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Cover page

**Survey of the Barriers, Enablers, and Preferences to
Swimming for People with Chronic Low Back Pain**

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Disclosure page

The authors report there are no competing interests to declare.

Title page

**Survey of the Barriers, Enablers, and Preferences to
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Abstract

Background and Purpose

It is common practice for health professionals to recommend swimming to people with chronic low back pain (CLBP) for rehabilitation, pain management and to improve levels of physical activity. Uptake and engagement in swimming involves a change in behaviour, influenced by various factors including barriers, enablers and preferences. The aim of this study was to identify the most common barriers, enablers, and preferences to swimming for people with CLBP and map them onto the Capability Opportunity Motivation-Behaviour (COM-B) model.

Methods

People with CLBP were invited to complete a survey collecting data regarding the barriers, enablers, and preferences in relation to swimming. The questions were scored on a 5-point Likert scale and mapped onto the COM-B model.

Results

82 people completed the survey. More than 50% of participants agreed with the following barriers: I am not sure which swimming stroke is best for my back pain and I lack motivation to go swimming. These barriers mapped to the psychological capability and reflective motivation dimensions on the COM-B model. At least 50% of participants agreed with the following enablers: I would like to use swimming to improve my strength, flexibility, weight, fitness, health, mood, and wellbeing; setting goals and making an action plan could help me swim regularly, I am more likely to go swimming if a health professional advised me and I

believe that swimming is good for my back. These enablers mapped to the reflective motivation and physical and social opportunity dimensions on the COM-B model.

Discussion and Conclusions

The findings from this survey suggest that when recommending swimming health professionals should discuss the wider health benefits of swimming, discuss specific swimming strokes and why swimming could be beneficial for back pain, and consider using motivational tools to encourage reflective motivation such as goal setting and action planning.

Key words

Barriers; Chronic low back pain; Enablers; Preferences; Swimming

Introduction

Activity limiting low back pain (LBP) is very common; the 2021 Global Burden of Disease Study reported that LBP is the leading cause of disability, affecting 619 million people globally and projected to increase to 843 million by 2050.¹ Persistent or recurrent LBP is categorised as a chronic primary pain, which is defined as a pain that lasts more than 3 months and *'is associated with significant emotional distress or significant functional disability'*.² The NICE guidelines for LBP and sciatica recommend that health professionals provide information and advice to enable self-management and group exercise programmes, either mind-body, aerobic or biomechanical or a combination of these approaches, stating that the patient's *'specific needs, preferences and capabilities'* should be acknowledged when recommending exercise.³ In alignment with the guidelines, it is common practice for health professionals to recommend swimming to people with chronic low back pain (CLBP) for rehabilitation, pain management and to improve levels of physical activity.^{4,5} There is a lack of research however supporting the recommendation of swimming, and limited data on the uptake, and use of swimming in this population.^{6,7,8}

Participation in exercise and physical activity can be challenging for people with chronic pain due to physical, mental, and social barriers.⁹ When compared to land-based exercise it is recognised that exercising in water is a bigger commitment; uptake and engagement in swimming involves a change in behaviour, influenced by various factors including barriers, enablers and preferences.^{10,11} Barriers reported in the literature to land-based exercise in the chronic pain population include: lack of motivation, fatigue, pain, impact of comorbidities, beliefs about physical activity and perceived risk, competing demands, access to support, fear of movement, lack of time, cost and incorrect advice from a health professional or

family.^{12,13,14,15,9} Service provision, colder water temperature, transport, reaction to pool water, inappropriate class or instructor for their condition or age, the lack of age specific sessions and only being able to swim one stroke are additional barriers encountered when people with long-term conditions use aquatic exercise.^{12,11,16}

Enablers are determinants which can have a positive impact on the initiation and maintenance of exercise. Research has found that exercising under direct supervision of a health care professional, regular follow up, improved pain management, functional improvements, mental health and well-being, group exercise, and social participation are enablers to exercise and physical activity.^{12,13,14,9} The social benefits of group classes, being able to do more in the water and the positive impact on general health have been found to be enablers to aquatic based exercise.^{11,16} It is recognised that healthcare professionals can only address some determinants impacting uptake and engagement in swimming in this population, other stakeholders, including swimming professionals, pool operators, commissioners, local government, and the national swimming bodies also have an impact.

When advising or delivering rehabilitation, behavioural change interventions and techniques have been found to improve uptake and engagement in exercise in people with chronic musculoskeletal pain.^{17,18} The Behaviour Change Wheel (BCW) provides a theoretical framework which can be used to analyse and develop behaviour change interventions, see Figure 1.^{19,20} The Capability Opportunity Motivation-Behaviour (COM-B) model is at the centre of the BCW; the model suggests that capability, opportunity and motivation are part of an interacting system which impact behaviour change.²⁰ The middle and outer sections of the BCW are used to identify interventions which can be utilised to change capability, opportunity and motivation and policies which could deliver those interventions.²⁰

To date, no research has been undertaken exploring the barriers, enablers and preferences impacting swimming uptake and engagement in the CLBP population. It could be suggested that if common determinants to swimming in this population were identified and analysed using the COM-B model, this data could inform more tailored recommendations for the CLBP population, enhance uptake and engagement in swimming and guide the development of services. The aim of this study therefore was to identify the most common swimming barriers, enablers, and preferences for people with CLBP and to map them onto the COM-B model.

Methods

Study design

Descriptive survey

Participants

Patients attending physiotherapy and orthopaedic outpatient clinics at an National Health Service (NHS) trust in East Kent, England with CLBP were invited to take part in an online survey. Patients were eligible if they had experienced LBP for more than three months, were aged at least 18 years old and could speak and read English.

Questionnaire and data collection procedures

Prior to completing the questionnaire, the participants read the participant information sheet and provided informed consent to take part in the study. The questionnaire consisted of 50 closed questions and two open questions; the survey did not ask for any identifiable information (see Appendix). The questions were developed based upon barriers and enablers to land and aquatic based exercise identified in research involving people with chronic pain,^{12,11,16,13,14,15} to swimming in the general population^{21,22} and a COM-B analysis. The questionnaire had been piloted with a small number of people with CLBP to ensure that the language was clear and accessible.

The initial questions collected demographic and background information including age, gender, ethnic group, marital status, employment status, education, smoking status, and number of years with LBP. The questions about swimming experience asked whether the participant could swim, how far they could swim, whether they had lessons as an adult, how frequently they swum and their reasons for going to a pool. The questions asking about

barriers and enablers to swimming were scored on a 5-point Likert scale. The participants were asked 17 questions about barriers, there were two parts to this section of the survey. Part one was introduced with the following statement: *'Would any of the following factors stop you from going to the swimming pool?'* Part two was introduced with: *'Would any of the following factors stop you from using swimming as a form of exercise?'* The participants were asked 12 questions about factors which might encourage them to swim. These questions were introduced with the following statement: *'This section is asking about factors that might encourage you to go swimming.'* The barriers section of the survey included two open questions which asked about medical reasons that could stop them swimming and adverse reactions to swimming in a pool. The questions about swimming preference included asking about the best time to swim, single gender swimming, adult only swimming, and swimwear.

Data analysis

The survey data was collected using an online platform, Online Surveys (<https://www.onlinesurveys.ac.uk/>) and analysed in Excel. The responses for the barriers and enablers were ranked by the percentage of participants who agreed or strongly agreed with the statement, compared to those who disagreed with the statement and the neutral responses. The data was analysed using the following data analysis methods; median, interquartile range, and percentages. To understand the distribution of the responses the data was divided into quartiles; two thresholds were set using the middle (>50%) and upper quartiles (>75%) and to determine the majority and most common responses in this sample of participants. Descriptive statistics were used to analyse the closed responses and the open responses were reported, and quotes were cited to give examples. The questions about

barriers and enablers were mapped on the COM-B model using the process described by Michie, Atkins, and West²⁰ to gain a better understanding of the nature of these determinants.

Ethical approval

Ethical approval was granted for this study from London Queens Square Research Ethics Committee on the 22/4/20 REC reference: REC/LO/0397.

Results

127 patients were invited to complete the survey and 82 participants completed the survey; therefore, the response rate was 65%. Table 1 reports the participant characteristics and Table 2 the swimming ability and experience.

Table 1: Participant characteristics

Table 2: Swimming ability and experience

Swimming preference

The participants were asked what time of day was best for them to swim. The most popular time was in the morning (9-12pm), 34.2% (n=26) of participants selected this option, the second most popular time was early evening (5-7pm) with 21.1% (n=16) choosing this time. 91.0% (n=71) of participants said that they would prefer to attend an adult only session. 42.0% (n=21) of female participants and 8.0% (n=2) of male participants said they would prefer to attend a swimming session with just female or just male swimmers. 39.0% (n=20) of female participants said they would prefer a session where you were allowed to wear a t-shirt compared to 21.4% (n=6) of male participants.

Barriers to swimming

Less than 75% of the participants in the survey agreed with all of the barriers suggested in this survey. More than 50% of the participants agreed with the following barriers: *'I am not sure which swimming stroke is best for my back pain'* and *'I lack motivation to go swimming.'* More than 75% of participants disagreed with the barrier: *'It is difficult for me to get to a pool due to transport reasons.'* More than 50% of participants disagreed with the following barriers: *'It*

is difficult for me to get in and out of the pool, *'I find it hard to go swimming if I am not able to park close to the pool'*, *'It is difficult for me to get from the changing room to the pool'* and *'I have a fear of water.'* More than 50% of participants chose a neutral response for the following barrier: *'I have found that my back pain is worse after swimming.'* See Tables 3 and 4 for the barriers ranked by percentage of the participants who agreed with the statements.

Table 3: What stops you from going to a swimming pool?

Table 4: What stops you from using swimming as a form of exercise?

Open responses for medical history and adverse reactions

The barriers section of the survey included two open questions; *'I have a medical reason that stops me swimming'* and *'I have experienced an adverse reaction to swimming in a pool'*. For the first question there were ten responses, the following conditions were mentioned once, breathing problems, short-sighted, fear of drowning and elbow pain. Back pain was mentioned by four participants *'Back pain puts me off swimming'* and skin conditions by two participants *'Eczema which becomes very sore after being in the water'*. The most common adverse reaction mentioned was ear problems, this was reported by four participants along with an explanation of how they overcome this problem. *"I have twice had ear infections requiring antibiotics, I now wear earplugs."* The second most common reaction was nose and sinus problems which were reported by three participants along with an explanation of how they overcome this problem; *'I swim a lot and started experiencing running water several hours after my swim. I now use a nose clip which prevents this.'* Two participants mentioned eye issues or concerns about eyes; *'The chlorine makes my eyes sore for days even if I wear*

goggles.' Two participants mentioned two conditions affecting the foot associated with swimming: verruca and toenail fungus. One participant mentioned that front crawl and backstroke tends to cause shoulder pain and another participant mentioned suffering a back spasm whilst swimming.

Enablers to swimming

The two enablers whereby more than 75% of the participants agreed with the statement were: *'I would like to use swimming to improve my muscle strength and flexibility'* and *'I would like to use swimming to help me maintain a healthy weight or lose weight.'* More than 50% of participants agreed with the following statements: *'I would like to use swimming to improve my fitness and general health'*, *'I would like to use swimming to improve my mood and wellbeing'*, *'I think that setting goals and making an action plan could help me go swimming more regularly'*, *'I am more likely to go swimming if my health professional has advised me to go'*, and *'I believe that swimming is good for my back.'* More than 50% of participants chose a neutral response to the following enablers: *'I find that I have less back pain when I am in the pool'*, *'I am able to do more in the water'*, *'I find that swimming eases my back pain'* and *'I like making new friends through swimming.'* See Table 5 for the enablers ranked by percentage of the participants who agreed with the statements and see Figure 2 for the barriers and enablers whereby the majority of participants agreed with the statement mapped onto the COM-B model.

Table 5: What factors might encourage you to go swimming?

Figure 2: Barriers and enablers mapped onto COM-B model

Discussion

Swimming preference

Preference can be measured as the response when presented with two or more choices,²³ these preferences could be mapped onto the opportunities dimension of the COM-B model. This survey found that 91% of participants would prefer to attend an adult only session and 42% of females would like to attend a session with just female swimmers. The findings suggest that when discussing swimming, health professionals should consider signposting people to their preferred sessions and pool operators should timetable a diverse range of sessions. The two most popular times to swim were in the morning between 9-12pm and during the early evening from 5-7pm. Research in the field of chronic pain has identified three circadian pain rhythms; pain that is highest on waking and then decreases, pain that is high on waking and decreases but increases again mid-afternoon and pain that builds up through the day.²⁴ It could be suggested that preference for time of day could have been influenced by circadian pain rhythms and daily commitments.

Common barriers to swimming

None of the responses in the barriers section of the survey reached the higher threshold of greater than 75%. More than 50% of participants agreed that not being sure which swimming stroke is best for CLBP and lack of motivation could be a barrier to swimming. It is already known that people with LBP are often advised to avoid breaststroke,^{25,26,27} particularly those with poor tolerance of lumbar extension,²⁸ however a recent scoping review identified limited research to support or negate this recommendation.²⁹ This barrier would come under the psychological capability dimension of the COM-B model; meaning that people with CLBP are unsure how to use swimming due to lack of knowledge. This suggests that people with CLBP

may require further information when swimming is recommended and vague advice to try swimming without guidance on stroke could be a barrier impacting uptake. Furthermore, the findings support the need for research exploring the impact of different swimming strokes and techniques on LBP to enable clearer guidance to be provided to this population.

Lack of motivation has been found to be a barrier to exercise in other studies involving people with LBP,¹² chronic pain,¹³ and musculoskeletal disorders.¹⁴ The arrows in the COM-B model demonstrate the interplay between motivation, capability, opportunity, and behaviour; illustrating that both capability and opportunity need to be present in order for motivation to generate a change in behaviour.²⁰ In practice this means having the motivation to swim will not enable a person to swim unless they have the capability and opportunity to swim. This interplay in the model illustrates the impact of one barrier on other barriers and cautions against simply directing rehabilitation to addressing motivation. In the COM-B model motivation is split into reflective motivation which involves planning and evaluation and automatic motivation which relates to emotions and desires. Reflective motivation could be targeted by goal setting and making an action plan which 62% of the participants agreed would help them go swimming more regularly. Automatic motivation could increase or decline, depending on the emotions experienced when swimming.³⁰ In this present survey 18% of participant agreed that they had a fear of water, 32% agreed that they did not enjoy swimming and 45% felt uncomfortable wearing a swimming costume or trunks, these emotions could have a negative impact on automatic motivation. It could be suggested that by providing an enjoyable and supportive swimming programme to this population that automatic motivation could increase, improving the chance of long-term behaviour change.

Common enablers to swimming

More than 75% of participants in the survey agreed that using swimming to improve strength and flexibility, maintain a healthy weight or lose weight would encourage them to go swimming and more than 50% of participants agreed that they would like to use swimming to improve fitness, general health, mood, and wellbeing. When mapped onto the COM-B these enablers would come under the reflective motivation dimension. Swim England, one of the national swimming bodies, undertook a review in 2019 exploring the value of swimming;²² the media coverage of this review could be one reason why the participants were aware of the wider health benefits of swimming. The Lancet series of papers on CLBP published in 2018 recommended that in order to reduce the impact of CLBP on daily life public health programmes should be developed to target physical activity and obesity and that care should focus on living well with CLBP and adopting a healthy lifestyle.³¹ Other leading physiotherapists have agreed that it is important to reframe the care provided to people with long-term pain; focusing on the wider benefits of physical activity and change in lifestyle rather than trying to 'cure' what is essentially a long-term condition which needs to be managed.³² The finding from this survey suggest that when recommending swimming health professionals should focus on the wider benefits of swimming, rather than CLBP and further work should be undertaken by the national swimming bodies to provide information about the benefits to the general public.

Being advised swimming by a health professional was recognised as an enabler by more than 50% of participants, illustrating that conversations between a patient and a health professional could encourage uptake of swimming. This enabler could be mapped onto two dimension on the COM-B model; reflective motivation and social opportunity. Social

opportunity links with the '*Making Every Contact Count*' (MECC) programme, which enables health and care professionals to start conversations with patients and clients, encouraging them to think about changing modifiable risk factors such as physical activity and offering or signposting to further support.^{33,34} The MECC approach encourages the use of brief or very brief advice during routine contacts. Brief advice has been found to increase levels of physical activity in the sedentary population³⁵ but to date no research has been undertaken exploring the impact of this technique on uptake of swimming. Brief advice can include advice, discussion, negotiation, and encouragement but can also include the use of behaviour change techniques such as goal setting.³⁶ In this present study more than 50% of participants agreed that behaviour change techniques, such as setting goals and making an action plan, could be enablers to swimming. Planning interventions such as goal setting and action planning have been found to be effective at improving physical activity behaviour.^{37,38,39} A written action plan for swimming could include documenting when, where, who the individual will swim with, alongside how they might overcome any barriers.⁴⁰ The findings from this survey suggest that health professionals should incorporate the use of goal setting and the formulation of an action plan when recommending swimming.

Other barriers and enablers to swimming

Although this study set thresholds of greater than 50% and 75% to determine the majority and most common barriers and enablers, it was recognised that all barriers and enablers included in this survey should be considered by health professionals when recommending swimming. Moreover, it was recognised that physiotherapists cannot address all the barriers in this survey; some barriers would need to be addressed by pool operators, local government, and health commissioners. For example, pool operators could make changes to

the pool temperature, pool access and changing rooms, health commissioners could direct additional funding to exercise referral schemes to prevent cost being a barrier and local government could consider improving public transport to pools. There were three barriers in part one of the survey which could be addressed by health professionals; these were: *'It is hard for me to find the time to go swimming during the week'*, *'I am worried about falling or slipping in the pool area of changing room'* and *'I struggle getting changed due to my back pain.'* Research has found that older adults with CLBP have an increased risk of falls.^{41,42} The provision of walking aids for use in the changing room, and advice about footwear and changing aids could address the second two barriers and the development of an action plan with a health professional could help address the barrier of time.³⁸

COM-B model

The barriers and enablers were mapped onto the COM-B model; more than 50% agreed with barriers that mapped to the psychological capability and reflective motivation dimensions and enablers than mapped to the reflective motivation and physical and social opportunity dimensions. It has been identified that one in three adults in England cannot swim 25 metres;⁴³ suggesting that swimming ability could be a barrier for many adults. However, the findings from this COM-B analysis suggest that although swimming ability, or physical capability could be a barrier for some, at a population level it may have less impact on swimming uptake and engagement than other determinants. The findings from the COM-B analysis suggest that when recommending or delivering swimming to people with CLBP, although all dimensions should be considered, methods utilising reflective motivation should be considered. When mapped onto the BCW the following implementation options could be

considered when recommending or delivering swimming; training, education, enablement and restructuring the environment.

Limitations

The sample size for this survey was smaller than anticipated, the aim was to recruit 350 people however only 82 participants completed the survey. Due to the COVID-19 pandemic there were extra pressures on staff and therefore the survey was shared with fewer patients. The demographic data showed that certain groups were underrepresented including non-swimmers, people who were unemployed and people from ethnic minority groups. A follow up survey could be conducted to determine the barriers and enablers in these under-represented populations, addressing ways to make the survey more inclusive and accessible to these groups. The results from this survey may only apply to the population of East Kent, similar surveys may need to be undertaken in other geographical areas to find out whether the responses are similar. It is acknowledged that no test-retest reliability analysis was undertaken prior to the questionnaire being distributed, however this could be undertaken prior to the survey being shared with other populations.

Conclusions and Recommendations

The findings from this survey add to what is already known about barriers, enablers, and preferences to physical activity for people with CLBP and to swimming in the general population in England. The results illustrate that due to the range of barriers, enablers, and preferences briefly recommending swimming to people with CLBP may not translate to uptake. The findings suggest that when recommending swimming health professionals should ask about barriers, enablers and preferences and work collaboratively to problem solve how these barriers can be overcome and how enablers can be utilised. The survey and COM-B analysis suggested that when recommending swimming health professionals should discuss the wider health benefits of swimming, discuss specific swimming strokes and why swimming could be beneficial for back pain, and consider using motivational tools to encourage reflective motivation such as goal setting and action planning. Although identifying the most common barriers and enablers have value in terms of system change it should be recognised that an understanding of individual barriers enables a tailored approach to be taken in clinical practice. Furthermore, due to the nature of the determinants, it is acknowledged that healthcare professionals can only address some determinants to engagement in swimming and that it is also the responsibility of other stakeholders including healthcare commissioners, swimming professionals, pool operators, local government, and the national swimming bodies. Future research in this field could use qualitative methods to explore what support or changes people with CLBP might need to overcome barriers and to gain a better understanding of preferences when swimming.

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Tables

Table 1: Participant characteristics

Demographics	All participants (n=82)
Median age y, (IQR)	52.5, (21.75)
Gender female, %, (n)	62, (51)
Ethnic group White British, %, (n)	96.3, (79)
Unemployed or unable to look for work, %, (n)	14.6, (12)
Married or domestic partnership, %, (n)	68.3, (56)
Education up to university level, %, (n)	39, (32)
Median number of years with back pain y, (IQR)	10.5, (17)
Smoker, %, (n)	11, (9)

IQR: Interquartile range; y: years

Table 2: Swimming ability and experience

Swimming ability and experience	All participants (n=82)
Able to swim, %, (n)	84.1, (69)
Able to swim 50m or more, %, (n)	52.4, (43)
Had swimming lesson as an adult, %, (n)	9.8, (8)
Been swimming in last month, %, (n)	25.6, (21)
Go to pool for other reason, %, (n)	22, (18)

IQR: Interquartile range; y: years

Table 3: What stops you from going to a swimming pool?

Barriers	COM-B	Agree %, (n)	Disagree %, (n)	Neutral %, (n)
It is hard for me to find the time to go swimming during the week	PO	47.5, (39)	34.1, (28)	18.3, (15)
I am worried about falling or slipping in the pool area of changing room	PsC	43.9, (36)	41.4, (34)	14.6, (12)
The cost of swimming prevents me from going swimming	PO	37.8, (31)	45.1, (37)	17.1, (14)
I struggle getting changed due to my back pain	PC	32.1, (26)	45.6, (37)	22.2, (18)
It is difficult for me to get in and out of the pool	PC	28.9, (24)	50.6*, (42)	20.5, (17)
I find that the swimming pool is too cold	PO	23.5, (19)	45.7, (37)	30.9, (25)
I find it hard to go swimming if I am not able to park close to the pool	PC	19.3, (16)	62.7*, (52)	18.1, (15)
It is difficult for me to get from the changing room to the pool	PC	12.0, (10)	61.4*, (51)	26.5, (22)
It is difficult for me to get to a pool due to transport reasons (car/bus routes)	PO	11.0, (9)	81.7*, (67)	7.3, (6)

**>75% agreement; *>50% agreement; Physical capability (PhC); psychological capability (PsC); physical opportunity (PO); social opportunity (SO); reflective motivation (RM); automatic motivation (AM)

Table 4: What stops you from using swimming as a form of exercise?

Barriers	COM-B	Agree %, (n)	Disagree %, (n)	Neutral %, (n)
I am not sure which swimming stroke is best for my back pain	PsC	58.0*, (47)	14.8, (12)	27.2, (22)
I lack motivation to go swimming	RM	57.5*, (46)	17.5, (14)	25.0, (20)
I feel uncomfortable wearing a swimming costume or trunks	PsC; AM	43.4, (36)	37.3, (31)	19.3, (16)
I don't enjoy swimming	AM	32.1, (26)	46.9, (38)	21.0, (17)
I can't swim very well	PC	31.0, (26)	47.6, (40)	21.4, (18)
I am worried that swimming will make my back pain worse	PsC	31.3, (25)	45.0, (36)	23.8, (19)
I have found that my back pain is worse after swimming	PC	21.0, (17)	27.2, (22)	51.9*, (42)
I have a fear of water	PsC; AM	18.3, (15)	74.4*, (61)	7.3, (6)
I have found that my back pain is worse while swimming	PC	14.6, (12)	42.7, (35)	42.7, (35)

**>75% agreement; *>50% agreement; Physical capability (PhC); psychological capability (PsC); physical opportunity (PO); social opportunity (SO); reflective motivation (RM); automatic motivation (AM)

Table 5: What factors might encourage you to go swimming?

Enablers	COM-B	Agree %, (n)	Disagree %, (n)	Neutral %, (n)
I would like to use swimming to improve my muscle strength and flexibility	RM	77.8**, (63)	6.2, (5)	16.0, (13)
I would like to use swimming to help me maintain a healthy weight or lose weight	RM	75.3**, (61)	8.6, (7)	16.0, (13)
I would like to use swimming to improve my fitness and general health	RM	72.8*, (59)	8.6, (7)	18.5, (15)
I would like to use swimming to improve my mood and wellbeing	RM	70.4*, (57)	9.9, (8)	19.8, (16)
I think that setting goals and making an action plan could help me go swimming more regularly	RM; PO	61.7*, (50)	13.6, (11)	24.7, (20)
I am more likely to go swimming if my health professional has advised me to go	RM; SO	61.7*, (50)	17.3, (14)	21.0, (17)
I believe that swimming is good for my back	RM	50.6*, (41)	4.9, (4)	44.4, (36)
I enjoy swimming with my friends and / or family	AM; SO	39.5, (32)	16.0, (13)	44.4, (36)
I find that I have less back pain when I am in the pool	PC	38.3, (31)	11.1, (9)	50.6*, (41)
I am able to do more in the water	PC	36.3, (29)	10, (8)	53.8*, (43)
I find that swimming eases my back pain	PC	23.5, (19)	11.1, (9)	65.4*, (53)
I like making new friends through swimming	SO	13.5, (11)	30.8, (25)	55.6*, (45)

**>75% agreement; *>50% agreement; Physical capability (PhC); psychological capability (PsC); physical opportunity (PO); social opportunity (SO); reflective motivation (RM); automatic motivation (AM)

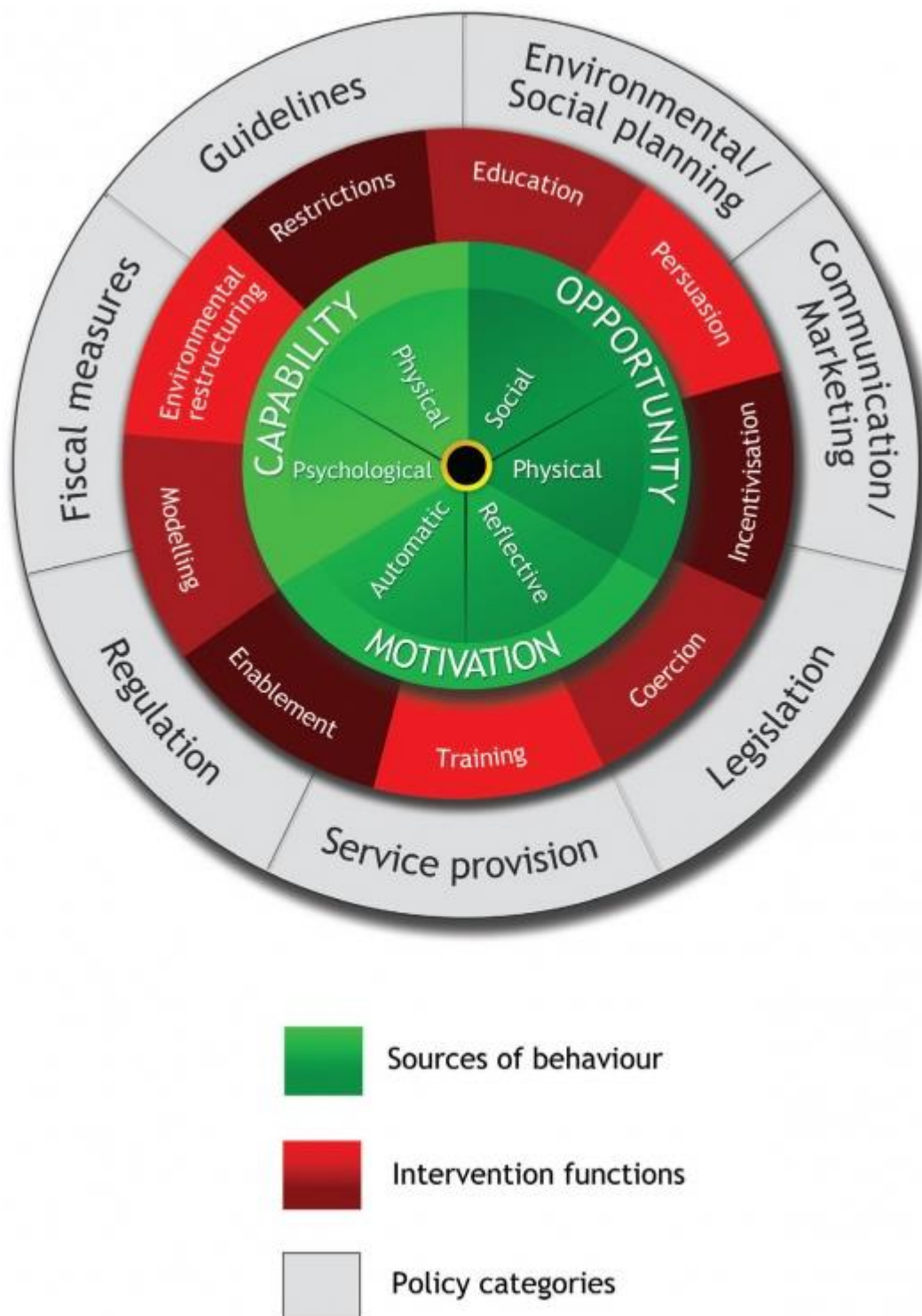


Figure 1: Behaviour Change Wheel (BCW) (Michie S, Atkins L, West R, 2014)

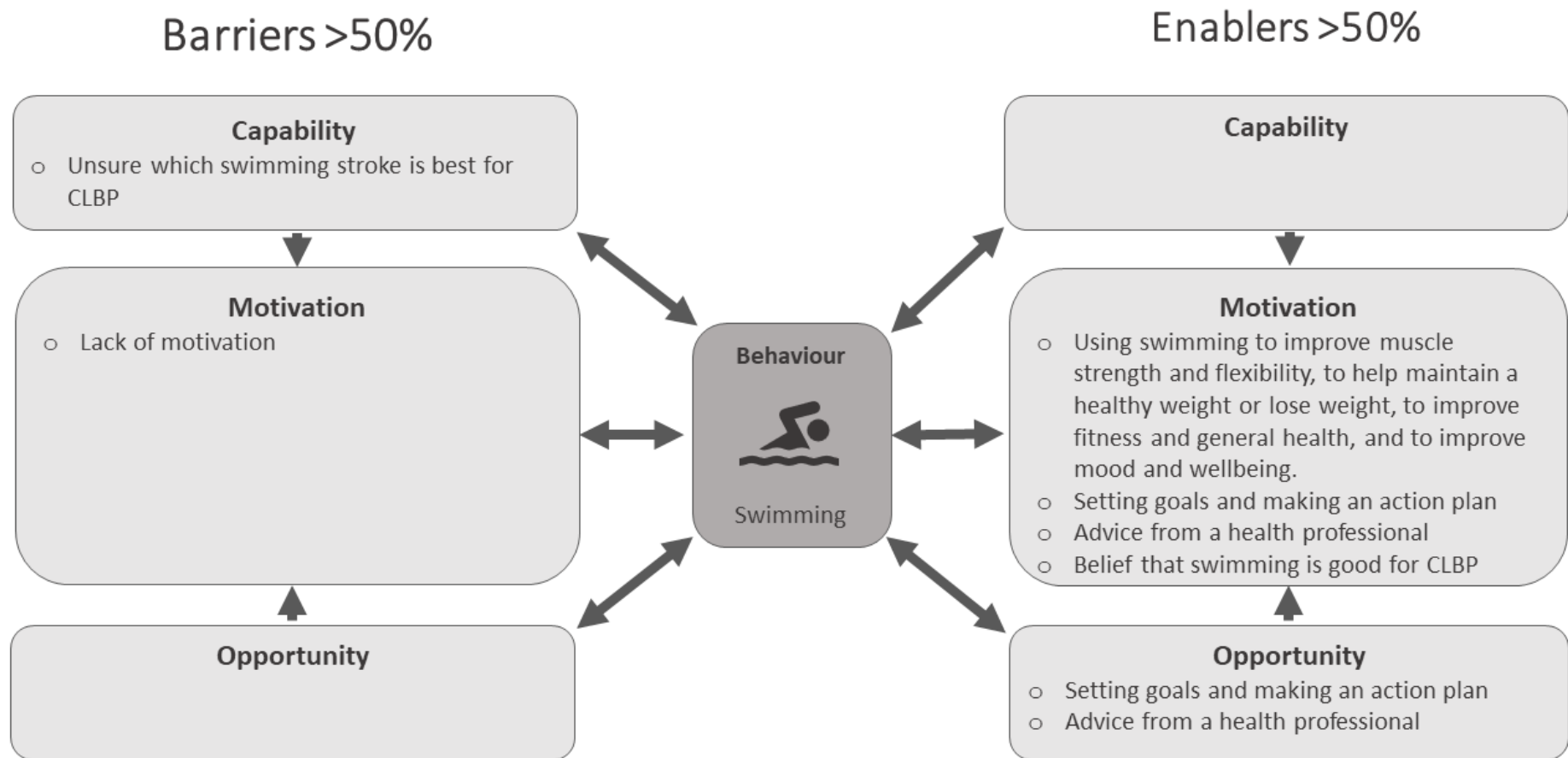


Figure 2: Barriers and enablers mapped onto COM-B model