**Title:** The barriers and facilitators to physical activity in people with a musculoskeletal condition: A rapid review of reviews using the COM-B model to support intervention development.

**Abstract**

**Objectives**

The objective of this review of reviews was to identify the modifiable barriers and facilitators to physical activity in people with a musculoskeletal condition to influence intervention development.

**Study design**

A rapid review of review.

**Methods**

The Cochrane library and PubMed Central were searched for reviews using pre-defined search terms using relevant synonyms for “physical activity”, “barriers” or “facilitators”, and “musculoskeletal condition”. The identified reviews were screened for inclusion. The barriers and facilitators to physical activity identified in the included reviews were coded using the COM-B model of behaviour.

**Results**

503 reviews were identified with 12 included for analysis across a mix of conditions (n=3: hip and knee osteoarthritis combined; n=1: rheumatoid arthritis and osteoarthritis combined; n=1: lower-back pain, hip and knee osteoarthritis combined; n=2 rheumatoid arthritis; n=1: knee osteoarthritis; n=1: spondylarthritis; n=2 chronic pain; n=1 lower-back pain) and designs (n=2: qualitative; n=6: quantitative; n=4 mixed). A multitude of interrelated factors influencing physical activity in people with a musculoskeletal condition were identified across the COM-B components.

**Conclusions**

This review of reviews identified the complex nature of physical activity in people living with a musculoskeletal condition. The identified barriers and facilitators coded using the COM-B model should be considered by intervention designers to develop behaviour change interventions for population group.

**Keywords**

Physical activity; Musculoskeletal condition; COM-B; Behaviour change; Intervention development; Health Improvement.

**Introduction**

Adults with a musculoskeletal condition can benefit from physical activity,1

yet data suggests that between 41% and 50% of people with a musculoskeletal condition in the UK are classified as inactive.2

Successful approaches to behaviour change are based on a thorough understanding of the barriers and the facilitators to the desired behaviour.3,4 Intervention approaches and strategies that aim to bring about a change in physical activity at a population level need to consider the broad range of barriers and facilitators to physical activity, using relevant theory to increase understanding of these determining factors.3

Many theories, models and frameworks exist to understand behaviour and likewise, design interventions to bring about change; however, not many combine an understanding of behaviour, within an intervention development framework.5 The Behaviour Change Wheel5 synthesizes 19 behaviour change frameworks with a behavioural model, the COM-B model, sitting at its centre allowing intervention designers to move directly from a behaviour diagnosis to intervention development. The COM-B model postulates that behaviour is part of a system involving one's capability to perform a behaviour, and the opportunity, and motivation to carry out that behaviour.5

The barriers and facilitators to physical activity in people with specific musculoskeletal conditions have been investigated and systematic reviews undertaken; to the knowledge of the authors, a review of reviews in this area has yet to be published. Identification of common barriers and facilitators to becoming and staying active, across musculoskeletal conditions, can support intervention development at a population level.

The focus of this paper is to identify the modifiable barriers and facilitators to physical activity in adults with a musculoskeletal condition, framed using the COM-B model. This review of reviews aims to answer the following question: What are the modifiable capability, opportunity, and motivational barriers and facilitators to physical activity in people with a musculoskeletal condition? This review of reviews was conducted in support of the work of UK charity, Versus Arthritis.

**Method**

**Study design**

Evidence syntheses are increasingly employed to inform decision-making in public health and healthcare.6 Whilst a systematic review of reviews may be seen as the gold standard, the time and resources available did not allow this within the context of a broader intervention evaluation. A rapid review approach, seen as a streamlined approach to synthesising evidence in a timely manner, was therefore adopted. 7

Rapid reviews synthesise the literature in much the same way as a systematic review, however, the process is simplified to produce information in a timelier manner. Streamlining methods include limiting the sources of information to one or two databases, having one person screen the identified articles for inclusion, in some cases not conducting a quality appraisal, and presenting the results as a narrative summary.7,8 Rapid reviews are completed, on average within 12 weeks and are shown to be valuable products to support evidence-based decisions, 8 and draw comparable conclusions to full systematic reviews.9

This review of reviews was based on the following seven-steps identified by Khangura *et al.*,7 for rapid ‘knowledge to action’ evidence summaries:

1. Identification of the need for the assessment
2. Development of a research question
3. Justification for the rapid review approach
4. A systematic search of the literature
5. Screening of the identified literature
6. A narrative synthesis of the included studies
7. Dialogue with the ‘knowledge users’ to ensure knowledge exchange

Steps 1 through 3 are described above. The remainder of the Methods section will cover steps 4 through 7. This review of reviews took place over 9 weeks between January and March 2021.

**Systematic search of the literature**

The following search string was used to identify the literature pertaining to the barriers and facilitators to physical activity in people with a musculoskeletal condition.

("physical activity"[Title] OR "physically active"[Title] OR exercise[Title])

AND (barriers OR facilitators OR determinants OR causes OR factors OR drivers OR motivat\* OR adherence) AND ("back pain" OR fibromyalgia OR arthritis OR osteoarthritis OR "ankylosing spondylitis" OR "musculoskeletal condition" OR "musculoskeletal disorder" OR MSK) AND review[Title]

The search was completed in PubMed Central and the Cochrane Library (the search term ‘review[Title]’ was not included in the search of the Cochrane Library as it contains reviews only).

Peer reviewed journal articles published in English were included within this review. Only review papers were included; this included narrative reviews, systematic reviews, and any other term to explain a literature review; this review was inclusive of qualitative and quantitative reviews. Only reviews where the primary or secondary outcome was an understanding of the barriers and facilitators to physical activity in people with a musculoskeletal condition were included; review papers not focused on understanding physical activity behaviour in people with a musculoskeletal condition were excluded. Papers not considered research such as commentary articles or opinion pieces were excluded. No date range was set.

**Screening of the literature**

Papers identified using the search strategy were screened for inclusion by the principal investigator (JW) in line with the recognised streamlining approaches for a rapid review.7,8 First the titles were screened, excluding those not relevant to the aim of this review of reviews, followed by review and exclusion of the abstracts in line with the research aim. Finally, the remaining papers were reviewed in full, again excluding those not relevant.

**Data synthesis**

The results and discussion sections of the identified reviews were assessed by framework analysis using the components of the COM-B model; the identified reviews were deductively coded for the capability, opportunity, and motivational barriers and facilitators to physical activity. Each review was coded by at least three investigators; JW and AB each coded all of the identified reviews, TP coded six reviews, and AH, AA, VO and JD coded one or two reviews each.

Few differences in coding between researchers were identified; where differences occurred, these were related to the classification of the barrier or facilitator by COM-B component, rather than the identification of the barrier or facilitator itself. Where there were coding differences, these differences were discussed and an agreement reached.

**Dialogue with knowledge users**

To support knowledge exchange members of UK charity Versus Arthritis (AH, AA, RH, VO and JD) were brought into the research team to support data synthesis and interpretation as described in the previous section.

**Results**

**Description of the included reviews**

The search identified 503 reviews once the duplicates were removed. Following screening, 12 reviews were included for analysis. The included reviews covered a mix of conditions, three focused on hip and knee osteoarthritis combined,10–12 one on rheumatoid arthritis and osteoarthritis combined,13 one on lower-back pain, hip and knee osteoarthritis combined,14 two with a focus on rheumatoid arthritis,15,16 one on knee osteoarthritis,17 one on spondylarthritis,18 two with a focus on chronic pain from a musculoskeletal condition,19,20 and one with a focus on lower-back pain.21 Two reviews were qualitative in nature,11,22 six reviews were quantitative in nature,13,14,18–21 and four mixed-methods reviews.10,12,15,17

Records identified through database searching
(n = 503)

## Identification

Articles excluded (n = 477)

Reviews included in synthesis
(n = 12)

Full-text articles excluded as not focused on people with a musculoskeletal condition (n=4) or the barriers and facilitators to physical activity (n=10)
(n = 14)

Records remaining following title and abstract screening
(n = 26)

## Screening

## Included

**Figure 1** The identification, screening and inclusion of reviews in this review of reviews

**The barriers and facilitators to physical activity**

A multitude of interrelated factors influencing physical activity in people with a musculoskeletal condition were identified as presented in Table 1. The constructs of the COM-B model, as identified by its creators,23 influence one another. The greater one’s capability and the presence of opportunities, the more likely a behaviour is to happen when motivation arises, and a person is more likely to be motivated if they are capable and the environment provides the necessary opportunities. A narrative of the identified barriers and facilitators to physical activity in people with a musculoskeletal condition by COM-B component, and the potential relationship between these components, is provided.

Table 1: The barriers and facilitators to physical activity in people with a musculoskeletal condition

|  |  |  |
| --- | --- | --- |
| COM-B Component | Barriers | Facilitators |
| Capability – Physical | Disease/symptoms,10–12,15,17,18,22 comorbidities and/or poor general health,10–12,15,17 lack of physical fitness and function,10–12,15,17 exercise-induced discomfort.11,15,17 | Stable symptoms,11,12,17,22 good general health11,12,17 and physical function, 10–12,15,17,22 being well rested physically,10 having the physical skills.10 |
| Capability – Psychological | Failure to follow advice due to a lack of understanding,17 lack of knowledge of the benefits,10,11 mental tiredness,10 forgetfulness,10,17 lack of mental ability to make physical activity decisions (not sure how, what level or activity),10,11,15 lack of awareness of physical activity as a strategy for self-management,12,15 not a priority due to other commitments.10–12,15 | Knowledge of the condition specific benefits,10–13,15,17–19 being well rested mentally,10 possessing the mental skills to make physical activity decisions (know-how, level, activity, barrier reduction and adaptations),10,11,13,15,17–19 the skills to self-monitor/self-regulate physical activity,14,17–19 prioritisation of physical activity,10–12,15 integration into daily life,10–12,17 commitment to referent individuals.10,14 |
| Opportunity – Physical | Lack of time,12,15,17,22 bad weather,10,15,22 inaccessible facilities or activities (time and location),10,12,15,17,19,22 cost/money,10,12,15,17 unqualified instructors,11 activity level unequal to skill and ability.15 | Physical activity diary and resources to self-monitor,10,14,19 exercise information and education,15,18,21 exercise prescription (individualised programming, instructions and demonstrations, delivered early in the condition pathway),11–13,15,17,18,20 graded programmes,13,14,19,21 condition management programmes,19 greater frequency/less intensity,17 structured consultation,17 follow-up sessions,14,17,19 convenient and accessible facilities,10,12,15,17,22 low cost,10,15,17 understanding, knowledgeable and skilled instructors,12,13,15,17,19 choice of activities and mode of delivery (home based, individual and group based activities)17,19 inclusive of family and friends,12 good weather,10,22 exercise in warm water,12,22 time.15 |
| Opportunity – Social | Lack of support, poor and conflicting information from healthcare professionals,11,12,15,17,22 lack of engagement and interaction with care providers,17 lack of instructions on what to do,10,15 lack of a training partner,10,15 negative social comparisons,11 lack of social support,10,11,22 no encouragement.15 | Inclusive, therapeutic alliance between care providers and patient12,17 with early intervention,17 tailored advice, information, support and encouragement from healthcare and exercise professionals10–15,17–20,22 with regular contact,17 opportunity to share concerns, 17 involvement in making physical activity programme decisions,10,19 demonstrations and instructions on what to do by healthcare professionals,10,11 supervision,11,17,18,21 being accountable to others,22 creating a behavioral contract,19 social/peer support,10–12,15,17,19,20,22 group socialisation,11,12,22 exercising with a partner,10–12,15,17 positive reinforcement.12,14,15,19  |
| Motivation – Reflective | Negative beliefs and/or experiences of physical activity on symptoms,10–12,15,17,22 safety and suitability concerns,10,12 negative general health beliefs and attitudes,17 belief that nothing can be done to help condition,10–12 belief that physical activity caused condition,12 no or limited physical improvements from physical activity,12,15,17 sceptical of the benefits of physical activity,11,12 perception that symptoms meant physical activity was not possible,10,15 perception that comorbidities meant physical activity was not possible,10,12,15 poor self-image,10 self-perception of being inactive,10 belief that already active enough,10 belief that lacking in skills and function to become active,12 energy needed for other tasks,11,15,17 low-levels of motivation,10,11,15,17 low importance,17 too much time/effort,10,12,15,17 belief that activities of daily living are not enough,12 low physical activity self-efficacy.12,17,18  | Positive beliefs about the benefits of physical activity in general,10,11,15,17,22 belief that physical activity is a means to self-manage condition and symptoms,10,11,15,17 and to prevent medication and surgery,11,12,17 taking control of condition,10,11,15,21 physical activity self-efficacy,10,12,15,17–19 self-efficacy for condition management,12,17 self-motivation,10,14,15,17 understanding post activity physical feelings,17 identifying as an active person,10–12 few perceived barriers,10 belief that activity could be incorporated into daily life,12 normative beliefs,12,17 way of getting out of the house,12 setting and achieving goals and intentions.17–20 |
| Motivation – Automatic | Unpredictability of symptoms prevents habit formation,12,17 loss of previous activity patterns due to condition,11 sedentary habits formed,10 lack of positive reinforcement,10 lack of enjoyment from non-positive experiences of physical activity (historically and with condition),10–12fear of further damage,12,15 apathy towards physical activity,11,15,17 fear of contact with others,22 condition impacts on sense of self (particularly if considered previously active),24 poor mental wellbeing.10,11,17,18 | Positive emotions, experiences and outcomes of physical activity,10,11,15,17,18,22,24 positive reinforcement,10,14,15 good mental wellbeing,10,11,17 not wanting to let people down,17,24 disease acceptance.17 |

**Capability - Physical**

Feeling physically incapable of being active is identified as a barrier to physical activity.10–12,15,17,18,22 Physical incapability to be active is attributed to the musculoskeletal condition and the severity of symptoms, other comorbidities, or a general lack of health, fitness and physical function.10–12,15,17,18,22 Exercise-induced discomfort11,15,17 could result in the belief that physical activity is damaging and making the condition worse, an identified Reflective Motivation.10–12,15,17,22 Stable symptoms,11,12,17,22 good general health11,12,17 and physical function10–12,15,17,22 with the necessary physical skills, maybe gained from prior experiences of being active, are identified facilitators to physical activity.10

**Capability – Psychological**

It is suggested by Veldhuijzen van Zanten *et al.,*15 that psychological factors are more important than physiological and social barriers and facilitators to becoming and staying active. Knowledge of the benefits of physical activity, not just for general health but specifically for condition management,10–13,15,17–19 is an important facilitator in the Psychological Capability domain; conversely, a lack of such knowledge is a barrier to physical activity.10,11 Knowing how to become more physically active, being able to make personal decisions about the level and type of physical activity, understand how to overcome barriers to activity and how to adapt plans and exercises, are identified as facilitators of both becoming and staying active.10,11,13,15,17–19 Conversely, a lack of knowledge in these areas is an identified barrier.10,11,15 One review found a lack of understanding of instructions from health and exercise professionals to be a reason for failure to follow physical activity advice.17 Possessing the ability to monitor and self-regulate physical activity encourages adherence to exercise programmes.14,17–19

Mental tiredness and forgetfulness are identified as barriers to becoming active,10,17 whereas being well rested is a facilitator of physical activity.10 Those making physical activity a priority and part of daily life are more likely to be active.10–12,15 However, the need to prioritise other family commitments over physical activity makes physical activity less likely.10–12,15 Interpersonal skills fall within the domain of Psychological Capability; a lack of interpersonal skills could explain the emotional response (an Automatic Motivation) of fear of being around others as identified in one review.22 Making a commitment to others is a facilitator of physical activity.10,14

**Opportunity – Physical**

As is common in the general population,24 the availability of time, money, good weather, accessibility of facilities, activities, and opportunities afforded by the local environment to be active, are facilitators to physical activity if available, and barriers if lacking.10,12,15,17,19,22

Having access to exercise information and education,15,18,21 and resources to monitor and self-regulate physical activity are facilitators to staying active.10,14,19 In addition, having access to an exercise prescription, specific exercise instructions and demonstrations, are facilitators of physical activity.11–13,15,17,18,20 Access to a structured behaviour consultation is identified as a facilitator of becoming and staying active;17 intervention early in the condition journey is identified as important.17

Access to a wide range of family friendly regular physical activity programmes12,17,19 that improve knowledge15,18,21 and build up gradually based on abilities13,14,19,21 are suggested to facilitate physical activity if delivered by knowledgeable, skilled and supportive instructors;10,13,15,17,19 unqualified instructors11 and activities not equal to skill and ability level 15 can have a negative impact and put people off from taking part. Sessions delivered with greater frequency but less intensity are preferred.17 Further, condition management programmes are identified as a facilitator of physical activity.19 Follow-up sessions after completing these programmes are identified facilitators of physical activity.14,17,19

**Opportunity – Social**

Access to physical activities that can be attended together by people with a musculoskeletal condition and their family and friends can increase social support, a widely cited facilitator of physical activity,10–12,15,17,19,20,22 with a lack of social support a barrier.10,11,22 Receiving encouragement and positive reinforcement from others is a facilitator of physical activity12,14,15,19 where-as a lack of encouragement is a barrier.15 Interacting and socialising with others is a facilitator to becoming and staying active,11,12,22 as is having a training partner or buddy,10–12,15,17, but a barrier if lacking.10,15 Social opportunities can create a sense of commitment and accountability to others, facilitators of becoming and staying active as highlighted in the Psychological Capability domain.19,22 However, comparison to others can have a negative impact on levels of physical activity.11

Healthcare professionals are identified as referent individuals whose information, advice and support carries weight; the opportunities afforded by the interpersonal interactions with these individuals constitute important barriers10–12,15,17,22 and facilitators10–15,17–22 to physical activity. The creation of therapeutic alliances between care providers, activity leaders and individuals,12,17 shared planning based on needs, abilities and preferences,10,17,19 with regular contact,17 clear instructions, demonstrations,10,11 and supervision are all facilitators to physical activity.11,17,18,21 Further, the creation of behavioural contracts,19 as-well-as sharing concerns about physical activity,17 contribute to becoming and staying active. A lack of support, advice, information and instructions from such trusted professionals, or worse, conflicting information, are barriers to becoming and staying active.10–12,15,17,22

**Motivation – Reflective**

Negative beliefs and attitudes towards physical activity and health in general are a barrier to change.10–12,15,17,22 Having a poor self-image, a self-perception of being an inactive person,10 as-well-as a fatalistic view that nothing can be done to improve one’s condition,10–12 are barriers to physical activity. Further, taking part in physical activity but not seeing any or only limited physical improvements,12,15,17 and a scepticism of the benefits of physical activity,11,12 are identified barriers. A belief that being active is too much time and effort,10,12,15,17 of low importance17 with energy being needed for other tasks,11,15,17 are also identified barriers to change. Some may believe that they are already active.10

Conversely, a belief that physical activity can improve general health,10,11,15,17,22 manage and take control of the condition,10,11,15,17,21 improve symptoms10,11,15,17 potentially preventing the need for medication and surgery,11,12,17 as-well-as an understanding and a positive interpretation of post exercise feelings,17 are facilitators to becoming and staying active.

Perceiving few physical barriers to physical activity, or knowing how to work around such barriers,10 and identifying as an active person,10–12 are reported to positively influence beliefs and attitudes towards physical activity and one’s ability to change. A belief that physical activity can be incorporated into daily life is a facilitator to becoming and staying active,12 normalising physical activity and making it a habit (an Automatic Motivation).12,17 Physical activity as a means to get out of the house is identified as a motivating factor.12 However, it is also identified that activities of daily living are believed not to be enough for health benefits.12

A belief that physical activity provision is not suitable with concerns about personal safety are identified barriers linked to the Opportunity domain.10,12 Physical activity self-efficacy and the confidence to self-manage one’s condition are frequently identified factors in becoming and staying active.10–12,15,17–19,21 The setting of goals, and the achievement of set goals, are identified as facilitators of physical activity.17–20

**Motivation – Automatic**

The belief that physical activity can be detrimental to one’s condition is identified as evoking a feeling of fear toward being active;12,15 fear of contact with others is also reported.22 Good mental wellbeing is identified as a facilitator of physical activity10,11,17 and conversely, poor mental wellbeing a barrier.10,11,17,18

Already ingrained sedentary habits are identified as barriers to physical activity.10 The impact of physical symptoms, and their unpredictability, as highlighted in the Physical Capability domain, are reported to impact upon the ability to make physical activity a habit and break positive physical activity habits that may have previously existed,11,12,17 impacting on the sense of self if previously active.12 An acceptance of one’s condition and physical limitations are facilitators to becoming and staying active.17

A general apathy towards activity,11,15,17 a lack of enjoyment and non-positive experiences of being active, both historically and with the condition, 10–12 are reported to evoke negative emotions towards physical activity, where-as positive experiences and outcomes result in positive emotions.10–12,15,17,18,22 Linked to the Social Opportunities domain, positive reinforcement from referent individuals evoke positive feelings toward physical activity;10,14,15 support from referent individuals creates a sense of not wanting to let people down.12,17

**Discussion**

This review of reviews set out to identify the modifiable capability, opportunity and motivational barriers and facilitators to physical activity in people with a musculoskeletal condition to support intervention development.

**Using the barriers and facilitators to drive action**

This review offers intervention designers an overview of potential means of improving physical activity in people with a musculoskeletal condition, from the broad range of factors known to influence behaviour. A checklist to support intervention designers in this process has been created and is included as Supplementary File 1. With an understanding of the capability, opportunity and motivational barriers and facilitators to physical activity in people with a musculoskeletal condition, intervention designers can work through the steps of the Behaviour Change Wheel to identify intervention functions, policy categories and behaviour change techniques to bring about change.25

To influence a change in behaviour it is important to “track prevalence of these behaviours over time, region and social group” (NICE, 2014, p25).25 Intervention designers must ensure that they are tracking physical activity in their populations to measure changes in the desired behaviour and the components of behaviour with comparison, where possible, against a control group.26

The findings reveal a complex interplay between the identified modifiable factors influencing physical activity. It is, therefore, not possible to rank the individual barriers and facilitators from the included reviews in terms of importance, however, the psychological factors are suggested to be of greater importance,15,27 and may be more accessible to Intervention designers as they do not require a higher level of policy or legislative change. Intervention designers should decide upon which of the identified factors they feel are changeable and are likely to have the biggest impact on physical activity in their target populations.

**Non-modifiable factors and the wider determinants of physical activity**

Many of the barriers and facilitators reported in this review of reviews are modifiable and specific to people with a musculoskeletal condition. However, the wider determinants of physical activity should be considered when designing and evaluating interventions, aiming to reduce any identified inequalities with interventions delivered with universal proportionalism.28

The non-modifiable determinants of physical activity in the UK general population include low-levels of health literacy, declining physical activity with age, English not as a first language, gender differences (males more active than females), socio-economic status, geographical differences, differences by ethnic group (Black people and Asian people are more likely to be inactive), and education level (with those less educated more likely to be inactive).24 These non-modifiable factors that influence physical activity in the general population are likely to also be relevant in those with a musculoskeletal condition.10,17 Therefore, the wider determinants of physical activity identified here are also included in the checklist included as Supplementary File 1 for consideration by intervention designers.

It is recommended that physical activity in people with a musculoskeletal condition be monitored by intervention designers on an ongoing basis from a representative sample, including data on (at least) age, gender, ethnicity and socio-economic status, allowing for more informed and targeted intervention development, identification of inequalities in physical activity, as-well as providing a robust comparator for the reach and impact of the physical activity programme.

**The importance of healthcare professionals**

The target of interventions requires consideration. The findings point strongly to the considerable influence of advice and support from trusted healthcare professionals. In particular, beliefs about the consequences of being active; such beliefs are often formed in the early stages of the diagnosis process.12 Lack of information, advice and support on physical activity from healthcare professionals may install negative beliefs, where-as positive encounters may facilitate physical activity by establishing positive attitudes and beliefs. Dobson *et al*.,10 conclude that healthcare professionals should proactively facilitate and reinforce physical activity and not expect people to overcome barriers on their own. Understanding the capability, opportunity and motivation of healthcare professionals to give physical activity support and advice, from the point of diagnosis, should be investigated so that strategies can be developed to influence this determining behaviour of physical activity in people with a musculoskeletal condition.

**Strength and limitations**

A strength of this review of reviews is the use of the COM-B model to synthesise the barriers and facilitators to physical activity in people with a musculoskeletal condition. Analysis of the barriers and facilitators to physical activity by COM-B component allows for the easy progression to evidence-based intervention development using the Behaviour Change Wheel.25 A further strength of this review of reviews is the inclusion of knowledge users within the research team to ensure knowledge exchange.

The major limitation of this review of reviews is that the searches were not fully systematic. As a rapid review, the search process was streamlined, for example, including only two databases and completion of the search and screening by only one investigator. Further, the search was highly defined with some terms searched for in the title field only which may have led to the exclusion of some relevant reviews. As is usual practice in reviews of this nature, a quality appraisal was not conducted. Despite the limitations, this rapid review of reviews has utility in evidence-based decision making to support physical activity improvement in people with musculoskeletal conditions.

**Conclusion**

This rapid review of reviews has identified the complex nature of physical activity in people living with a musculoskeletal condition. Using the COM-B model to frame the identified barriers and facilitators provides intervention designers with a range of potential components amenable to for further development to improve physical activity for this population group.

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**Competing interest**

RH, AH, AA, JD and VO are members of staff at Versus Arthritis. No other conflicts of interest are declared.

**Author contributions**

JW was the principal investigator for this rapid review of reviews; DS and RH provided input into the design. JW conducted the search, screening, coding and analysis of the identified reviews and wrote the final manuscript. TP, AB, AH, AA, JD, and VO supported the coding and analysis of the identified reviews. All authors read and approved the final manuscript.

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**Supplementary file 1**

Proposed activity or action: Date:

Checklist completed by:

|  |  |
| --- | --- |
| The following factors have been identified as barriers and facilitators to physical activity in people with a musculoskeletal condition. Thinking about the proposed activity/action, which of the following barriers does it aim to overcome and which of the facilitators does it aim to enhance? |  |
|  |  |  |  |  |
|   | Barriers | ✓ | Facilitators | ✓ |
| Capability PHYSICAL | Disease symptoms |   | Symptom stability |   |
| Comorbidities and/or poor general health |   | Physical function |   |
| Lack of physical function |   | General health |   |
| Exercise induced discomfort |   | Physical skills |   |
|  |   | Being well rested physically |   |
|   |   |   |   |   |
| Capability PSYCHOLOGICAL | Failure to follow advice due to a lack of understanding |   | Knowledge of the condition specific benefits |   |
| Lack of knowledge of the benefits |   | Being well rested mentally |   |
| Mental tiredness |   | Possessing the mental skills to make physical activity decisions (know-how, level, activity, barrier reduction and adaptations) |   |
| Forgetfulness |   | The skills to self-monitor/self-regulate physical activity |   |
| Lack of mental ability to make physical activity decisions (not sure how, what level or activity) |   | Prioritisation of physical activity |   |
| Lack of awareness of physical activity as a strategy for self-management |   | Integration into daily life |   |
| Not a priority due to other commitments |   | Commitment to referent individuals |   |
|   |   |   |   |   |
| Opportunity PHYSICAL | Lack of time |   | Physical activity diary and resources to self-monitor |   |
| Bad weather |   | Exercise information and education |   |
| Inaccessible facilities or activities (time and location) |   | Exercise prescription (individualised programming, instructions and demonstrations) |   |
| Cost/money |   | Graded programmes |   |
| Unqualified instructors |   | Condition management programmes |   |
| Activity level unequal to skill and ability |   | Greater frequency/less intensity  |   |
|   |   | Structured consultation |   |
|   |   | Follow-up sessions |   |
|   |   | Convenient and accessible facilities |   |
|   |   | Low cost |   |
|   |   | Understanding, knowledgeable and skilled instructors |   |
|   |   | Activities inclusive of family and friends |   |
|   |   | Choice of activities and mode of delivery (home based, individual and group based activities) |   |
|   |   | Good weather |   |
|   |   | Exercise in warm water |   |
|  |   | Time |   |
|   |   |   |   |   |
| Opportunity SOCIAL | Lack of support |   | Inclusive, therapeutic alliance between care providers and patient, with early intervention |   |
| Poor and conflicting information from healthcare professionals |   | Tailored advice, information, support and encouragement from healthcare and exercise professionals, with regular contact |   |
| Lack of engagement and interaction with care providers |   | Opportunity to share concerns |   |
| Lack of instructions on what to do |   | Involvement in making physical activity programme decisions |   |
| Lack of a training partner |   | Demonstrations and instructions on what to do by healthcare professionals |   |
| Negative social comparisons |   | Supervision |   |
| Lack of social support |   | Being accountable to others |   |
| No encouragement |   | Creating a behavioural contract |   |
|   |   | Social/peer support |   |
|   |   | Group socialisation |   |
|   |   | Exercising with a partner |   |
|  |   | Positive reinforcement |   |
|   |   |   |   |   |
| Motivation REFELCTIVE | Negative beliefs and/or experiences of physical activity on symptoms |   | Positive beliefs about the benefits of physical activity in general |   |
| Safety and suitability concerns surrounding physical opportunities |   | Belief that physical activity is a means to self-manage condition and symptoms and to prevent medication and surgery |   |
| Negative general health beliefs and attitudes |   | Taking control of condition |   |
| Belief that nothing can be done to help condition |   | Physical activity self-efficacy |   |
| Belief that physical activity caused condition |   | Self-efficacy for condition management |   |
| No or limited physical improvements from physical activity |   | Self-motivation |   |
| Sceptical of the benefits of physical activity |   | Understanding post activity physical feelings |   |
| Perception that symptoms mean physical activity is not possible |   | Identifying as an active person |   |
| Perception that comorbidities mean physical activity is not possible |   | Few perceived barriers |   |
| Poor self-image |   | Belief that activity could be incorporated into daily life |   |
| Self-perception of being inactive |   | Normative beliefs |   |
| Belief that already active enough |   | Way of getting out of the house |   |
| Belief that lacking in skills and function to become active |   | Setting and achieving goals and intentions |   |
| Energy needed for other tasks |   |   |   |
| Low-levels of motivation |   |   |   |
| Low importance |   |   |   |
| Too much time/effort |   |   |   |
| Activities of daily living are not enough |   |   |   |
| Low physical activity self-efficacy |   |  |   |
|   |   |   |   |   |
| Motivation AUTOMATIC | Unpredictability of symptoms prevents habit formation |   | Positive emotions, experiences and outcomes of physical activity |   |
| Loss of previous activity patterns due to condition |   | Positive reinforcement |   |
| Sedentary habits formed |   | Good mental wellbeing |   |
| Lack of positive reinforcement |   | Not wanting to let people down |   |
| Lack of enjoyment from non-positive experiences of physical activity (historically and with condition) |   | Disease acceptance |   |
| Fear of further damage |   |  |   |
| Apathy towards physical activity |   |   |   |
| Fear of contact with others |   |   |   |
| Condition impacts on sense of self (particularly if considered previously active) |   |   |   |
| Poor mental wellbeing |   |   |   |
|  |  |  |  |  |

|  |  |
| --- | --- |
| Determinant/inequality | ✓ |
| Has the health literacy of the participants been considered? |  |
| Is the programme inclusive of people who do not have English as a first language? |   |
| Have physical activity inequalities by ethnicity been considered? |   |
| Have physical activity inequalities by age been considered? |   |
| Have physical activity inequalities by gender been considered? |   |
| Have physical activity inequalities by socio-economic status been considered? |   |
| Have physical activity inequalities by education level been considered? |   |
| Have physical activity inequalities by geography been considered? |   |