into usual practice, and interventions that were additional to usual practice.

The findings from the cross-sectional survey indicate that the majority of respondents integrated some form of discussion about PA into the majority of patient contacts. As many as 77% (n=347) report always doing so and an additional 21% (n=95) reported usually doing so. The reported levels of BI delivery were high, with as many as 91% (n=414) of respondents reporting that they either always, or usually, deliver a BI when indicated. This suggests an existing level of engagement amongst physiotherapists in relation to PA

promotion. However, further survey data revealed that the majority of survey respondents (60%) do not routinely assess PA status, despite engaging in frequent discussions with patients about PA. Additionally, only 44% of survey respondents routinely signpost patients to further sources of PA support.

The findings from the survey also highlighted a knowledge gap in relation to the current PA guidelines. Only 16% of respondents answered the three specific questions correctly, and their knowledge between each of the three components of the PA guidelines varied substantially; 60% correctly answered the question about moderate PA recommendations, yet only 33% and 32% correctly answered questions about vigorous PA and strength training recommendations respectively. Furthermore, the survey identified that the proportion of respondents, who themselves, achieved the recommended 5x 30 minutes of moderate intensity PA over a week, was 38%. This suggests that 62% of physiotherapy respondents were not sufficiently active to confer the optimum health benefits.

The findings from the qualitative study created a deeper understanding of the mechanisms that underpin current practice and further explained the quantitative findings. Four themes were identified: (1) Current physiotherapy practice, this theme added detail to the survey findings, it describes the features of current practice and expands upon the survey findings. (2) Barriers to, and facilitators of PA promotion, this theme explains key factors that constrain and facilitate PA promotion in current practice. (3) Exercise or Physical Activity? This theme highlights a lack of clarity regarding key terms yet also acknowledges the importance of terminology in patient contacts. (4) Functional restoration versus general wellbeing, this theme identified a focus on short-term restoration of function over a longer-term focus on wellbeing.

7.3 Strengths and Limitations

The strengths and limitations specific to each method are discussed within the published papers and their respective chapters. The overarching strengths and limitations of the programme of research are considered here.

This research was the first exploration of many aspects of PA promotion in physiotherapy practice, and as such it has advanced the knowledge of current practice and elucidated future developments. To date, the potential for physiotherapists to contribute to PI has been largely overlooked. The methods used are carefully justified, appropriate for complex research questions and are based on sound methodological underpinnings. The reporting is transparent and in line with current best-practice guidance. The inclusion of three peer-reviewed publications verifies the quality of the research, the standard of reporting and also the pertinence of the topic.

Many aspects of this research have been collaborative, and this may have enhanced the perceived salience of the work and thus contributed positively to the recruitment and response rates. This collaboration also enhances any potential dissemination routes. Three separate outputs and one infographic have been published in high-quality, peer-reviewed journals, and as such have provided the wider research and clinical communities with timely information that can improve practice.

Certain assumptions about current knowledge and practice were made in the early planning stages. For example, the survey assumed knowledge of terms such as “Brief Intervention” and “Making Every Contact Count”, however the findings suggest that such assumptions were unfounded. This was a direct result of the lead researcher’s previous experience, but this clearly did not represent the breadth of current practice. The survey was subject to an extensive pilot phase and it is interesting that these issues were not highlighted as part of this process. One of the benefits of the mixed methods approach was that these emergent issues were further explored and therefore better understood through the qualitative phase.

The situatedness of the author within this field is acknowledged for both its potential positive and negative impacts. This is discussed in detail in Chapter 6, and has been reported transparently throughout the research process.

7.4 Discussion of Findings

In this section, the findings from the programme of research are discussed in relation to the literature, and their broader meaning is explored. The findings are organised and explored in terms of the challenges and opportunities that they present for physiotherapy; each discussion item is followed by a section that outlines key implications and recommendations.

7.4.1 Limited Evidence Base

The scoping review was a systematic exploration of the global evidence on physiotherapy and PA. It exposed a lack of interventional research to guide practice and highlighted a number of areas that warrant further exploration. The key learning points were extended by the broader literature review which considered key contextual factors and methodological issues.

The scoping review identified a predominance of observational studies and a paucity of interventional studies. Within the interventional studies, a distinction was drawn between pragmatic interventions that could feasibly be integrated into routine practice and higher-intensity interventions in which physiotherapists provide PA opportunities and progress patients through a programme that sits outside of usual physiotherapy care. This distinction raises questions about what the role of physiotherapy is in PA promotion and indeed what the scope of physiotherapy is. It also raises questions about whether the profession aims to position itself to fulfil its responsibilities for public health and prevention through *promoting* PA and *linking* in with broader PA services, or position itself so that physiotherapy becomes a major *provider* of PA opportunities for people with long-term conditions.

Shirley, van der Ploeg and Bauman, (2010) identified a perception amongst physiotherapists that BIs integrated into routine practice was the most feasible way of promoting PA through physiotherapy. Despite this, no evidence was identified through the scoping review that PA

promotion is integrated into routine practice and no interventional studies were identified that focussed on brief, pragmatic interventions that could be delivered at scale within physiotherapy. One study that pre-dates the systematic scoping review was identified, Sheedy *et al.*, (2000) devised a physiotherapy-specific BI consisting of a single 5-minute session of PA counselling in addition to receiving physiotherapy treatment. Physiotherapists were trained to deliver the intervention within the confines of a routine physiotherapy service, and the findings suggest that the intervention group had significantly greater odds of increasing PA levels by 60 min or more per week, compared with the control group (OR = 2.97, 95% CI 1.36- 6.46). This was a pilot in Australia, thus in a different era and a different health system and it only provided preliminary findings. However, although these preliminary findings were positive, there is no published evidence that these were replicated or that subsequent changes were made to practice. Indeed, the later Australian studies suggest that advancement has been slow, comparable to that in the UK (Shirley, van der Ploeg and Bauman, 2010; Freene *et al.*, 2017).

The scoping review identified that individual, high-intensity PA interventions were also shown to be effective at increasing PA, at least in the short-to-medium term (de Vries *et al.*, 2015; Holm *et al.*, 2015). Since the publication of the scoping review, the first systematic review of effectiveness of physiotherapy interventions for PI has been published (Kunstler, *et al.*, 2017). This synthesised data from 8 primary studies and concluded that physiotherapy-led interventions are effective at increasing PA levels for up to one year after intervention.

Limited Evidence Base: Implications and Recommendations

The scoping review identified a predominance of observational studies and highlighted a paucity of interventional studies, indicating that there is currently little evidence to guide practice in this area. This explains, in part, the lack of a consistent approach that was evident in current PA practice amongst physiotherapists.

The distinction between pragmatic interventions and high-intensity interventions warrants further consideration in terms of professional priorities. Although all areas warrant further enquiry, the findings from the scoping review, broader literature review and mixed methods study have informed the view that facilitating the adoption of pragmatic interventions into routine practice should be a research priority. This is based on the fact that pragmatic interventions can be integrated without radical change or disruption; compatibility with current practice is a known characteristic of successful innovation (Webb *et al.*, 2016). Such interventions show promise of effectiveness in other areas of healthcare are cost effective and are supported by clinical guidelines and government agendas. Enhancing the understanding of how to embed pragmatic BIs into practice is more feasible, logical, and aligned with parallel workstreams across healthcare.

Specific recommendations for research in this area include furthering the ongoing work to refine the knowledge of the specific BCTs that are associated with effective BIs in a physiotherapy context. Establishing a core set of BCTs would help the development of interventions which can then be tested and further refined in physiotherapy specific contexts and thus in a further current programme of research (Pears *et al.*, 2016; Kunstler *et al.*, 2017). Interventions are often complex and multi-faceted, with many interacting components, and they can be conceptualised as having 'core components' (the essential and indispensable elements of the intervention) and an 'adaptable periphery' (adaptable elements, structures, and systems related to the intervention and organization into which it is being implemented) (Greenhalgh *et al.*, 2004). Fixed “active ingredients” are essential in order for replication and delivery with fidelity. However, if a new intervention is too rigid then it will not fit comfortably into a range of different departments and organisations (Damschroder *et al.*, 2009). Thus, research programmes that identity the fixed and adaptable components of PA promotion interventions could enable effective, yet flexible approaches to be identified and implemented.

The tension between the need to achieve full and consistent implementation across multiple contexts whilst providing the flexibility for local sites to adapt presents a challenge. However, there are examples of how MECC approaches have been tailored to suit specific

practice environments; sharing these examples may enable physiotherapists to relate these interventions to their own practice environment, and identifying the adaptable peripheral elements may make integration easier (Bancroft and Moss, 2016).

In furthering the knowledge of both pragmatic interventions and high-intensity interventions the nuances of physiotherapy practice and the specific behaviour change assets implicit in it should be acknowledged and maximally exploited. These include the repeated appointments that physiotherapists have, the relatively long contact time with patients and the natural focus on function, mobility and rehabilitation. These important features are behaviour change assets, they provide an opportunity for more meaningful discussion and enable key issues to be revisited over time in order to check understanding, reassure, confirm, adjust, progress and encourage. These features highlight that the patterns of physiotherapy practice are different to those of other professions and therefore the extent to which, and the manner in which, PA promotion can be embedded should be considered on a profession-specific basis.

Aligning future research with the current accepted approaches (for example, MECC) might enable more traction for change. For example, underpinning any future enquiry with a sound understanding of how PI fits in with broader patterns of health behaviours (in line with MECC approaches which also consider alcohol, nutrition, mental health and smoking), is recommended. PI rarely occurs in isolation; it is known to cluster with other risk behaviours and changing one behaviour can influences others (Buck and Frosini, 2012). Similar synergies are seen between smoking and alcohol and therefore approaches that recognise these complexities are recommended. Future research might consider these interactions and explore how behaviour change impact can be maximised by addressing issues that are known to cluster.

Furthermore, the recognition that these clusters of unhealthy behaviours are substantially more prevalent in more deprived individuals and communities should direct future research away from approaches that get active, affluent people more active and towards

programmes that target where the need is greatest in line with the principle of proportionate universalism (Marmot and Bell, 2012).

7.4.2 Engagement with Physical Activity Promotion

The survey findings indicate that the majority of respondents integrated some form of discussion about PA into the majority of patient contacts. As many as 77% (n=347) report always doing so and an additional 21% (n=95) reported usually doing so. Phase 2 highlights a perception that PA promotion is aligned with physiotherapy practice. PA promotion is described as "automated" and "ingrained" and many data segments situate PA promotion as part of current practice.

> *"Certainly, as patients are coming in as an outpatient it's a natural thing that you would ask." P6*

> *"In any setting really, I guess trying to get a sense of how active they are is important." P7*

There is no existing evidence on the extent to which PA promotion is integrated into physiotherapy practice in the UK. Evidence from other countries suggests lower levels of PA promotion; Barrett, Darker and Hussey (2013) reported that 37% of physiotherapists counselled physiotherapy patients in the Republic of Ireland. Cross-sectional surveys from Nigeria and Australia report that 36% and 54% of physiotherapists respectively, had counselled 10 or more patients on PA in the past month (Shirley, van der Ploeg and Bauman, 2010; Aweto *et al.*, 2013).

These reported figures are substantially below the 98% of physiotherapists in this study who report initiating some form of discussion about PA either usually or always with their patients. This finding may suggest that an increased level of awareness of PA exists amongst UK physiotherapists about the benefits of PA, which could be due in part to the increased focus on PA that is mediated through policy documents such as the Five Year Forward View which advocates a central role for prevention within all frontline health services (NHS England, 2014). The findings also suggest that the act of initiating a conversation about PA is feasible within the context of a UK physiotherapy appointment, although this reveals nothing about the content or context of the discussion.

The factors that assist physiotherapists in promoting PA were identified, and these include having repeat appointments with patients, using supporting resources (including smart phone apps, assessment tools, wall displays and policy documents), collaborating with other service providers, having personal experience of activity and having a positive relationship with a patient. It is interesting that these were largely suggested by one participant who was identified as a deviant case. This participant gave an account of how PA had successfully been integrated into the culture of their department, practice was collaborative and progressive and was highlighted as a pocket of good practice.

Engagement with Physical Activity Promotion: Implications and Recommendations

These promising findings present an opportunity to foster and further develop the perceived alignment between physiotherapy and PA, and to use this to further engage the profession. The stakeholders who share an interest in furthering this agenda include (but are not limited to) (i) clinical teams, in terms of demonstrating a response to policy directives. (ii) professional physiotherapy organisations, who share an interest in doing so at scale and thus amplifying the impact of the profession on public health agendas, (iii) organisations with a responsibility for leadership and direction setting, in terms of their identified priority of embedding prevention in healthcare including NHS England and Public Health England. Concerted efforts to engage physiotherapists could be initiated and sustained by such stakeholders.

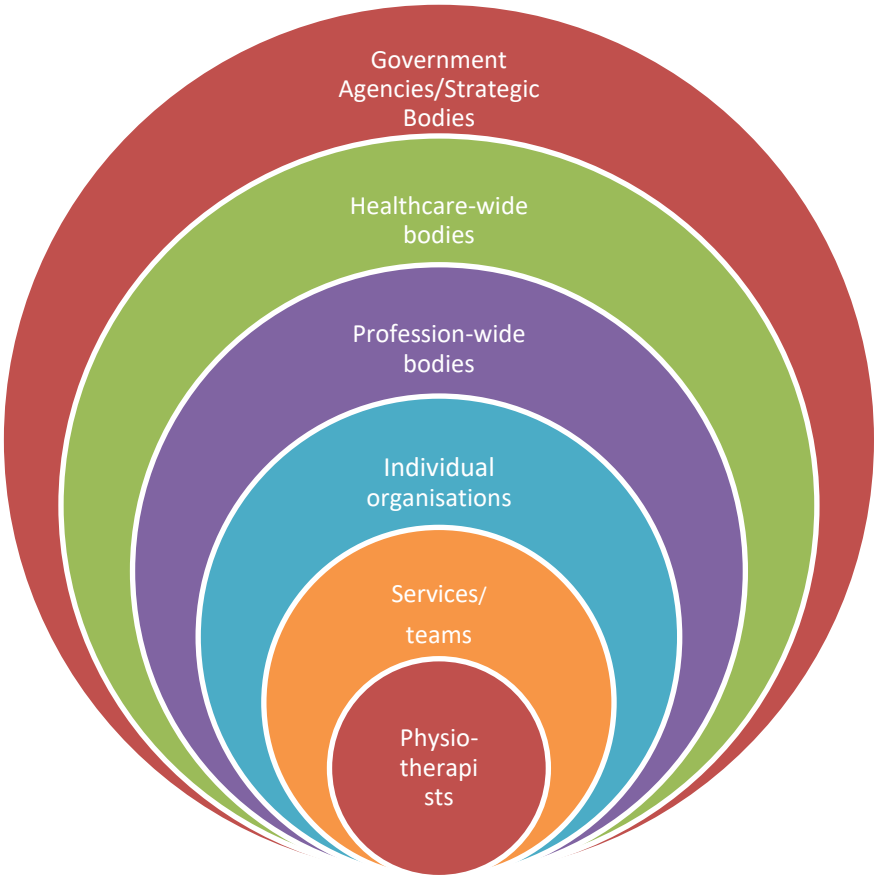

Figure 8. Stakeholders in the Physical Activity Change Process.

It is important to recognise that if activity is limited to any single domain, change is likely to be limited. Cross-sectoral work is recommended to identify priorities, highlight opportunities, lever support and create change. This may be facilitated by the development of networks with representation from different stakeholder groups. This may include opinion leaders and champions, who are described as individuals who dedicate themselves to supporting, marketing, and "driving through" an implementation (Greenhalgh *et al.*, 2004). These might be formal networks developed and sustained by organisations or informal communities of practice that take more of a grassroots approach to creating change.

One example of how a workforce was activated to deliver brief advice comes from MacMillan Cancer Support, where one of their programmes aimed to improve the

capability, opportunity and motivation of nurses, to deliver very brief advice on PA, to people living with cancer (Webb *et al.*, 2016). This provides an innovative model whereby a third sector organisation supported the activation of a workforce to improve services in relation to PA promotion.

The challenging economic climate, compounded by demographic changes has led to widespread concern about the sustainability of health and care systems. Whilst this creates a difficult environment to instigate change, it conversely creates an imperative to work differently. It is recommended that in view of the clear rationale for change and the perceived positive alignment between physiotherapy and PA, this engagement is fostered and further developed. For this to happen an alliance between stakeholders is required and this could provide an important step in establishing a group who have the knowledge, skills and connections to lead change. The process of change is explored further in section 7.5.

7.4.3 Knowledge Gap

Despite the positive initial findings described above, subsequent survey questions about the specific components that form BIs cast doubt on whether BIs are being carried out in accordance with guidance. The survey finding that respondents reported delivering BIs yet did not complete the key components of a BI (that is, assessment of PA and signposting) was somewhat contradictory. The findings from Phase 2 provide a rich description of current practice, expanding upon and explaining the findings from Phase 1. It became clear that BIs were not widely understood.

> *"What is meant by brief intervention? What would that look like in practice?" P7*

> *"It wouldn't be something I would normally use as terminology I don't think. How would you describe what you mean by brief intervention?" P9*

These comments explain the findings from Phase 1 that reported high levels of BI delivery yet contradicted this with low levels of delivery of the component parts of BIs.

A general lack of a unified approach was identified, and as physiotherapists were unclear about the mechanism through which they were promoting PA, this lead to current approaches being described in Article C as informal and inconsistent. The terms “brief advice”, “brief intervention”, “cognitive behavioural therapy”, “motivational interviewing” and “Making Every Contact Count” were used by participants in the qualitative study but confusion was expressed over some of the terminology and there was no sense of a defined approach existing that was accepted practice in physiotherapy. These findings suggest that physiotherapy PA promotion interventions are ill-defined, and the structure is neither clear nor consistent. This is problematic, because the behaviour change interventions should be clearly defined and based on the best available evidence. Interestingly, the MECC approach provides such a framework yet it does not appear to be informing practice.

A knowledge gap was also identified in relation to the PA guidelines, and the survey findings showed that despite 88% of respondents being aware of the current guidelines, only 16% answered the three specific questions correctly. When considering responses to the three questions individually it is clear that the respondents' knowledge of the detail varied substantially between each of the three components. That is, 60% correctly answered the question about moderate PA recommendations, yet only 33% and 32% correctly answered questions about vigorous PA and strength training recommendations respectively.

Few studies related to PA guidelines were identified, and none were UK-based. When surveyed, 53% of Belgian physiotherapists could identify at least three of the four official PA recommendations (Mouton *et al.*, 2014). More recently, Freene *et al.* (2017) report that as few as 10% of Australian physiotherapists could accurately identify all components of the current guidelines. The evidence from other healthcare professions highlights a lack of curriculum content related to PA (Weiler *et al.*, 2012; Dunlop and Murray, 2013) and a lack of knowledge about PA guidelines among medical students (Bates and Kipps, 2013; Dunlop and Murray, 2013) and also amongst GPs (Chatterjee *et al.*, 2017). The findings from the current cross-sectional survey add physiotherapy evidence to the recent assertion by Reid *et al.* (2017) that basic knowledge of the PA recommendations, and their components, remains consistently low across UK health professionals.

The poor knowledge of strength training guidelines amongst UK physiotherapists is particularly surprising and warrants further exploration. In a recent study (Strain *et al.*, 2016) identified that only 31% of men and 24 % of women met the muscle strengthening guideline, which equates to approximately half of that of the published figures for aerobic PA. It is interesting that the proportion of the general public achieving the strength guidelines is mirrored by the proportion of healthcare professionals whom have knowledge of these guidelines. The strength guidelines have been described as "the forgotten guidelines" which is concerning in view of the impact of sarcopenia on function, mobility, independence and quality of life, all of which is amplified by ageing (Strain *et al.*, 2016). From a physiotherapy perspective, all aspects of the guidelines are directly relevant to practice and it is interesting to consider the disparity between knowledge of the moderate PA guidelines and knowledge of the strength guidelines.

Knowledge Gap: Implications and Recommendations

The implications and recommendations are discussed in relation to firstly the PA guidelines and secondly the inconsistency of approaches to PA promotion.

Firstly, the identified lack of knowledge of the PA guidelines implies that physiotherapists might not be in a position to give evidence-based advice regarding the amount of PA required for health benefits. To recommend a change in behaviour yet be unable to advise regarding the desired behaviour is not acceptable, and it could be hypothesised that this could negatively affect the credibility of the advice and therefore reduce the chance of behaviour change occurring. The PA guidelines are established, credible and straight forward. Mechanisms are recommended that promote the dissemination of this information to physiotherapists to support them to deliver evidence-based PA interventions. This might include further dissemination of the PA guideline infographic shown in Figure 4, through targeted campaigns by professional bodies to assist the mobilisation of knowledge to clinicians.

Secondly, PA behaviour change interventions need to be evidence-based; consistency between approaches and fidelity to a particular model or approach is expected. Whilst it was identified in section 7.4.1 that further evidence is required, MECC provides an operational framework that is widely endorsed. MECC has been adopted as the primary delivery mechanism for public health in routine healthcare, and is endorsed by arm's length government agencies and leading healthcare organisations. However, the findings suggest that this has not yet become routine practice and raises questions about the extent to which the MECC approach has been disseminated and integrated. This may not be surprising, as literature suggests that it can take up to 17 years for evidence to be adopted into practice (Slote Morris, Wooding and Grant, 2011). However, MECC is not based on new evidence; it is more a synthesis of a growing body of complex public health evidence and a concerted effort to provide a pragmatic means of using this evidence to inform practice in a way that is compatible with current practice.

A lack of awareness of current PA promotion approaches and a lack of knowledge of PA guidelines was identified within the *current* physiotherapy workforce highlighting an educational need amongst qualified physiotherapy staff. It is recommended that the types, availability and accessibility of postgraduate education are reviewed. The notion of continued professional development is central to physiotherapy professional practice yet development opportunities in traditional clinical areas predominate. There is a paucity of development opportunities related to prevention and public health and where these do exist they are frequently lengthy, credit-bearing courses.

Free, online learning is available to support MECC and also PA promotion in clinical practice, this however, is generic to all healthcare professionals. This may not fully resonate with physiotherapists and so not be sensitive to the nuances of physiotherapy practice. There are implications for Health Education England as the arm's length government agency responsible for workforce development and also for professional bodies who share an interest in ensuring that the workforce has the knowledge and skills required for practice.

There are also implications for pre-registration course planners. There are questions about the extent to which current models of physiotherapy education are preparing future physiotherapists to embed evidence-based approaches within their practice related to PA promotion. University-based education and practice-based education are intrinsically linked, and these should mirror one another with practice placements offering opportunities to consolidate, apply and extend formal learning. This requires practice education systems to offer such opportunities, which in turn requires clinical teams to be working towards a more evolved physiotherapy approaches that integrate prevention.

A report of the extent to which public health is embedded into the pre-registration curricula of allied health courses identified that only 28% said that they are confident that their course has a strong public health component (Council of Deans for Health and Public Health England, 2015). This raises questions not only for course planners but also for those who drive the direction of physiotherapy education, including validating bodies and profession regulators. Although broader than just PA, recent guidance has been published for the public health content of pre-registration health courses (Council of Deans for Health, 2017). This should assist course planners to have oversight of critical strategic developments to ensure the currency and relevance of course content.

7.4.4 Ability to Demonstrate Impact

Physiotherapists need to be able to demonstrate impact, for this to happen it is essential that clinical interventions create the desired change, and that they are delivered with fidelity and that data is collected to demonstrate that change has occurred. The findings from this programme of research highlight a number of areas in which current practice might not permit such data to be collected, and thus the opportunity to demonstrate impact might not be fully utilised.

The current guidance suggests that PA status should be assessed prior to, or as part of a BI (National Institute for Health and Care Excellence, 2013). However, the majority of survey

respondents (60%) do not routinely assess PA status, despite engaging in frequent discussions with patients about PA. There is little published evidence with which to compare this finding. Two conflicting, cross-sectional surveys from Ireland, report that 34 % of physiotherapists screen for PA in all of their patients (Barrett, Darker and Hussey, 2013) whilst O'Donoghue *et al.* (2014) found that 76% of physiotherapists always assessed PA levels. The terms assessment and screening can be interpreted differently, and this may account, at least in part, for the discrepancy in the findings.

The literature suggests that there may be a number of benefits to a more formal and consistent approach to the assessment of PA status. Firstly, screening enables targeted interventions. Barrett, Darker and Hussey, (2013) identified that a lack of screening resulted in a number of inactive or insufficiently active patients not being correctly identified. If PA status is not assessed interventions are potentially applied to all patients regardless of need; this blanket approach is wasteful of resource. Delivering BIs indiscriminately, regardless of risk, has cost implications for services that could be avoided with a more targeted approach (Bull and Milton, 2010).

Secondly, screening itself can be a primer for behaviour change. The measurement of PA is an important part of health promoting efforts to address PI (Bauman *et al.*, 2006). Knox *et al.*, (2013) identified that theories such as the precaution adoption process model and the protection motivation theory suggest that individuals must be accurately aware of their current actions in order to be able to intimate change to more desirable actions. Snyder, (2007) concluded that knowledge of one's own levels of PA and knowledge of ideal levels of one's PA are an important precursor to behaviour change. Therefore, a process that facilitates the understanding of one's own PA levels in relation to ideal values may work as a primer for increasing activity levels.

Lastly, measuring PA status enables the collection of data, which in turn allows for the measurement of change. Bauman *et al.* (2006) highlight that PA measurement data can be used to measure the impact and effectiveness of health promotion programmes and interventions designed to increase PA. Furthermore, this can be used to provide a sound

and strong evidence base for broader initiatives in health promotion policy and practice (Bauman *et al.*, 2006). Barrett, Darker and Hussey, (2013) suggest that given the potential public health benefits of increasing PA, all primary care assessments should at least include a simple screening process to identify patients who are not meeting the recommendations.

Ability to demonstrate Impact: Implications and Recommendations

Positioning the profession to demonstrate impact in relation to public health is important, firstly because of the need to maximise the impact of physiotherapy interventions on health and secondly for the future sustainability of the profession.

There are opportunities to secure and develop practice in a number of areas. Defining a physiotherapy PA promotion intervention more clearly in a way that is concordant with current guidance would improve physiotherapy practice. The inclusion of a clear and agreed means of assessment of PA within such a framework would provide physiotherapists with a means of measuring baseline PA levels and evaluating change.

Guidance to this effect already exists, as NICE guidance outlines a robust process for PA promotion (National Institute for Health and Care Excellence, 2013). Furthermore, the Royal Society for Public Health published an impact pathway for PA which can be seen in Figure 9. This details a step-by-step process that clinicians can follow, and it offers a standardised approach that highlights the opportunities to collect data and demonstrate impact (Royal Society for Public Health, 2017). This impact pathway is aligned with MECC approaches and again, highlights the need for the translation of MECC into clinical practice (Public Health England *et al.*, 2016).

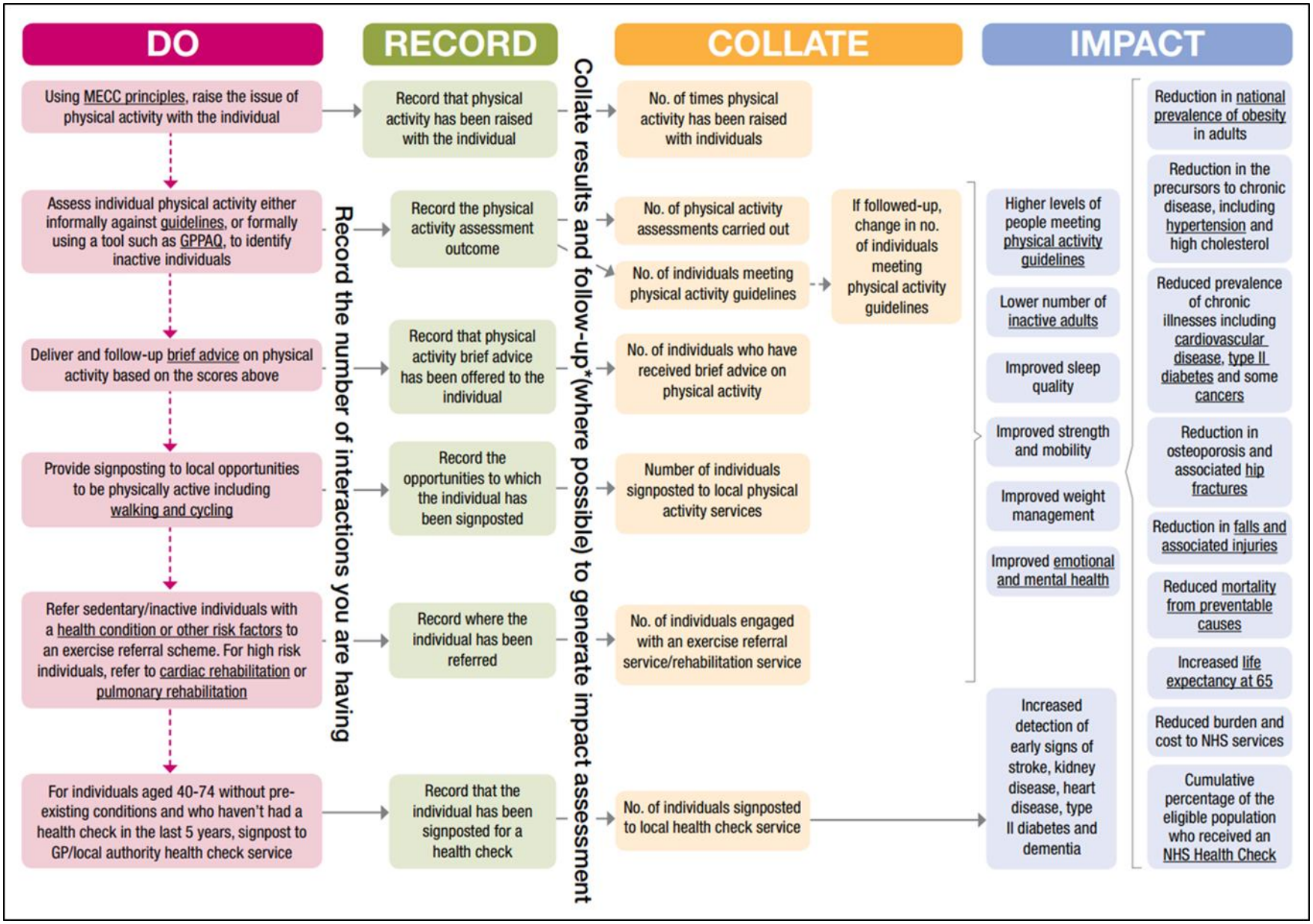
DO
RECORD
COLLATE
IMPACT
Using MECC principles, raise the issue of physical activity with the individual
Record that physical activity has been raised with the individual
No. of times physical activity has been raised with individuals
Assess individual physical activity either informally against guidelines, or formally using a tool such as GPPAQ, to identify inactive individuals
Record the physical activity assessment outcome
No. of physical activity assessments carried out
No. of individuals meeting physical activity guidelines
If followed-up, change in no. of individuals meeting physical activity guidelines
Deliver and follow-up brief advice on physical activity based on the scores above
Record that physical activity brief advice has been offered to the individual
No. of individuals who have received brief advice on physical activity
Provide signposting to local opportunities to be physically active including walking and cycling
Record the opportunities to which the individual has been signposted
Number of individuals signposted to local physical activity services
Refer sedentary/inactive individuals with a health condition or other risk factors to an exercise referral scheme. For high risk individuals, refer to cardiac rehabilitation or pulmonary rehabilitation
Record where the individual has been referred
No. of individuals engaged with an exercise referral service/rehabilitation service
For individuals aged 40-74 without pre-existing conditions and who haven't had a health check in the last 5 years, signpost to GP/local authority health check service
Record that the individual has been signposted for a health check
No. of individuals signposted to local health check service
Record the number of interactions you are having
Collate results and follow-up*(where possible) to generate impact assessment
Higher levels of people meeting physical activity guidelines
Lower number of inactive adults
Improved sleep quality
Improved strength and mobility
Improved weight management
Improved emotional and mental health
Increased detection of early signs of stroke, kidney disease, heart disease, type II diabetes and dementia
Reduction in national prevalence of obesity in adults
Reduction in the precursors to chronic disease, including hypertension and high cholesterol
Reduced prevalence of chronic illnesses including cardiovascular disease, type II diabetes and some cancers
Reduction in osteoporosis and associated hip fractures
Reduction in falls and associated injuries
Reduced mortality from preventable causes
Increased life expectancy at 65
Reduced burden and cost to NHS services
Cumulative percentage of the eligible population who received an NHS Health Check

Figure 9. Impact Pathway for Physical Activity (Royal Society of Public Health, 2017).

7.4.5 Networking into Communities

Signposting is a way of linking patients with sources of support within the community. It provides non-medical referral options that can operate alongside existing treatments to improve health and wellbeing. There is no agreed definition and the terms "social prescribing", "community referral" and "signposting" are frequently used interchangeably. Reports on social prescribing include an extensive range of prescribed interventions and activities that include but are not limited to PA options (Centre for Reviews and Dissemination, 2015). The survey question was worded as follows:

> *"Do you use signposting or social prescribing to connect service users with suitable local physical activity services? (These services may be NHS, private, community or third sector)"*

This ensured that the more formal term "social prescribing" was used along with the term "signposting" as it is described in the MECC literature (Public Health England *et al.*, 2016). Only 44% of survey respondents routinely signpost patients to further sources of PA support. Current guidance suggests that signposting patients on to such support is an integral part of a BI (National Institute for Health and Care Excellence, 2014; Public Health England *et al.*, 2016; Royal Society for Public Health, 2017).

NHS England is promoting access to non-clinical interventions, such as voluntary services and community groups, as a way of making healthcare more sustainable (Dyson, 2014). The focus for social prescribing to date has been on GP services, and this has been limited to structured pilots. Social prescribing and signposting are a manifestations of health systems recognising the wider determinants of health and the importance of factors such as PA and social connectivity for long-term wellbeing.

There are policy drivers to formalise signposting and to embed social prescribing within healthcare systems, yet the findings suggest that more could be done within physiotherapy interventions. The qualitative findings gave insights into the reasons for the low signposting activity, including time pressures, a lack of knowledge of local options, and opaque referral pathways:

> *"I think sometimes physios don't feel that they have the time to signpost or feel the need to understand all the things that are out there to signpost patients to." P6*

> *"I suppose you need to know what's about locally for you. Also, I suppose sometimes we're very focused on what we're doing for the patient, rather than what's going to happen beyond that." P9*

> *"I guess on the whole physios, or any profession, don't want to spend too much time finding out where someone can go or where you can signpost, but if those things are overt and clear, then I guess naturally that's more likely to happen." P12*

Important insights also came from the pockets of good practice. They identified the facilitatory impact of developing broader community networks and developing relationships with PA providers. These processes enabled physiotherapists to better understand, and indeed to become part of, their local community PA infrastructure.

Networking into Communities: Implications and Recommendations

Signposting is a key component of MECC and this highlights the need for the further integration of MECC into practice. It is recommended that efforts are made to raise awareness of the importance of signposting. It is recommended that examples of good practice are identified and shared. The deviant case in Article C is an example of innovative partnership working to overcome barriers, and tangible examples were given that could be implemented elsewhere.

It is recommended that efforts are made to move signposting from being an optional add-on to being recognised as an important clinical intervention. Developing the workforce's

understanding that signposting is both a key conduit to sustaining PA change in the longer term, and also a key mechanism through which long-term wellbeing is promoted through social connections.

There are clear indications about the general direction of travel that could inform the development of physiotherapy services. There are questions about why developments related to social prescribing seem to have been limited to GPs thus far and what the opportunities might be for physiotherapy in this area.

7.4.6 Orientating Physiotherapy Towards Prevention

The findings suggest that the promotion of PA in current practice is focused on short-term interventions that aim to the improve components of fitness and function. This may overshadow opportunities to influence long-term wellbeing through encouraging engagement with PA beyond therapeutic exercise. It has been suggested that the implications of focussing solely on the disease or injury with which a patient presents limits the ability of the physical therapist to think and act holistically and within a larger context outside the patient model (Bezner and Bezner, 2015).

The findings from the qualitative study suggest that the key terms of PA and exercise may not be clearly understood by physiotherapists and that this might contribute to the lack of clarity about the role of the physiotherapist in promoting PA. A model of suggested progression was provided in Article C (see Figure 10).

Figure 10. A Model of Physical Activity Promotion in Physiotherapy Practice.

The first two sections comprise targeted exercise with specific, short-term aims. This might include the phases of exercise prescription that are familiar to physiotherapists, including tissue healing, mobility, performance initiation, stability, motor control, performance improvement, advanced coordination, agility, and skill (Anemaet and Hammerich, 2014). However, this model goes further to consider the interface between therapeutic exercise (which is, of course, a subset of PA) and sustainable PA on a long-term basis. This model highlights the need for long-term goal related to PA alongside short-term goals for functional restoration. It also highlights an opportunity for physiotherapists and rehabilitation specialists to integrate this from the start of rehabilitation in order to maximise the chances of a successful transition from clinically-driven PA promotion in the rehabilitation phase to sustained increases in PA beyond an episode of care.

The findings raise broader questions about the extent to which the promotion of health is considered a priority in contemporary physiotherapy practice. Physiotherapy has been part of UK health care since the late 19th century, and it was founded on the principles of restoring function and even recently was described by the Chartered Society of Physiotherapy in such terms;

> *"Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability"* (Chartered Society of Physiotherapy, 2013)

In the late 19th century, life expectancy was less than 50 years of age and the major causes of death were infectious diseases (Thompson *et al.*, 2012). During this period, traditional natural sciences dominated medical practice, and there was a prevailing belief that science could cure all illness and disease, and furthermore that the absence of disease equated to good health (Community Development and Health Network, 2011). Such thinking forms the basis of the medical model of health which dominated healthcare and medicine at that time. The medical model is described as a product of the pathogenic orientation which dominates all western medical thinking (Antonovsky, 1996). The World Health Organization takes a broader view, and it defines health as:

> *"….a state of complete physical, mental and social well-being and not merely the absence of disease." (WHO 1946)*

This definition, dating back to the 1940s, recognises that health is more than the absence of disease and thus that efforts to improve health should be holistic. The reorientation of health services, to be more preventive of disease and promotive of health, was called for by the Ottawa Charter (World Health Organisation, 1986). However, the medical model remains a powerful influence on healthcare systems today, and attempts at re-orientating healthcare systems have been limited (Wise and Nutbeam, 2007; Catford, 2011).

A social model of health is advocated as a more relevant alternative, as this model acknowledges the wider determinants of health (Community Development and Health Network, 2011). Indeed, healthcare is thought to have a relatively minor influence on an individual's overall health as shown in Figure 11. McGinnis, Williams-Russo and Knickman, (2002) estimated that a relatively small proportion (10–15%) of preventable mortality in the United States, could be avoided by the better availability or quality of medical care. They used this to create an argument for an increased focus on preventative interventions that address other, bigger influences such as behaviour patterns.

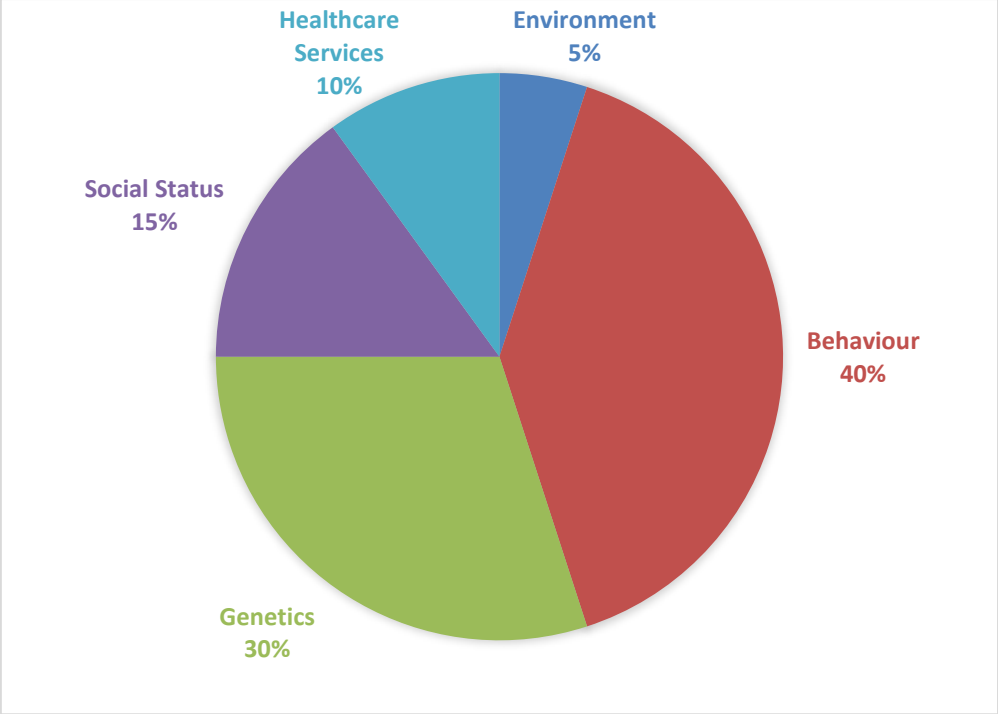

Figure 11. Factors that Influence Overall Health (Adapted from McGinnis, Williams-Russo, & Knickman, 2002).

Acknowledging that health is determined by the complex interplay of genetics, individual lifestyle choices, social networks, and general socioeconomic, cultural and environmental conditions forms the basis of the social model of health. This model acknowledges healthcare as being an important, but limited, part of a much bigger picture (Whitehead, Dahlgren and Gilson, 2001). Adopting a social model of health would allow the development of integrated services that focus on promoting health rather than solely treating disease and disability. Antonovsky, (1996) describes healthcare with a "salutogenic" orientation, this includes the idea that, alongside the management of risk factors, salutary factors (health promoting factors) should also be considered. From this perspective the inadequacies of a narrow focus on medicine and the limited picture of health become apparent. In relation to this study for example, the failure to connect physiotherapy services into community support for PA is a major shortcoming.

Today NCDs (mediated by modifiable risk factors including PI) are responsible for the largest proportion of preventable morbidity and mortality (Newton *et al.*, 2015). This enormous change in patterns of health puts physiotherapists in a position to do so much more than simply restoring function. It positions them to influence health in its broadest terms, through prevention and health promotion and to contribute to the prevention of NCDs and the promotion of lifelong wellbeing (Dean, 2009a, 2009b).

Orientating Physiotherapy Towards Prevention: Implications and Recommendations

Such vast changes in population health need to be mirrored by changes in professional identity. The findings from the mixed methods study suggest that the medical model still influences physiotherapy approaches. A move away from this may facilitate the adoption of a more relevant, professional self-view that enables the profession to survive and thrive within contemporary healthcare. Allowing and supporting its professional identity to evolve has the potential to facilitate changes in services that value and foster health in its broadest sense rather than solely trying to reduce and eliminate disease.

Change can be viewed as an opportunity for professions to renew and reconstitute themselves. Change can facilitate a process through which professions can become the collective entrepreneurs of their own professional project (McDonald, 1999). This requires skill in recognising change and acting pre-emptively to ensure that the profession can respond. It is recommended that the professional leadership challenges current approaches and their underpinning assumptions about what creates health. An understanding needs to be developed within the profession that in order to improve population health, the most powerful influences on health need to be taken seriously. This means considering ways in which physiotherapy can support health through its wider determinants, which means looking far beyond the presenting complaint to consider complex issues such as education, health literacy, self-efficacy and social connections. Facilitating the evolution of a professional identity that actively promotes health, in its

broadest sense, could influence the future positioning of the profession and contribute to ensuring a profession can continue to meet the complex needs of a changing population.

7.5. Moving Forwards: Creating and Sustaining Change

Section 7.4 includes a discussion of the key issues that arose from the findings of this programme of research; implications are highlighted and specific recommendations made. There is a need for widespread, coordinated change to occur and this requires more than a collection of individual actions. It requires coordination, shared interest and resource to create and sustain change. Kotter *et al.*, (2007) describe an eight-stage model of change which provides a useful framework for describing how the individual recommendations from this Ph.D. might form part of a broader change project.

1. **Establish a sense of urgency**, identify and discuss crises, potential crises or opportunities. Create the catalyst for change.

2. **Form a powerful coalition**, assemble a group with enough power to lead the change effort. Develop strategies for achieving that vision.

3. **Create a vision** to help direct the change effort. Develop strategies for achieving that vision.

4. **Communicate the vision** using every channel and vehicle of communication possible to communicate the new vision and strategies. The guiding coalition needs to teach new behaviours and lead by example.

5. **Empower others to act** on the vision by removing obstacles to change, changing systems or structures that seriously undermine the vision and encouraging risk taking and non-traditional ideas, activities and actions.

6. **Plan for and create short-term wins** recognise and reward individuals involved in these improvements.

7. **Consolidate improvements,** produce still more change using increased credibility to change systems, structures and policies that don't fit the vision. Reinvigorate the processes with new projects, themes and change agents.

8. **Institutionalise new approaches**, create the connections between new behaviours and organisational successes. Develop channels to ensure Leadership development and succession.

This thesis supports a view that the change process is in the very early stages. The sense of urgency has not been sufficiently generated or communicated. The findings from this programme of research have been disseminated broadly across research and practice and leadership forums with the aim of raising awareness of the need for change. This contributes to establishing a sense of urgency as described by Kotter *et al.*, (2007).

One of the key barriers in the case of PI is that no one individual, organisation or system is directly responsible for change. Stakeholders are distributed across many sectors, and although they all share an interest in change and improvement, no one "owns" the problem. This makes it difficult to create the catalyst for change and puts a particular emphasis on stage two; creating the change coalition which has the resource (including knowledge, finance and social capital) to lead a change effort is essential. As yet, no such alliance exists, and this might be an important step in moving forwards. The development of such a group could enable the creation and communication of a compelling vision for change, furthermore it could help to garner further support and identify priorities. This need is alluded to in section 7.4.2 and is emphasised here as a critical next step in the change process.

7.6 Chapter Summary

This Chapter has reviewed and explored the key findings from this programme of research in relation to the existing evidence base. The strengths and weaknesses of this programme of research are discussed along with the potential impact of these factors. The implications

for research, education, policy and practice are discussed. The necessity for, and complexities of, widescale change are discussed. Physiotherapy and PA are situated within this narrative, and the next steps are suggested.

Chapter 8: Thesis Conclusions

8.1 Introduction

Over the course of 8 chapters this thesis has explored PA in physiotherapy practice. The ways in which the political, social and economic landscape contributes to the rationale for this programme of research have been explained. The relevant literature has been identified and reviewed and this has enabled this programme of research to be situated within the existing knowledge base. Three, linked studies that employed a range of research methods have been planned, executed and analysed. The findings have been discussed and positioned within the existing evidence. Finally, implications of this research for clinical practice, policy, research and education have been detailed and further to this, the need for widescale change has been highlighted.

8.2 Review Aims & Objectives

Seven individual objectives were identified a priori in order to achieve the overarching research aim of exploring PA promotion in physiotherapy and to understand the factors that underpin the patterns of current practice. The individual objectives are reviewed here in order to establish the extent to which they have been achieved.

Objective 1: To explore the existing evidence base related to physiotherapy and PA promotion. The systematic scoping review provides a published account of the current state of the evidence. This used robust methods which adhered to best practice guidance for scoping reviews. It was reported transparently, again adhering to current reporting guidance. Additionally, it was peer-reviewed and judged to be of sufficient merit to warrant publication in the British Journal of Sports Medicine (Chapter 2).

Objective 2: To build a picture of the current PA promotion practice in the UK.

Objective 3: To measure and report on physiotherapists' knowledge of PA guidelines.

Objective 4: To measure and report on physiotherapists' own PA behaviours.

The national, cross-sectional survey provides a published account of current physiotherapy practice in relation to PA promotion which includes a report of the knowledge of PA guidelines and of the physiotherapists' own PA behaviours. This pragmatic methodological approach has limitations which are clearly acknowledged and discussed in this thesis. The resultant publication was peer-reviewed and judged to be of sufficient merit to warrant publication in the British Medicine Journal Open Sports and Exercise Medicine journal (Chapter 5).

Objective 5: To use the quantitative findings to inform an in-depth qualitative explanatory follow up. The quantitative findings from the cross-sectional survey were used to inform the subsequent qualitative phase. They were used to guide the development of pertinent interview questions and also to inform the qualitative sampling approach. These points of interface between the quantitative and qualitative strands are described in detail in Chapter 5.

Objective 6: To expand upon and explain the quantitative findings with an in-depth qualitative exploration of the mechanisms that underpin current practice. The quantitative findings provided foundational insights which were further developed in the qualitative study. The qualitative findings expanded upon the quantitative findings by providing rich, thick descriptions of the experiences of physiotherapists. These provided explanations for some of the confounding quantitative findings. The qualitative study also significantly enhanced understanding of current practice by identifying prevailing cultures and paradigms that may stymie progress. The qualitative study used robust methods and was reported transparently in accordance with relevant reporting guidelines. The resultant publication was peer-reviewed and published in Musculoskeletal Science and Practice (Chapter 6).

Objective 7: To identify the implications for education, research, policy and clinical practice which are described in Chapter 7. These implications are informed by the collective learning from the scoping review, cross-sectional survey and qualitative follow up. The steps required to create widescale change are considered, and these can inform future approaches and elevate the chances of meaningful and sustained change occurring.

8.3 Contribution of New Knowledge

This programme of research has generated new knowledge in several areas. Firstly, Article A collated the global literature related to PA and physiotherapy, and this provided the most up-to-date summary of the state of the global evidence in this area. It highlighted previously unrecognised features and trends, and these include the small but growing body of literature, the predominance of observational studies, the focus on high-intensity PA interventions and the paucity of evidence for pragmatic interventions.

Secondly, Article B has contributed new knowledge of the current practice of UK physiotherapists in relation to PA promotion in routine healthcare. It has elucidated the patterns of practice, and highlighted the aspects of current practice that were previously undocumented. It has generated preliminary findings related to the PA habits of UK physiotherapists that warrant further investigation. Article B provides the most comprehensive and current information of its kind, and as such it can inform future strategies to promote PA through healthcare.

Finally, Article C has contributed new knowledge of the mechanisms that underpin PA promotion in UK physiotherapy practice which have not previously been explored. Article C has added to the picture of current practice and provides new insights. It has elucidated the mechanisms that underpin practice, including a focus on short-term restoration of function in physiotherapy practice which over-shadows a more holistic health promotion approach.

8.4 Dissemination and Impact to Date

The impact of the individual publications is described within Chapters 2, 5 and 6. The overall programme of research has had an impact in a number of ways; in addition to the dissemination through peer-reviewed journals, the findings have been disseminated widely through social media. For example, the infographic that summarises the findings from Article B was shared widely on Twitter. Figure 12 shows that this was subsequently shared by a further 107 individuals and 1517 people interacted with the tweet (accurate on 1.2.18).

Figure 12. Twitter Analytics Indicating Reach and Impact.

Findings have been accepted as a platform presentation at the International Society for Physical Activity and Health International conference which takes place in London in 2018.

Findings were presented to the leadership team at the Chartered Society of Physiotherapy. They informed a national PA campaign, called “Love Activity, Hate Exercise?” which recently launched to its 57,000 members. Substantial changes were made to the structure and content of the campaign because of the insights from this programme of research. The campaign is already the most successful campaign that the organisation has led to date. In addition, the survey questions from Article B have been used by the Chartered Society of

Physiotherapy to collect baseline data prior to their campaign. Following this they will be used as part of routine monitoring of patterns of practice in relation to PA.

Findings from this programme of research have been summarised and included in the prospectus for Public Health England's Moving Healthcare Professionals Programme to strengthen the rationale for their programme by outlining the need for improvements in PA promotion within physiotherapy.

I led a successful collaborative application for a focused symposium at the World Confederation for Physical Therapy. This will take place in Geneva in 2019 and is an opportunity to disseminate findings, and to develop networks with key contemporaries, many of whom have been cited in this thesis. I will chair this 90-minute session and will integrate key findings from this thesis. Other collaborators include Dr Nicole Freene (University of Canberra, Australia) and Dr Breanne Kunstler (University of Melbourne, Australia), their work has informed and been heavily cited in this thesis. This is a high-profile opportunity to put findings into a global context and to develop future collaborations.

Following on from this successful application I was asked to represent the World Confederation for Physical Therapy at a number of development meetings for the recently published Global Action Plan for Physical Activity. This presented another opportunity to consider thesis findings in a global context.

8.5 Thesis Summary

This thesis describes a comprehensive, pragmatic and pertinent programme of research devised to explore and understand a contemporary public health priority. The findings from this programme of research suggest that the medical model still dominates physiotherapy approaches. It suggests that treatment focuses on short-term restoration of function over longer-term health improvement. Allowing and supporting professional identity to evolve has the potential to facilitate changes in services, such that health, in its broadest sense, is

valued and fostered. Promoting PA effectively in a way that is meaningful to patients and facilitates long-term behaviour change is one means of contributing to this goal.

Health promotion should be valued and central to physiotherapy practice, treatment aims should be bold enough to go beyond the restoration of function to consider how long-term health can be optimised. Facilitating the evolution of a professional identity that is actively and openly committed to promoting health, could influence the future positioning of the profession and help to ensure that physiotherapists can continue meet the needs of a complex and changing population.

The ways in which these objectives have been achieved is described above. Collectively, meeting these objectives means that the over-arching research aim of exploring PA promotion in physiotherapy practice and of understanding the factors that underpin the patterns of current practice, has been achieved. In achieving this aim many other questions have presented themselves and these have been captured in the implications for education, research, policy and clinical practice. It is hoped that the new knowledge that has been generated will provide a springboard for further research, debate and enquiry, all of which will assist the physiotherapy profession to continue to move forwards.

Approximates word count 41,620

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Appendices

Appendix 1: Article A Published Supplementary Files Article A

Figure 1. Flowchart of the Study Selection Process

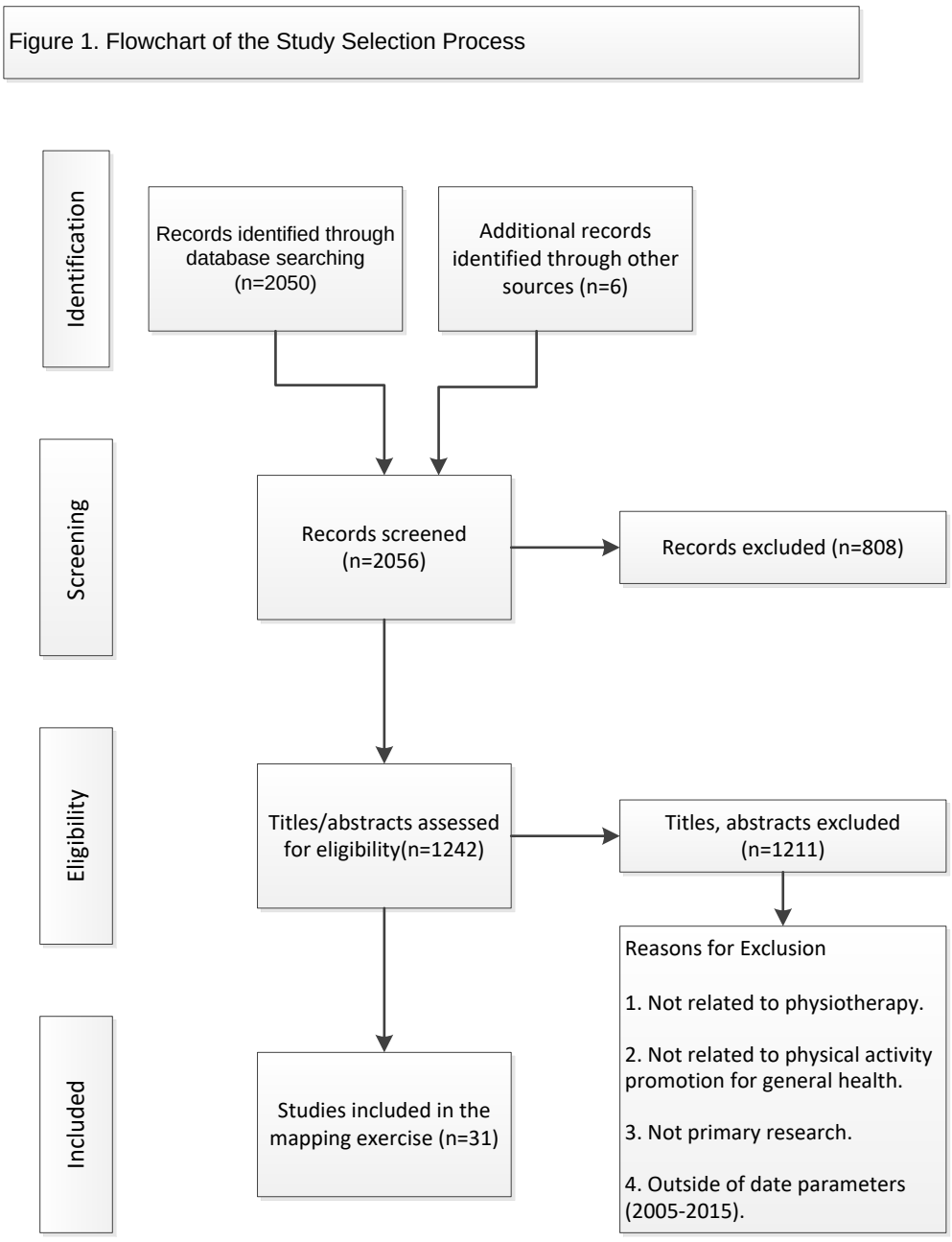


Figure 2. Year of Publication of Records

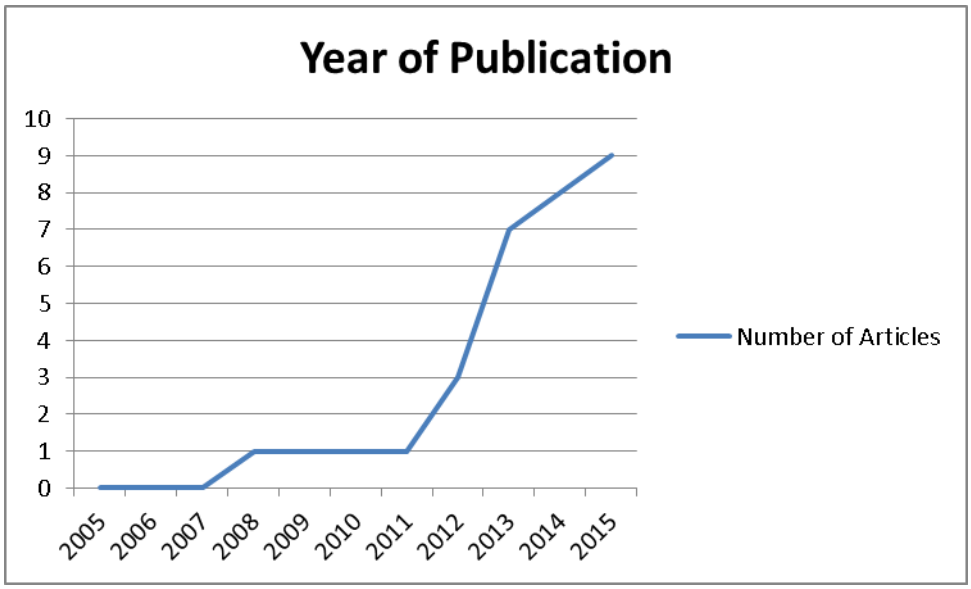
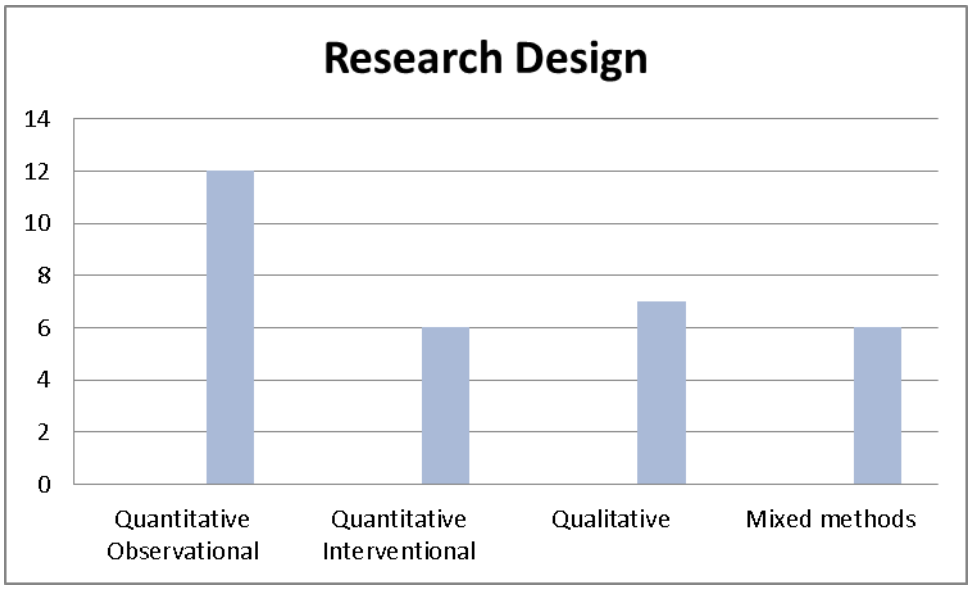


Figure 3. Study Type by Research Design



Full Overview of Included Studies

1	Aweto, HA et al	2013	Nigeria	Knowledge, attitude and practice of physiotherapists towards promotion of physically active lifestyles in patient management.	To measure knowledge, attitudes, practice in relation to PA promotion.	Scoping	Physiotherapists (public and private sector).	Quantitative Observational
2	Bodner, ME et al	2013	USA	Benchmarking curriculum content in entry-level health professional education with special reference to health promotion practice in physical therapy: A multi-institutional international study.	To quantify the health promotion content (including PA) in entry-level international PT programmes.	Education	International accredited PT programmes.	Quantitative Observational
3	Christian, A et al	2015	USA	Designing a Wellness Program for Rural Community Physical Therapy Clinics Based Upon a Needs Assessment.	To assess needs of 3 rural fitness programs and design an holistic wellness programme incorporating PA promotion.	Developme nt/evaluatio n of PA promotion.	PTs/ assistants / fitness programme members.	Quantitative Observational
4	de Vries, NM et al	2013	Netherla nds	The Coach2Move Approach: Development and Acceptability of an Individually Tailored Physical Therapy Strategy to Increase Activity Levels in Older Adults With Mobility Problems.	To devise and assess the acceptability and potential effectiveness of a specific long-term physical activity intervention for older	Intervention testing	PTs and older adults with mobility limitations.	Mixed methods

					adults with limited mobility.			
5	de Vries, NM et al	2015 a	Netherlands	Personalized physiotherapy in frail older adults with mobility problems is (cost)-effective in improving physical activity and frailty: a RCT	To assess the effectiveness & cost-effectiveness of a specific PA promoting intervention (Coach2Move) compared with usual physio care.	Intervention testing	Adults aged 70+ with mobility problems from 13 physio practices.	Quantitative Interventional
6	de Vries, NM et al	2015 b	Netherlands	Patient-centred physical therapy is (cost-) effective in increasing physical activity and reducing frailty in older adults with mobility problems: a randomized controlled trial with 6 months follow-up.	As above, with follow up.	Intervention testing	As above.	Quantitative Interventional
7	Frantz, JM et al	2013	Rwanda	Physical activity and health promotion strategies among physiotherapists in Rwanda.	To investigate the relationship between PA levels of PTs and their HP (including PA promotion) strategies in practice.	Scoping	PTs	Mixed methods
8	Healey, WE et al	2013	USA	Creating a community-physical therapy partnership to increase physical activity in urban African-American adults.	To describe the development of a community/PT partnership to promote PA.	Development/evaluation of PA promotion	African American adults in community & PT students	Mixed methods

9	Holm I, et al	2015	Norway	Does outpatient physical therapy with the aim of improving health-related physical fitness influence the level of physical activity in patients with long-term musculoskeletal conditions?	To describe changes in self-reported PA in patients receiving general PA promotion in addition to disease specific physiotherapy.	Intervention testing	Patients with long term musculoskeletal conditions.	Quantitative Interventional
10	Langhammer, B et al	2014	Norway	Physiotherapy and physical functioning post-stroke: Exercise habits and functioning 4 years later? Long-term follow-up after a 1-year long-term intervention period: A randomized controlled trial.	To compare intensive exercise with regular exercise for function after stroke (followed up after 4 years) to inform future PA promotion.	Intervention testing	Patients following stroke.	Quantitative Interventional
11	Lau,C et al	2015	Canada	Facilitating community-based exercise for people with stroke: a cross-sectional e-survey of physical therapy practice and perceived needs.	To evaluate PTs education of stroke survivors regarding community-based exercise programmes.	Scoping	Physiotherapists.	Quantitative Observational
12	McPhail, S.	2015 a	Australia	Multi-morbidity, obesity and quality of life among physically inactive Australians accessing physiotherapy clinics for musculoskeletal disorders.	To assess general health amongst sedentary patients attending for MSK physiotherapy to	Id need for PA promotion	Patients with musculoskeletal pain.	Quantitative Observational

					ascertain whether lifestyle intervention (to increase PA) is warranted.			
13	McPhail, S	2015 b	Australia	Patient-perceived barriers and facilitators to increasing physical activity among patients with musculoskeletal disorders receiving outpatient physiotherapy: a qualitative investigation.	To investigate perceived barriers and facilitators to increasing physical activity levels to inform future PA promotion strategies.	Scoping	Patients accessing outpatient physiotherapy clinics for musculoskeletal disorders.	Qualitative
14	Messner, T.	2012	Germany	Change in the activity behavior in the context of outpatient physiotherapy treatments. Effects of planning and action control intervention.	To evaluate the impact of a volitional intervention (alongside physiotherapy) on PA for patients with low back pain.	Intervention testing	Patients with low back pain.	Quantitative Interventional
15	Mulligan, H et al.	2012	New Zealand Sweden	Promoting physical activity for people with neurological disability: perspectives and experiences of physiotherapists.	To explore physiotherapists' perspectives of promoting PA in adults with chronic neurological conditions.	Scoping	Neurological physiotherapists in New Zealand & Sweden.	Qualitative

16	O'Donoghue, G et al	2011	Ireland	Physical activity and exercise promotion and prescription in undergraduate physiotherapy education: content analysis of Irish curricula.	To provide an overview of PA & exercise promotion/prescription content in undergraduate physiotherapy curricula.	Education	Undergraduate curricula in Ireland.	Quantitative Observational
17	O'Donoghue, G et al	2012	Ireland	Contemporary undergraduate physiotherapy education in terms of physical activity and exercise prescription: practice tutors' knowledge, attitudes and beliefs.	To establish PA curriculum content and practice tutors' knowledge, attitudes and beliefs of PA and exercise promotion.	Scoping	Practice tutors on undergraduate physiotherapy courses in Ireland.	Mixed methods
18	O'Donoghue, G et al	2014 a	Ireland	Assessment and management of risk factors for the prevention of lifestyle-related disease: a cross-sectional survey of current activities, barriers and perceived training needs of primary care physiotherapists in the Republic of Ireland.	To provide an overview of provision, barriers and training needs of physiotherapists in relation to risk assessment & management of lifestyle-related risk factors (including promotion of PA).	Scoping	Physiotherapists in primary care in Ireland.	Quantitative Observational

19	O'Donoghue, G et al	2014 b	Ireland	Physical activity and exercise promotion and prescription: Recommendations for contemporary professional entry-level physiotherapy education.	To evaluate undergraduate curricula and to devise recommendations for future physiotherapy education on PA and exercise promotion.	Education	Final year physiotherapy students, clinical educators, academic educators and experience physiotherapy clinicians.	Mixed methods
20	Radež,P et al	2015	Slovenia	The physiotherapy and physical activity components within the antenatal classes in Slovenia	To determine the PA promotion and PT components included in antenatal classes.	Scoping	Physiotherapists.	Quantitative observational
21	Sandström K et al	2009	Sweden	Prerequisites for carrying out physiotherapy and physical activity - experiences from adults with cerebral palsy.	To explore the experience of physiotherapy & PA from childhood to adulthood and impact of personal & environmental factors.	Scoping	Adults with cerebral palsy.	Qualitative
22	Sheridan,C et al	2008	Ireland	Do physiotherapy-led exercise classes change activity levels and weight	To evaluate the impact of a physiotherapy-led exercise/PA promotion	Intervention testing	Mobile obese children >7yrs.	Quantitative

				parameters in children attending a weight management clinic?	programme on children's' PA levels and weight.			Interventional
23	Shirley,D et al	2010	Australia	Physical activity promotion in the physical therapy setting: perspectives from practitioners and students.	To evaluate knowledge, experience & understanding of physical activity promotion by physiotherapists and physiotherapy students.	Scoping	Physiotherapists and student physiotherapists.	Quantitative Observational
24	Smith CM et al	2013	New Zealand	Participant perceptions of a novel physiotherapy approach ("Blue Prescription") for increasing levels of physical activity in people with multiple sclerosis: a qualitative study following intervention.	To explore the experience of being involved in a specific physiotherapy-led intervention to increase PA.	Scoping	People with multiple sclerosis living in the community.	Qualitative
25	Snodgrass, SJ. et al	2014	Australia	Weight management including dietary and physical activity advice provided by Australian physiotherapists: a pilot cross-sectional survey.	To investigate physiotherapists' beliefs, practices, knowledge of weight management advice (including PA) for overweight/obese clients.	Scoping	Physiotherapists from a variety of practice settings.	Quantitative Observational

26	Soundy, A. et al	2014 a	Internati onal	Barriers to and facilitators of physical activity among persons with schizophrenia: a survey of physical therapists.	To explore knowledge, practices, beliefs of mental health physiotherapists in relation to barriers/facilitators of PA for people with schizophrenia.	Scoping	Physiotherapists working in mental health (international).	Quantitative Observational
27	Soundy, A. et al	2014 b	Internati onal	The value of social support to encourage people with schizophrenia to engage in physical activity: an international insight from specialist mental health physiotherapists.	To explore social support dimensions used by physiotherapists when promoting PA to patients with schizophrenia.	Scoping	Physiotherapists working in mental health (international).	Qualitative
28	Stretton, C. et al	2013	New Zealand	Activity coaching to improve walking is liked by rehabilitation patients but physiotherapists have concerns: a qualitative study.	To investigate whether PA coaching adds value to neurological physiotherapy & whether it is considered feasible by physiotherapists and patients.	Intervention testing	Patients with long term neurological conditions and their physiotherapists.	Qualitative

29	Tovin, M. et al	2014	USA	Parent perspectives on physical activity and the role of physical therapy in children with autism spectrum disorder.	To explore parent perspectives of obesity risk, PA promotion & the role of physiotherapy in the management of children with autistic spectrum disorders.	Scoping	Parents of children 3-18 with ASD.	Mixed methods
30	Walkeden, S. et al	2015	UK	Perceptions of physiotherapists about their role in health promotion at an acute hospital: a qualitative study.	To explore physiotherapists' perspectives of their role in health promotion (including PA promotion).	Scoping	Physiotherapists working in UK, in-patient (medical/surgical) setting.	Qualitative
31	Zalewski K. et al	2014	USA	Identifying barriers to remaining physically active after rehabilitation: differences in perception between physical therapists and older adult patients.	To explore, compare and contrast physiotherapist and patient perspectives of readiness to change, barriers to engaging in PA and PA promotion.	Scoping	Physiotherapists and older adults.	Quantitative Observational

MCQs to accompany bjsports-2016-096735

Correct answers underlined.

1) The effects of physical activity have been documented in which of the following areas?

-physical health

-mental health?

-health-related quality of life?

-healthy ageing?

-all of the above?

2) According to the authors, levels of participation in physical activity globally are;

-unknown

-low

-high

-moderate

3) In 2012, how many outpatient physiotherapy contacts were there?

-20,000?

-1 million?

-2 million?

-3 million?

4) The authors concluded that the volume of research explicitly related to physiotherapy and physical activity promotion is;

-vast?

-unknown?

-small?

-moderate?

5) Over the last decade the number of publications per year that explicitly relate to physiotherapy and physical activity;

-is unknown?

-has increased?

-remains unchanged?

-has decreased?

Appendix 2: Article B Published Supplementary Files

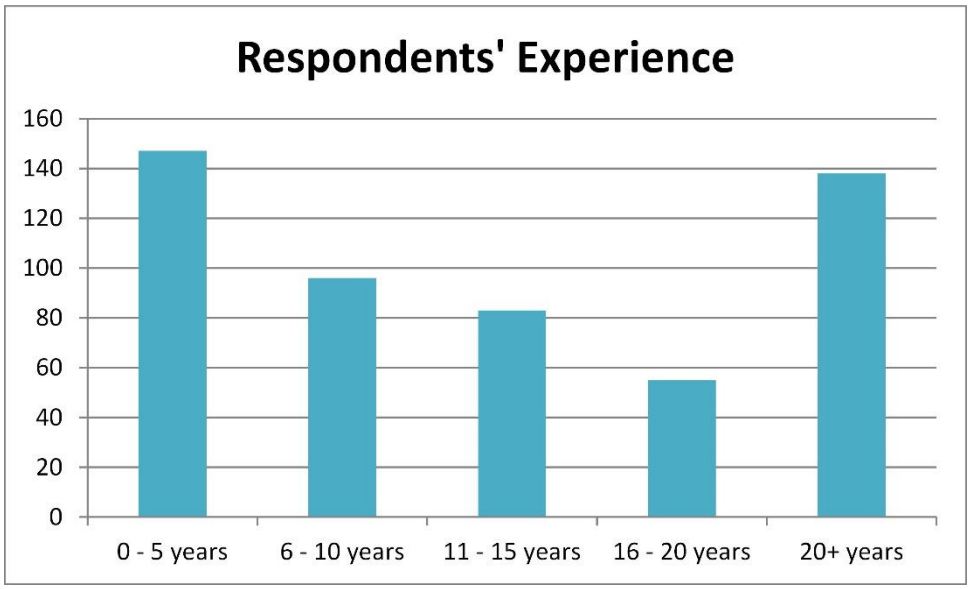
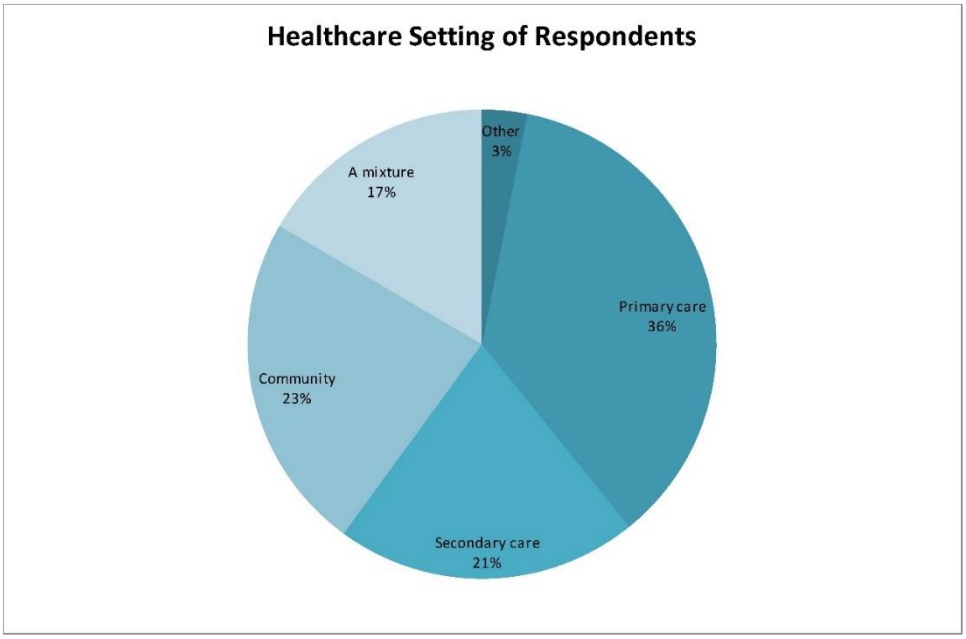
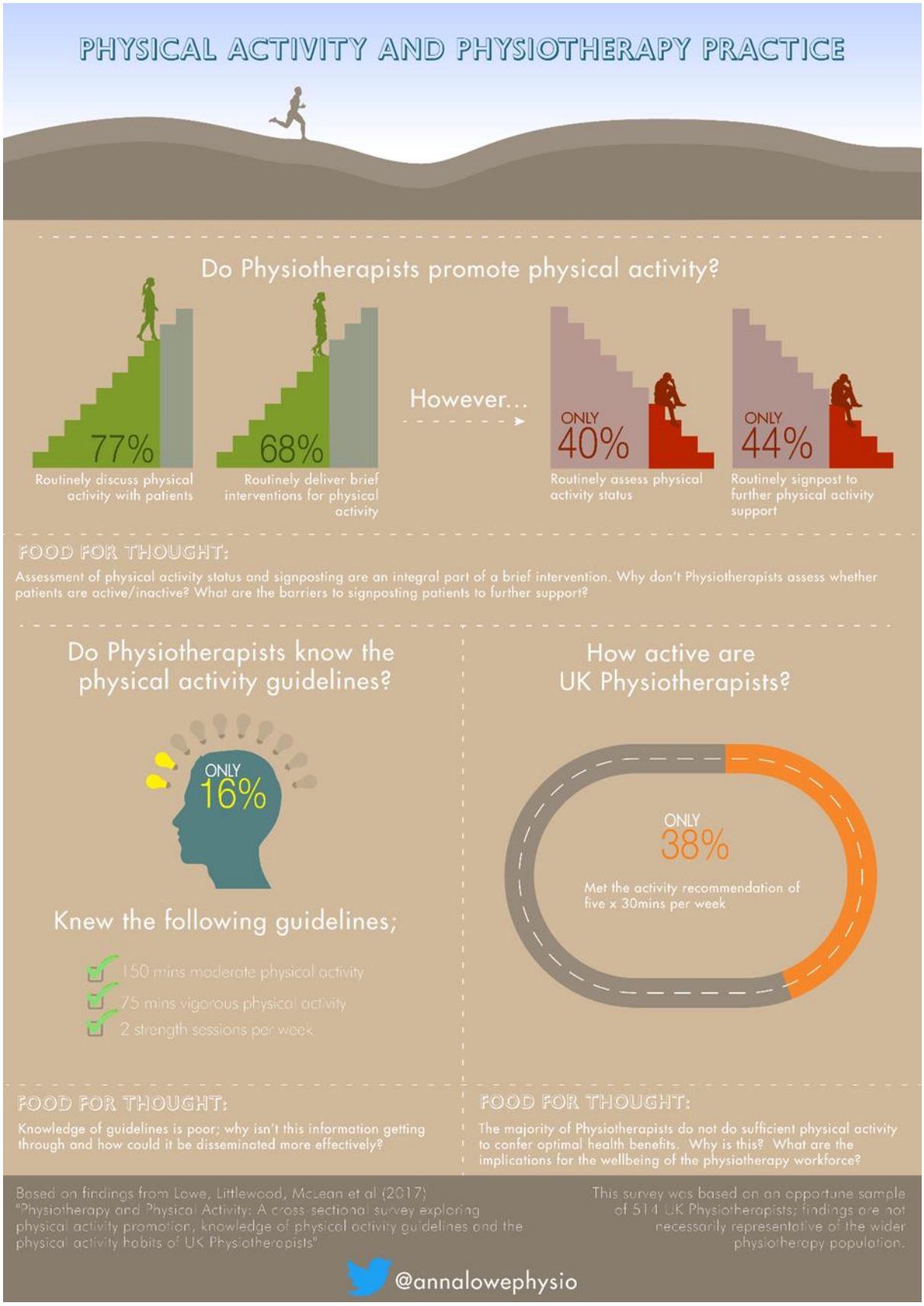


Figure 1. Years of Experience of Survey Respondents

Figure 2. Healthcare Setting in which Respondents Work



Infographic Summarising Findings


PHYSICAL ACTIVITY AND PHYSIOTHERAPY PRACTICE
Do Physiotherapists promote physical activity?
77%
Routinely discuss physical activity with patients
68%
Routinely deliver brief interventions for physical activity
However...
ONLY 40%
Routinely assess physical activity status
ONLY 44%
Routinely signpost to further physical activity support
FOOD FOR THOUGHT:
Assessment of physical activity status and signposting are an integral part of a brief intervention. Why don't Physiotherapists assess whether patients are active/inactive? What are the barriers to signposting patients to further support?
Do Physiotherapists know the physical activity guidelines?
ONLY 16%
Knew the following guidelines;
150 mins moderate physical activity
75 mins vigorous physical activity
2 strength sessions per week
How active are UK Physiotherapists?
ONLY 38%
Met the activity recommendation of five x 30mins per week
FOOD FOR THOUGHT:
Knowledge of guidelines is poor; why isn't this information getting through and how could it be disseminated more effectively?
FOOD FOR THOUGHT:
The majority of Physiotherapists do not do sufficient physical activity to confer optimal health benefits. Why is this? What are the implications for the wellbeing of the physiotherapy workforce?
Based on findings from Lowe, Littlewood, McLean et al (2017) "Physiotherapy and Physical Activity: A cross sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK Physiotherapists"
This survey was based on an opportune sample of 514 UK Physiotherapists; findings are not necessarily representative of the wider physiotherapy population.
@annalowephysio

STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies

	Item No	Recommendation	
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Y
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Y
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Y
Objectives	3	State specific objectives, including any prespecified hypotheses	Y
Methods			
Study design	4	Present key elements of study design early in the paper	Y
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Y
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Y
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	NA
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	NA
Bias	9	Describe any efforts to address potential sources of bias	Y

Study size	10	Explain how the study size was arrived at	Y
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	NA
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Y
		(*b*) Describe any methods used to examine subgroups and interactions	Y
			Y
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Y
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Y
		(b) Indicate number of participants with missing data for each variable of interest	Y
Outcome data	15*	Report numbers of outcome events or summary measures	Y

Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	NA
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Y
Discussion			
Key results	18	Summarise key results with reference to study objectives	Y
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Y
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Y
Generalisability	21	Discuss the generalisability (external validity) of the study results	Y
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	NA

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction

with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Survey Questions

Screening

-Please confirm that you are registered to practice in the UK and have current patient contact.

-Which profession do you belong to?

-Are you Qualified/Student/Assistant/Other

1.Which Nation do you work in/

Options: Scotland, Ireland, Wales, England

2. Which health care setting do you mainly work in?

Options:

Primary Care

Secondary Care

Community

A mixture

I do not work in a clinical setting-this will end the study

Other please spec

3. Approximately how many years of experience do you have of working as an AHP or support worker?

Options: 0-5, 6-10, 11-15, 16-20, 20+

4. Which sector do you mainly work in?

Options: NHS, Private, Third Sector (community, charity, social enterprise), Local Authority/Social Care, Other please spec

8. When indicated, do you initiate conversations with service users about physical inactivity?

Options: Never, Sometimes, Usually, Always.

9. When indicated, do you formally assess whether a service user falls into a risk category for physical inactivity (i.e. do you use any screening tools)?

Options: Never, Sometimes, Usually, Always.

10. When indicated, do you offer brief interventions for Physical Inactivity?

Options: Never, Sometimes, Usually, Always.

11. Do you use signposting or social prescribing to connect service users with suitable local physical activity services? (These services may be NHS, private, community or third sector)

Options: Never, Sometimes, Usually, Always.

14. Are you aware that there are UK physical activity guidelines for adults?

Yes, No, Don't know.

15. Do you know how many minutes of moderate intensity physical activity is recommended per week for adults? Please use digits only.

16. Do you know how many minutes of vigorous intensity physical activity is recommended per week for adults? Please use digits only.

17. Do you know on how many days per week it is recommended that adults do

strength training? Please use digits only.

22. In the past week, on how many days have you done a total of 30 min or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.

Options 0-7

Supplementary Data

Demographics-Whole sample		Count	Column N %
I confirm that I am an allied health professional and that I am registered with one of the professional bodies	Yes	522	100.00%
	No	0	0.00%

	Years of experience	Count	Column N %
Approximately how many years of experience do you have of working as an AHP or support worker?	0 - 5 years	147	28.30%
	6 - 10 years	96	18.50%
	11 - 15 years	83	16.00%
	16 - 20 years	55	10.60%
	20+ years	138	26.60%

		Count	Column N %
Which sector do you mainly work in?	Other (please specify)	9	1.70%
	NHS	477	92.40%
	Private	21	4.10%
	Third sector (eg. community, charity, social enterprise)	7	1.40%
	Local Authority/Social Care	2	0.40%

		Count	Column N %
Please select the nation in which you are registered:	Scotland	14	2.80%
	Northern Ireland	3	0.60%
	Wales	17	3.30%
	England	475	93.30%

		Count	Column N %
Which health care setting do you mainly work in?	Other (please specify)	16	3.10%
	Primary care	187	36.10%
	Secondary care	108	20.80%
	Community	121	23.40%
	A mixture	86	16.60%
	I do not work in a clinical setting	0	0.00%

Demographics-Physiotherapists (inc students)

Count	Column N %		
Physiotherapist	Qualified member	463	88.70%
	Student member	51	9.80%
		514	

Approximately how many years of experience do you have of working as an AHP or support worker?											
		0 - 5 years		6 - 10 years		11 - 15 years		16 - 20 years		20+ years	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Physiotherapist	Qualified member	96	20.80%	94	20.40%	81	17.60%	54	11.70%	136	29.50%
	Student member	47	94.00%	2	4.00%	1	2.00%	0	0.00%	0	0.00%
		143		96		82					

Which health care setting do you mainly work in?													
		Other (please specify)		Primary care		Secondary care		Community		A mixture		I do not work in a clinical setting	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Physiotherapist	Qualified member	8	1.70%	169	36.70%	105	22.80%	118	25.70%	60	13.00%	0	0.00%
	Student member	8	16.00%	14	28.00%	1	2.00%	2	4.00%	25	50.00%	0	0.00%

		16		183		106		120		85	
Which sector do you mainly work in?											
		Other (please specify)		NHS		Private		Third sector		Local Authority/Social Care	
Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %		
Physiotherapist	Qualified member	5	1.10%	423	92.40%	21	4.60%	7	1.50%	2	0.40%
	Student member	4	8.00%	46	92.00%	0	0.00%	0	0.00%	0	0.00%

PA promotion (descriptive stats)

	Never		Sometimes		Usually		Always		
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	
Do you initiate conversations about PA	0	0%	11	2.40%	95	21%	347	76.60%	453
Do you assess risk re PA	96	21.20%	63	14%	113	24.90%	181	40%	453
Do you deliver brief interventions for PA	13	2.90%	26	5.70%	106	23.40%	308	68%	453
Do you signpost to other PA support	18	4%	83	18.30%	152	33.60%	200	44.20%	453

Physiotherapists' PA habits (descriptive stats)

	4 or less		5+	
	count	%	count	%
qual	222	62%	134	37.6
student	19	55.70%	15	44.10%

		Milton single item question
N	Valid	390
	Missing	124
Median		5.00
Percentiles	25	3.00
	50	5.00
	75	6.00

PA guidelines

Knowledge about 150 mins MPA

Moderate activity knowledge - answer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too low	88	17.1	21.8	21.8
	correct	240	46.7	59.6	81.4
	too high	75	14.6	18.6	100.0
	Total	403	78.4	100.0	
Missing	System	111	21.6		
Total		514	100.0		

Knowledge 75 mins vigorous PA

Vigorous activity knowledge - answer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too low	130	25.3	35.4	35.4
	correct	122	23.7	33.2	68.7
	too high	115	22.4	31.3	100.0
	Total	367	71.4	100.0	
Missing	System	147	28.6		
Total		514	100.0		

Knowledge 2 days strength training

Strength training knowledge - answer					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	too low	25	4.9	6.6	6.6
	correct	121	23.5	32.2	38.8
	too high	230	44.7	61.2	100.0
	Total	376	73.2	100.0	
Missing	System	138	26.8		
Total		514	100.0		

% of scores all correct or all incorrect

No of correct answers (out of 3)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	254	49.4	49.4	49.4
	1	120	23.3	23.3	72.8
	2	57	11.1	11.1	83.9
	3	83	16.1	16.1	100.0
	Total	514	100.0	100.0	

Percentage who are aware of PAGs

Are you aware that there are UK physical activity guidelines for adults?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	382	74.3	87.6	87.6
	No	33	6.4	7.6	95.2
	Don't know	21	4.1	4.8	100.0
	Total	436	84.8	100.0	
Missing	System	78	15.2		
Total		514	100.0		

Associations

chi squared for independence between: likelihood of delivering a brief intervention AND years of experience

nb Never/Sometimes categories merged due to low numbers

Approximately how many years of experience do you have of working as an AHP or support worker? * PA BIs Never/Sometimes v Usually v always Crosstabulation

			PA BIs N/S v U v A			
			2.00	3.00	4.00	Total
years of experience	0 - 5 years	Count	7	22	96	125
		Expected Count	10.6	28.8	85.6	125.0
	6 - 10 years	Count	9	18	61	88
		Expected Count	7.5	20.3	60.3	88.0
	11 - 15 years	Count	8	20	51	79
		Expected Count	6.7	18.2	54.1	79.0
	16 - 20 years	Count	3	14	33	50
		Expected Count	4.2	11.5	34.2	50.0
	20+ years	Count	12	32	74	118
		Expected Count	10.0	27.2	80.8	118.0
Total		Count	39	106	315	460
		Expected Count	39.0	106.0	315.0	460.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.045[a]	8	.429
Likelihood Ratio	8.236	8	.411
Linear-by-Linear Association	4.429	1	.035
N of Valid Cases	460		

chi squared for independence between: Likelihood of delivering Brief intervention AND own PA habits

nb Never/Sometimes categories merged due to low numbers

Milton single item qu.

			PA BIs N/ v Usually v always			
			Never/Sometimes	Usually	Always	Total
Milton single item qu	0	Count	2	6	11	19
		Expected Count	1.6	4.3	13.1	19.0
	1	Count	2	8	17	27
		Expected Count	2.3	6.1	18.7	27.0
	2	Count	8	16	37	61
		Expected Count	5.1	13.7	42.2	61.0
	3	Count	3	19	49	71
		Expected Count	5.9	16.0	49.1	71.0
	4	Count	6	19	43	68
		Expected Count	5.7	15.3	47.1	68.0
	5	Count	2	9	61	72
		Expected Count	6.0	16.2	49.8	72.0
	6	Count	3	7	20	30
		Expected Count	2.5	6.7	20.8	30.0

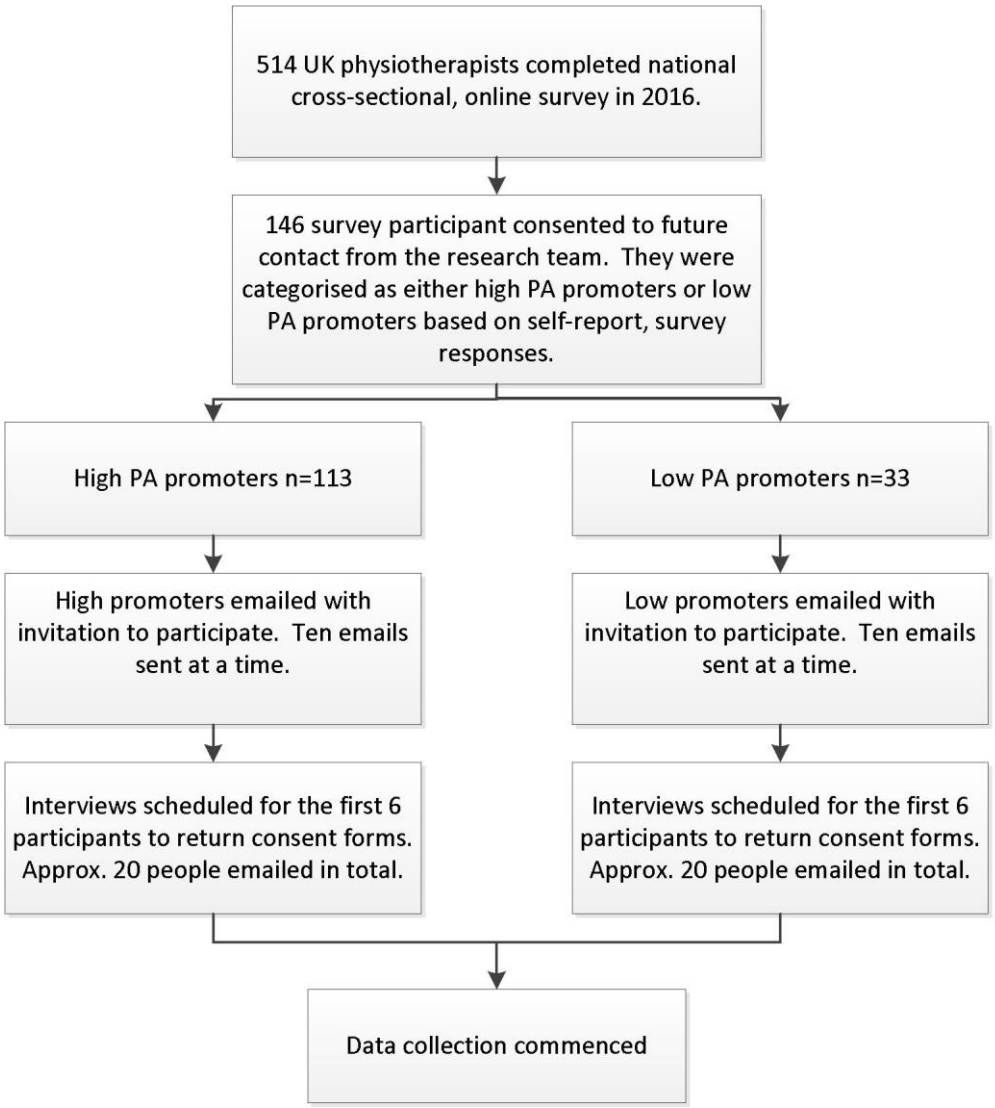
Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	22.035[a]	14	.078
Likelihood Ratio	23.645	14	.051
Linear-by-Linear Association	2.682	1	.101
N of Valid Cases	396		

	7	Count	7	5	36	48
		Expected Count	4.0	10.8	33.2	48.0
Total		Count	33	89	274	396
		Expected Count	33.0	89.0	274.0	396.0

Appendix 3: Article C Published Supplementary Files

Flowchart Showing Sampling Process



COREQ Form

No	Item	Guide questions/description	
1: Research team and reflexivity			
Personal Characteristics			
1.	Interviewer/ facilitator	Which author/s conducted the interview or focus group?	Anna Lowe
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD*	Doctoral student Master's degree-Physiotherapy Member of Chartered Society of Physiotherapy
3.	Occupation	What was their occupation at the time of the study?	Doctoral student Physical Activity Clinical Champion - Public Health England
4.	Gender	Was the researcher male or female?	Female
5.	Experience and training	What experience or training did the researcher have?	Theoretical training in qualitative research methods & previous experience of conducting semi-structured interviews.
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Methods section
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e.*g. personal goals, reasons for doing the research*	Methods section Reflexivity section
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. *Bias, assumptions, reasons and interests in the research topic*	Patient info sheet Consent form & email inviting participation. Reflexivity section

No	Item	Guide questions/description	
Domain 2: study design			
Theoretical framework			
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	Methods section
Participant selection			
10.	Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball*	Methods section
11.	Method of approach	How were participants approached? e*.g. face-to-face, telephone, mail, email*	Methods section
12.	Sample size	How many participants were in the study?	Methods section
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Methods section
Setting			
14.	Setting of data collection	Where was the data collected? e*.g. home, clinic, workplace*	Methods section
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	NA-telephone interviews Methods section

No	Item	Guide questions/description	
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*	Methods section
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods section
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	No-methods section
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	Audio recorded see methods section
20.	Field notes	Were field notes made during and/or after the interview or focus group?	Methods section
21.	Duration	What was the duration of the interviews or focus group?	Approx 45 mins per interview see methods section
22.	Data saturation	Was data saturation discussed?	Yes-see methods section
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	1 See methods section
25.	Description of the coding tree	Did authors provide a description of the coding tree?	Yes -methods section

No	Item	Guide questions/description	
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Derived from the data Methods section
27.	Software	What software, if applicable, was used to manage the data?	Quirkos Methods section
28.	Participant checking	Did participants provide feedback on the findings?	No
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.*g. participant number*	Findings section
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	Findings section
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Findings section
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Findings section Deviant case analysis section.

Appendix 4: Ethical Approval for Survey

Sheffield Hallam University | Centre for Health and Social Care Research

22 February 2016

LOWE Anna
Sheffield Hallam University

Research proposal number: 2015-16/HWB-HSC-21

Dear Anna

This letter relates to your research proposal:

A survey of the Allied Health Professions in Public Health

This proposal was submitted to the Faculty Research Ethics Committee with a standard SHUREC 1 form. This indicates that your project does not require formal ethics and scientific review. As such, it has been added to the register of projects and given a reference number. You do not need any further review from the Ethics Committee. You will need to ensure you have all other necessary permission in place before proceeding, for example, from the Research Governance office of any sites outside the University where your research will take place. This letter can be used as evidence that the proposal has been registered within Sheffield Hallam University.

The documents reviewed were:

SHUREC1 Form
AHP PH Draft Survey
AHP PH Survey

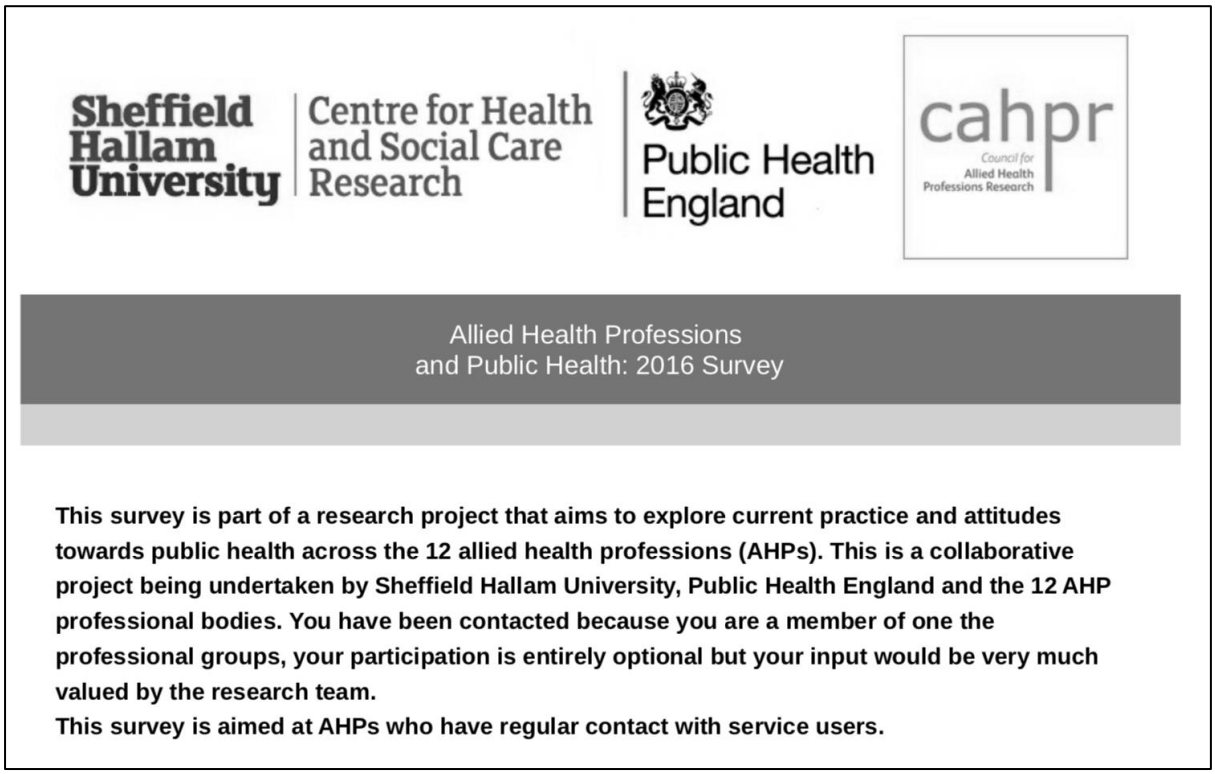
Good luck with your project.

Yours sincerely

Peter Allmark

Peter Allmark
Chair Faculty Research Ethics Committee
Faculty of Health and Wellbeing
Sheffield Hallam University
32 Collegiate Crescent
Sheffield
S10 2BP
0114 224 5727
p.allmark@shu.ac.uk

Appendix 5: Complete Survey Questions



Allied Health Professions
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The questionnaire will take approximately 15 minutes to complete.

If you choose to complete the questionnaire this is what will happen;

1. Your responses will be returned to the research team who will remove any identifying features (for example, IP address or email address if you choose to give it).

2. Your anonymised answers will be collated and analysed and the findings will be published by the research team.

3. Your anonymised data will be preserved and made available for further analysis in the future .

Thank you for helping us with this research project, your input is very much valued!

If you have any concerns about this project or if you need further information please contact;

Anna Lowe (a.lowe@shu.ac.uk) or Sionnadh McLean (s.mclean@shu.ac.uk)

Key Terms

Before you begin we thought it might be useful to clarify some key terms. For the purposes of this research we will be using the following definitions .

Public health is defined as the science and art of promoting and protecting health and well-being, preventing ill-health and prolonging life through the organised efforts of society. For the purposes of this survey, the term public health includes health promotion, prevention and early intervention.

Making Every Contact Count means having the competence and confidence to deliver healthy lifestyle message, to encourage people to change their behaviour, and to direct them to local services that can support them.

* 1. I confirm that I am an allied health professional and that I am registered with one of the professional bodies

- ◯ Yes
- ◯ No

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2. Which health care setting do you mainly work in?

- ○ Primary care
- ○ Secondary care
- ○ Community
- ○ A mixture
- ○ I do not work in a clinical setting (This will end the survey)
- ○ Other (please specify)

3. Approximately how many years of experience do you have of working as an AHP or support worker?

- ○ 0 - 5 years
- ○ 6 - 10 years
- ○ 11 - 15 years
- ○ 16 - 20 years
- ○ 20+ years

4. Which sector do you mainly work in?

- ○ NHS
- ○ Private
- ○ Third sector (eg. community, charity, social enterprise)
- ○ Local Authority/Social Care
- ○ Other (please specify)

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* 5. Which profession are you? (Please indicate one profession only)

	Qualified member	Student member	Support worker/associate member	Other
Art Therapist	○	○	○	○
Music Therapist	○	○	○	○
Drama Therapist	○	○	○	○
Chiropodist/Podiatrist	○	○	○	○
Dietitian	○	○	○	○
Occupational Therapist	○	○	○	○
Orthoptist	○	○	○	○
Paramedic	○	○	○	○
Physiotherapist	○	○	○	○
Prosthetist and Orthotist	○	○	○	○
Therapeutic Radiographer	○	○	○	○
Diagnostic Radiographer	○	○	○	○
Speech and Language Therapist	○	○	○	○

Other (please specify)

6. Please select the nation in which you are registered:

- ○ Scotland
- ○ Northern Ireland
- ○ Wales
- ○ England

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7. Do you consider public health (including prevention, health promotion and early intervention) to be a core part of your professional role?

- ○ Yes
- ○ No
- ○ Don't know

* 8. When indicated, do you initiate conversations with service users about:

	Never	Sometimes	Usually	Always
Mental health	◯	◯	◯	◯
Smoking cessation	◯	◯	◯	◯
Physical activity	◯	◯	◯	◯
Alcohol	◯	◯	◯	◯
Diet/nutrition	◯	◯	◯	◯
Social isolation/loneliness	◯	◯	◯	◯
Falls prevention	◯	◯	◯	◯
Developmental delay in children	◯	◯	◯	◯
Domestic violence	◯	◯	◯	◯
Environmental issues/housing	◯	◯	◯	◯
Addiction/substance abuse	◯	◯	◯	◯
Weight management in relation to overweight/obesity	◯	◯	◯	◯
Weight management in relation to malnourishment	◯	◯	◯	◯
Managing pain	◯	◯	◯	◯

Other (please specify)

* 9. When appropriate, do you formally assess whether a service user falls into a risk category for (ie. do you use any screening tools)?

	Never	Sometimes	Usually	Always
Mental health	◯	◯	◯	◯
Smoking cessation	◯	◯	◯	◯
Physical activity	◯	◯	◯	◯
Alcohol	◯	◯	◯	◯
Diet/nutrition	◯	◯	◯	◯
Social isolation/loneliness	◯	◯	◯	◯
Falls prevention	◯	◯	◯	◯
Developmental delay in children	◯	◯	◯	◯
Domestic violence	◯	◯	◯	◯
Environmental issues/housing	◯	◯	◯	◯
Addiction/substance abuse	◯	◯	◯	◯
Weight management in relation to overweight/obesity	◯	◯	◯	◯
Weight management in relation to malnourishment	◯	◯	◯	◯
Pain management	◯	◯	◯	◯

Other (please specify)

* 10. When appropriate, do you offer brief interventions for:

	Never	Sometimes	Usually	Always
Mental health	◯	◯	◯	◯
Smoking cessation	◯	◯	◯	◯
Physical activity	◯	◯	◯	◯
Alcohol	◯	◯	◯	◯
Diet/nutrition	◯	◯	◯	◯
Social isolation/loneliness	◯	◯	◯	◯
Falls prevention	◯	◯	◯	◯
Developmental delay in children	◯	◯	◯	◯
Domestic violence	◯	◯	◯	◯
Environmental issues/housing	◯	◯	◯	◯
Addiction/substance abuse	◯	◯	◯	◯
Weight management in relation to overweight/obesity	◯	◯	◯	◯
Weight management in relation to malnourishment	◯	◯	◯	◯
Managing pain	◯	◯	◯	◯

Other (please specify)

* 11. Do you use signposting or social prescribing to connect service users with suitable local services? (these services may be NHS, private, community or third sector)

	Never	Sometimes	Usually	Always
NHS Health Check	◯	◯	◯	◯
Weight management	◯	◯	◯	◯
Alcohol support	◯	◯	◯	◯
Smoking cessation	◯	◯	◯	◯
Physical activity	◯	◯	◯	◯
Social groups	◯	◯	◯	◯
Mental health services	◯	◯	◯	◯
Falls prevention	◯	◯	◯	◯

Other (please specify)

12. Which, if any, of the following information do you record?

	Never	Sometimes	Usually	Always
The conversation (raising the issue)	◯	◯	◯	◯
The assessment of risk	◯	◯	◯	◯
The brief intervention/advice	◯	◯	◯	◯
Signposting/social prescription	◯	◯	◯	◯

Other (please specify)

13. Is this data collated?

- ◯ Yes
- ◯ No
- ◯ Don't know

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and Public Health: 2016 Survey

14. Are you aware that there are UK physical activity guidelines for adults?

- ◯ Yes
- ◯ No
- ◯ Don't know

15. Do you know how many minutes of moderate intensity physical activity is recommended per week for adults? Please use digits only

16. Do you know how many minutes of vigorous intensity physical activity is recommended per week for adults? Please use digits only

17. Do you know on how many days per week it is recommended that adults do strength training? Please use digits only

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18. What (if anything) limits you when it comes to delivering healthy messages/MECC interventions/brief interventions? Please tick all that apply.

- [ ] Lack of time
- [ ] Lack of organisational support
- [ ] Lack of knowledge/expertise
- [ ] Lack of access to patient education material
- [ ] Lack of knowledge of local services
- [ ] Lack of local leadership
- [ ] Lack of confidence
- [ ] Lack of perceived patient interest
- [ ] I don't think it is part of my professional role
- [ ] It's not part of the culture
- [ ] Other (please specify)

19. Which **skills** (if any) would you like more training in to help you deliver health promotion interventions? Please tick all that apply.

- [ ] Initiating and managing difficult conversations
- [ ] Knowledge of current national guidance/ recommendations/safe levels
- [ ] Assessing risk behaviour
- [ ] Prioritising where to start with multiple behaviours
- [ ] Knowledge of local services
- [ ] Behaviour change
- [ ] Engaging and motivating people
- [ ] Time management
- [ ] Other (please specify)

20. For which **UK public health priorities** do you need to further your knowledge? Please tick all that apply.

- [ ] Mental health
- [ ] Smoking cessation
- [ ] Physical activity
- [ ] Alcohol
- [ ] Diet/nutrition
- [ ] Early years/best start in life
- [ ] Social isolation/loneliness
- [ ] Falls prevention
- [ ] Musculoskeletal disorders
- [ ] Obesity
- [ ] None
- [ ] Other (please specify)

21. Can you currently access any training related to health promotion?

- ◯ Yes
- ◯ No
- ◯ Don't know

22. In the past week, on how many days have you done a total of 30 min or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise and brisk walking or cycling for recreation or to get to and from places, but should not include housework or physical activity that may be part of your job.

23. In general, how would you rate your health?

- ◯ Excellent
- ◯ Very good
- ◯ Good
- ◯ Fair
- ◯ Poor

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24. Do you manage an AHP service?

- ◯ Yes - if yes, you will be asked a few additional questions
- ◯ No - if no, you will automatically skip the next few questions

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25. Have you developed any services specifically to focus on population health, for example, obesity prevention?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

26. Do you train other professionals or voluntary sector organisations to provide prevention or first line interventions?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

27. Does your organisation or commissioners expect you to focus on prevention?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

28. Is prevention included in the contract for your service?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

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29. Is prevention/health promotion included in your job description?

- ◯ Yes
- ◯ No
- ◯ Don't know

30. Is prevention/health promotion included in your appraisal objectives?

- ◯ Yes
- ◯ No
- ◯ Don't know

31. Do you see a role for AHP public health specialists?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

32. Are you aware of CPD/training/career development opportunities through which you could develop your public health knowledge and skills?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please give details

33. Would you be interested in becoming an AHP public health champion if such a scheme where available?

- ◯ Yes
- ◯ No
- ◯ Don't know

34. Would you be interested in annual membership of an established, credible public health organisation? This would support your development in this area and allow you to develop professional networks?

- ◯ No
- ◯ Yes but I would not pay
- ◯ Yes and I would consider paying for individual membership
- ◯ Yes I would be interested in team/departmental membership
- ◯ Don't know

Please give details

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35. Would you like to stay on an AHP public health database?
Please note that this is optional, if you choose to provide an email address you may receive email updates and occasional information related to AHPs and public health.
Please note that your email address will be kept separate from your questionnaire answers and your answers will remain anonymous.

- ◯ Yes - if yes, please provide an email address below
- ◯ No

Please provide email address

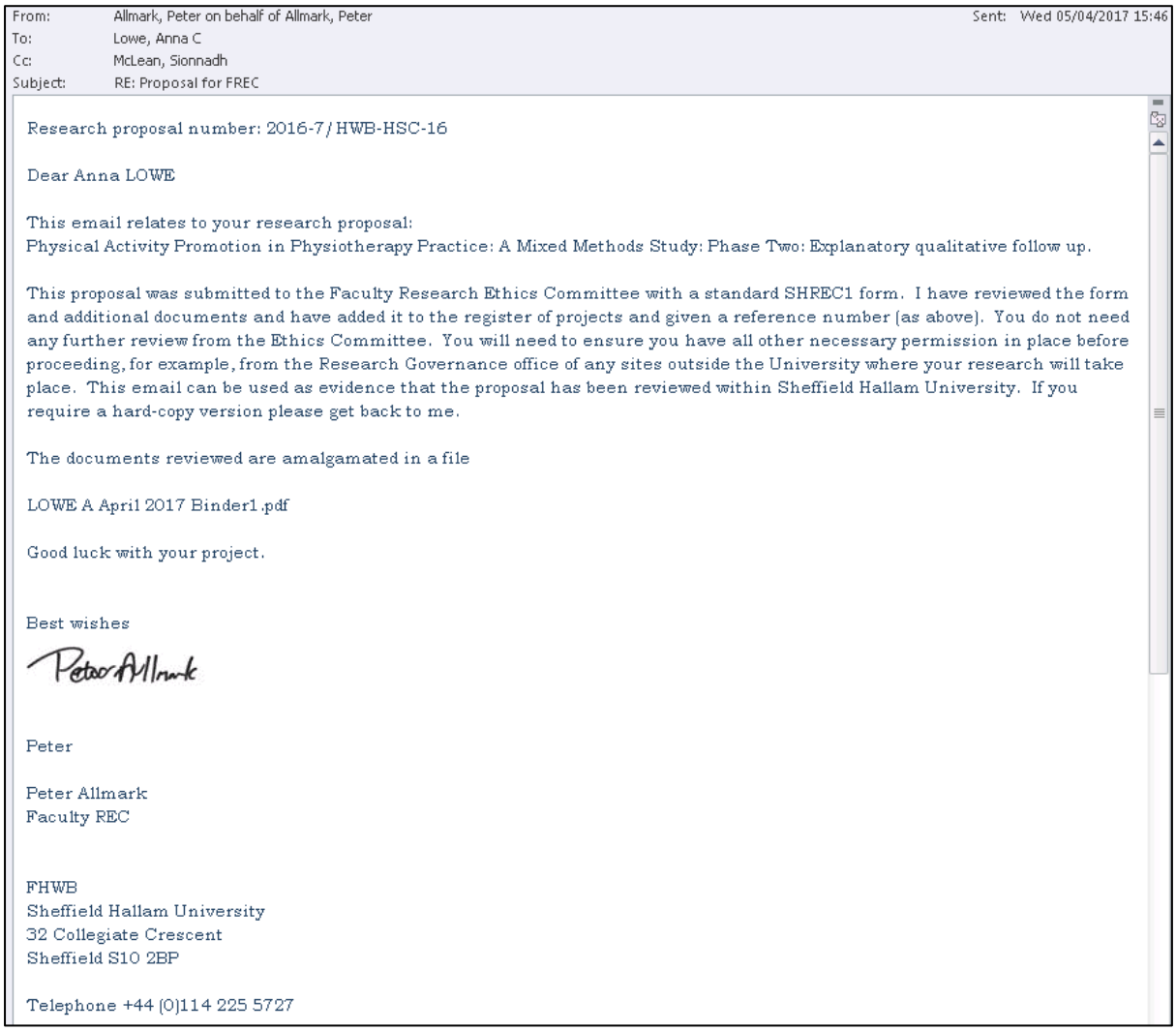
36. Would you be happy to be contacted by the research team for further discussion about the role of AHPs in public health?

- ◯ Yes - if yes, please provide an email address below
- ◯ No

Please provide email address

Thank you for completing this questionnaire, we really value your input!

Appendix 6: Ethical Approval Qualitative Study



From: Allmark, Peter on behalf of Allmark, Peter
Sent: Wed 05/04/2017 15:46
To: Lowe, Anna C
Cc: McLean, Sionnadh
Subject: RE: Proposal for FREC

Research proposal number: 2016-7/HWB-HSC-16

Dear Anna LOWE

This email relates to your research proposal:
Physical Activity Promotion in Physiotherapy Practice: A Mixed Methods Study: Phase Two: Explanatory qualitative follow up.

This proposal was submitted to the Faculty Research Ethics Committee with a standard SHREC1 form. I have reviewed the form and additional documents and have added it to the register of projects and given a reference number (as above). You do not need any further review from the Ethics Committee. You will need to ensure you have all other necessary permission in place before proceeding, for example, from the Research Governance office of any sites outside the University where your research will take place. This email can be used as evidence that the proposal has been reviewed within Sheffield Hallam University. If you require a hard-copy version please get back to me.

The documents reviewed are amalgamated in a file

LOWE A April 2017 Binder1.pdf

Good luck with your project.

Best wishes

Peter

Peter Allmark
Faculty REC

FHWB
Sheffield Hallam University
32 Collegiate Crescent
Sheffield S10 2BP

Telephone +44 (0)114 225 5727

Appendix 7: Consent Form Qualitative Study

Sheffield Hallam University

PARTICIPANT CONSENT FORM

Physical Activity Promotion in Physiotherapy Practice

Please answer the following questions by ticking the response that applies;

	YES	NO
1. I have read the Participant Information Sheet for this study and have had details of the study explained to me.	☐	☐
2. My questions about the study have been answered to my satisfaction and I understand that I may ask further questions at any point.	☐	☐
3. I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.	☐	☐
4. I agree to provide information to the researchers under the conditions of confidentiality set out in the Information Sheet.	☐	☐
5. I wish to participate in the study under the conditions set out in the Information Sheet.	☐	☐
6. I consent to the information collected for the purposes of this research study, once anonymised (so that I cannot be identified), to be used for any other research purposes.	☐	☐

Participant's Name (Printed): _____

Date: _____

Contact details: _____

Researcher's Name (Printed): Anna Lowe

Researcher's contact details:
a.lowe@shu.ac.uk
Mobile: 07809 212 712

Please keep your copy of the consent form and the information sheet together.

Appendix 8: Participant Information Sheet Qualitative Study

Sheffield Hallam University

Participant Information Sheet: Physical Activity Promotion in Physiotherapy Practice

You are invited to take part in a research project about physical activity promotion and physiotherapy practice. Before you decide whether to take part, it is important that you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if anything is not clear or if you would like more information, our contact details are provided at the end.

We appreciate that you are a busy clinician with many demands on your time. We are very grateful to you for considering taking part in this important research project!

1. **What is the project's purpose?**
   This research project aims to explore if and how physical activity is promoted in physiotherapy practice. Phase 1 involved an online survey of current practice. Phase 2 aims to better understand the findings from the survey.

2. **Why have I been chosen?**
   You have been chosen because you kindly completed our online survey in May 2016 and agreed to be contacted by the research team in the future. You have been specifically identified as someone who can help us better understand the findings from the survey.

3. **Do I have to take part?**
   No, it is up to you to decide whether or not to take part. If you decide to take part you can still change your mind at a later date. You can withdraw at any time and you do not have to give a reason.

4. **What will happen to me if I take part?**
   You will be asked to take part in one telephone interview; we expect this to last between 40-60 minutes. The interview will be led by one of the research team, it will be conducted over the telephone and it will be recorded. It can be done at a time that is convenient for you.

5. **What do I have to do?**
   You will be asked to answer some questions and we might discuss your answers. There are no right or wrong answers, we are interested in your thoughts, opinions and experience in relation to physical activity promotion.

6. **What are the possible disadvantages and risks of taking part?**

Participating in the research is not anticipated to cause you any disadvantages or discomfort. The potential physical and/or psychological harm or distress will be the same as any experienced in everyday life.

7. **What are the possible benefits of taking part?**
   Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will inform developments to embed the promotion of physical activity into routine practice.
   Results will be shared with participants in order to inform their professional development.

8. **What happens if the research study stops earlier than expected?**
   Should the research stop earlier than planned and you are affected in any way we will tell you and explain why.

9. **What if something goes wrong?**
   If you have any complaints about the project in the first instance you can contact the lead researcher (Anna Lowe) at any time. If you do not feel that your enquiry has been handled to your satisfaction you can contact the researcher's Director of Studies (Dr Sionnadh McLean, all contact details are below).

10. **Will my taking part in this project be kept confidential?**
    All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified and you will not be identifiable in any reports or publications. Your institution will also not be identified or identifiable. Any data collected from you will be stored online in a form protected by passwords and other relevant security processes and technologies.

    Data collected may be shared in an anonymised form to allow reuse by the research team and other third parties. These anonymised data will not allow any individuals or their institutions to be identified or identifiable.

11. **Will I be recorded, and how will the recorded media be used?**
    You will be recorded for the duration of the interview. This recording will be transcribed into a written document and any identifiable content will be removed. All material from the recording will be kept confidential and anything that is shared will be anonymised.

12. **What will happen to the results of the research project?**
    Results of the research will be published. You will not be identified in any report or publication. Your institution will not be identified in any report or publication. If you wish to be given a copy of any reports resulting from the research, please ask us to put you on our circulation list.

13. **Who is organising this research?**
    This project is being led by Anna Lowe. Dr Sionnadh McLean and Dr Chris Littlewood are acting in a supervisory capacity, all contact details are below.

14. **Who has ethically reviewed the project?**
    This project has been reviewed and approved by the Health & Wellbeing Faculty Ethics Committee at Sheffield Hallam University.

15. **What will happen to the information after the study has finished?**

During the study, only the immediate research team will have access to your data. When the study ends, we will archive the data in an anonymised format so that it can not be linked to you in any way. We would like to make this anonymous data available to other researchers in the future and have asked for your permission for this on the consent form.

16. **How will you use what you find out?**
The data that we collect will be analysed and written up in several ways, firstly as part of a doctoral thesis, secondly as articles that will be published in academic peer-reviewed journals and finally we hope to share our findings at selected conferences. We will only ever use anonymised data whenever we share our findings.

17. **How long is the whole study likely to last?**
We expect the study to last approximately 6 months, you will be asked to interview between June and August 2017.

18. **How can I find out about the results of the study?**
We would be very happy to share our findings with you, if you would like a copy of our findings please let the research team know.

19. **Details of who to contact with any questions or concerns;**

Anna Lowe, Sheffield Hallam University a.lowe@shu.ac.uk

Dr Sionnadh McLean, Sheffield Hallam University s.mclean@shu.ac.uk

Dr Chris Littlewood, University of Keele c.littlewood@shu.ac.uk

Thank you for considering taking part in this research.

Appendix 9: Interview Guide Qualitative Study

Topic Guide:
Physical Activity and Promotion in Physiotherapy

Thank participant.

Confirm read PIS.

Confirm written received & confirm consent verbally.

Confirm plan;

- aims of project
- confirm that recording interview
- recap that questions are based on survey findings
- PA focused whereas survey was PH-wide
- 40-60 mins
- answer any questions they may have
- no right or wrong answers

1. Icebreaker
   Tell me a bit about your current work as a physiotherapist
   -how long worked there?
   -what speciality?
   -how big is the team?

   SECTION 1-PA in physio practice

2. This interview is about physical activity and physiotherapy. Our survey findings told us that most physios have a conversation about PA with most of their patients;
   -does that resonate with your experience?
   -how do you see PA fitting into physiotherapy practice broadly?
   -why is this important to you, to the profession, to patients?

3. Do you talk about PA physical activity with patients? YES/NO…. why?
   -what determines whether you do or don't?
   -what's your approach?
   -have you always done this?

-why do you think it's important?

4. When you do promote PA, what prompts you to raise the issue/start that conversation?
   -tell me more about that
   -any there any other factors that prompt or remind you to do this?

5. When you don't, what stops you?
   -tell me more about that
   -are there any other things that make you less likely to raise the issue?

6. Are you expected to discuss PA?
   -by your employer/organisation?
   -by your profession?
   -is part of our "core" role/prof id

7. How do your patients respond/react to these discussions?
   -why?
   -tell me more

SECTION 2: specifics

8. Survey findings suggest that generally physios don't assess whether someone is active/inactive
   -what are your thoughts on this?
   -does it resonate with your own experience?

9. We asked about Brief Interventions in the survey but our findings suggest that actually this term might not be very meaningful to physios

10. Following on from this, how would you describe your approach to promoting PA?

11. In the survey we asked about signposting patients on to other PA support services outside of the NHS. can you talk to me about if/how you do this?
    -what makes this possible?
    -what makes it difficult?

SECTION 3: Skills /learning

12. Do you feel confident discussing PA with patients? How did you develop these skills? (discuss options pre-registration education, on the job, self study, post grad)

13. You may remember that in the survey we asked about the PA guidelines. Do these influence your practice at all?
    -in what ways?
    -tell me more/can you expand on that?
    -Could they be useful?
    -how could these be disseminated/shared

SECTION 4: Own PA habits

14. We also asked about your own PA behaviours. Do you think that your own PA choices influence how if/how you discuss PA with patients?
    -why do you think that is?
    -can you expand?
    -tell me more
    -role modelling?

Appendix 10: Invitation to Participate Email Qualitative Study

Subject: Appendix. Invitation to take part in Qualitative Study

Dear Physiotherapist,

I would like to invite you to take part in the following research project "**Physical Activity Promotion in Physiotherapy Practice" which** is being conducted at Sheffield Hallam University.

This research project aims to explore if and how physical activity is promoted in physiotherapy practice. **Phase 1** involved an online survey of current practice and Phase **2** aims to better understand the findings from the survey through individual interviews.

You have been contacted because you kindly completed the online questionnaire in May 2016 and gave us permission to contact you again in the future. You have been specifically identified as someone who can help us better understand the findings from the survey, I would therefore like to invite you to take part in a follow-up interview over the phone.

I appreciate that you are probably a very busy clinician and I will endeavour to keep the impact of participating to a minimum. I have detailed everything that is involved in the attached **Participant Information Sheet**, please take time to read this carefully and email me if you have any further questions.

When you have read the Participant Information Sheet and had any questions answered you will need to decide whether you would like to participate. If you would like to be involved, please complete the attached **Consent Form** and return it to me. I will then make contact with you to arrange a convenient time for the telephone interview in the next few weeks.

Thank you for considering taking part in this study, I look forward to hearing from you,

Anna

Ph.D Researcher, Health & Wellbeing Institute - Sheffield Hallam University.
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Attachments;

-Participant Information Sheet

-Consent Form