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Perceived barriers and facilitators to increasing physical activity among people with musculoskeletal disorders: a qualitative investigation to inform intervention development

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Purpose: Musculoskeletal conditions can impair people's ability to undertake physical activity as they age. The purpose of this qualitative study was to investigate perceived barriers and facilitators to undertaking physical activity reported by patients accessing ambulatory hospital clinics for musculoskeletal disorders.

Patients and methods: A questionnaire with open-ended items was administered to patients (n=217, 73.3% of 296 eligible) from three clinics providing ambulatory services for nonsurgical treatment of musculoskeletal disorders. The survey included questions to capture the clinical and demographic characteristics of the sample. It also comprised two open-ended questions requiring qualitative responses. The first asked the participant to describe factors that made physical activity more difficult, and the second asked which factors made it easier for them to be physically active. Participants' responses to the two open-ended questions were read, coded, and thematically analyzed independently by two researchers, with a third researcher available to arbitrate any unresolved disagreement.

Results: The mean (standard deviation) age of participants was 53 (15) years; n=113 (52.1%) were male. A total of 112 (51.6%) participants reported having three or more health conditions; n=140 (64.5%) were classified as overweight or obese. Five overarching themes describing perceived barriers for undertaking physical activity were "health conditions", "time restrictions", "poor physical condition", "emotional, social, and psychological barriers", and "access to exercise opportunities". Perceived physical activity facilitators were also aligned under five themes, namely "improved health state", "social, emotional, and behavioral supports", "access to exercise environment", "opportunities for physical activities", and "time availability".

Conclusion: It was clear from the breadth of the data that meaningful supports and interventions must be multidimensional. They should have the capacity to address a variety of physical, functional, social, psychological, motivational, environmental, lifestyle, and other perceived barriers. It would appear that for such interventions to be effective, they should be flexible enough to address a variety of specific concerns.

Keywords: exercise, pain, comorbidity, lifestyle, sedentary, behavior

Introduction

Physical inactivity has been identified by the World Health Organization as the fourth leading risk factor for mortality globally.[1] In addition to mortality, insufficient physical activity has substantial negative personal, economic, and social impacts.[2,3] There is an increasing burden of musculoskeletal disorders among increasingly sedentary and aging populations.[4–9] In contrast, benefits of physical activity include improved

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musculoskeletal and mental health, as well as improved cardiovascular and pulmonary health.[10,11] Furthermore, physical activity may reduce the severity of existing health conditions and prevent a range of serious chronic conditions.[10,12–18] Maintaining a physically active lifestyle throughout the life span also reduces the risk of being impacted by age-related physical debility, falls, and depression.[19–23]

Effectively promoting lifestyle-related physical activity behavior change among aging clinical populations is typically not easy or straightforward,[24] and the contexts for such interventions may also warrant consideration. A recent investigation has highlighted that people with musculoskeletal disorders frequently report low levels of physical activity.[25] Furthermore, among this clinical group, age was associated with reduced physical activity levels, higher body mass index, and a greater number of comorbid health conditions.[25] While patients with musculoskeletal disorders will likely benefit from physical activity appropriate for their condition, they are also likely to face additional barriers to becoming physically active compared to those without musculoskeletal dysfunction.[25] Pain and difficulty with movement are two likely contributors to reduced participation in exercise.[13,24] Depression has also been associated with both chronic musculoskeletal disorders and physical inactivity.[14] Paradoxically, while depression may hinder motivation for undertaking physical activity, increased physical activity also protects against depression.[26]

Regarding potential contexts, the interaction between patients and health professionals in clinical settings may prove a useful opportunity to link inactive patients with positive physical activity behavior-change interventions, as it is likely that these inactive patients may require additional supports to become physically active.[13,14,24] Outpatient hospital clinics that provide conservative (nonsurgical) interventions for people with musculoskeletal disorders are one potential setting where physical activity behavior-change interventions could be initiated.[24,25] Health professionals who routinely work in these clinical settings are likely to have in-depth knowledge of the patients' presenting conditions. This includes expertise regarding potential exercise and other physical activities that would (and would not) be appropriate for their patients. Previous research has indicated that health professionals who work in these settings tend to maintain high levels of physical activity in their own lives,[27] a potential indicator that they intrinsically value physical activity.

A key step in the development of effective intervention strategies to assist inactive patients with musculoskeletal disorders to become more physically active is to understand their perceived barriers to undertaking physical activity in their everyday lives. Whether perceived barriers are veritable or not, strategies that effectively address perceived barriers may facilitate improved physical activity outcomes among inactive patients. Barriers to undertaking physical activity have been investigated among a variety of clinical populations that have relevance to people with musculoskeletal disorders. This includes older adults with physical debility,[28] people with diabetes,[29] adults accessing primary care services,[30] people with rheumatoid arthritis,[31–35] and people with mental illness.[36] Some of the key overarching barriers likely to hinder patients becoming physically active include concerns about pain, safety, and low levels of motivation. The purpose of this qualitative study was to investigate perceived barriers and facilitators to undertaking physical activity during everyday living reported by patients accessing ambulatory clinics for musculoskeletal disorders.

Patients and methods

Design

A questionnaire with open-ended items was administered among participants taking part in a cross-sectional survey.[25]

Participants and setting

Patients (n=296) from three clinics providing ambulatory services for nonsurgical treatment of musculoskeletal disorders in a metropolitan region of Brisbane, Australia were eligible to participate in the cross-sectional study. These clinics included a multidisciplinary service for spinal pain, an outpatient physical therapy clinic, and an outpatient aquatic physical therapy clinic for musculoskeletal disorders. These clinics were chosen to provide a cross-section of community-dwelling individuals across the life span experiencing musculoskeletal conditions.[25]

Ethics statement

All potential participants received a written study-information form inviting them to provide their informed consent prior to participation. Participation was voluntary, and did not influence services offered to patients at the participating clinics. This investigation was approved by the Metro South Human Research Ethics Committee and the Queensland University of Technology Human Research Ethics Committee as a low-risk investigation.

Materials and procedure

The questionnaire included items to describe the clinical and demographic characteristics of the sample including age, sex, height and weight, primary reason for visiting the clinic,

and current diagnosed health conditions. It also included two open-ended questions requesting detailed qualitative responses. The first asked the participant to describe factors that made physical activity more difficult (ie, perceived barriers to participation in physical activity), and the second asked which factors made it easier for them be physically active (ie, perceived facilitators of physical activity). To maximize response rate, participants were permitted to provide their responses via the telephone or return written responses to the questions (via paper copy or a web-based survey platform at the patients' convenience). Most participants (n=203, 93.5%) provided their responses over the telephone rather than paper copy (n=10, 4.6%) or web-based platform (n=4, 1.8%). For telephone respondents, a research assistant typed the participants' responses, then read the recorded responses to the participants to ensure they were happy with the recorded narrative (member checking for narrative accuracy). The participant was given the opportunity to clarify, amend, or expand their response or provide additional new information. The interviewer was also able to record any additional contextual notes where they considered this relevant to understanding the participant narrative. This process was the same for identifying both barriers and facilitators. There was no limit on the length of each response recorded.

Analysis

Descriptive statistics (means, standard deviations, numbers, and percentages) for the demographic information from this survey were tabulated (Table 1). Self-reported height and weight was used to calculate body mass index (BMI) for each respondent. Participants' responses to the two open-ended questions were independently analyzed by two researchers (MS and MW). Each researcher first read all responses to familiarize themselves with the data, then coded each individual response, grouped the responses with similar content into categories, and identified themes under which the categories were classified.[37] When a single response contained multiple phrases or components that could be classified in more than one category, the respective components were attributed to each relevant category (with the remainder of the original phrase also included alongside it to ensure the appropriate contextual information was readily available). After independent coding, the two researchers discussed their findings with a third researcher (SMM) to obtain consensus on the themes and categories within themes; this researcher was also able to arbitrate any unresolved disagreement between the two primary coders, but no such unresolved disagreement occurred. A representative summary of the themes and categories reported by respondents was tabulated.

Table 1 Demographic information for all participants

Clinical and demographic characteristics	All respondents n=217
Mean (standard deviation) age in years	53 (15)
Sex – male (%)	113 (52.1%)
Body mass index (derived from self-report)	
Underweight (<18.5)	3 (1.4%)
Normal weight (18.5–25)	74 (34.1%)
Overweight (25–30)	49 (22.6%)
Obese (30–35)	62 (28.6%)
Severely obese (40–45)	15 (6.9%)
Very severely obese (≥45)	14 (6.5%)
Primary reason for clinic attendance	
Back condition	83 (38.2%)
Shoulder condition	37 (17.1%)
Knee condition	19 (8.8%)
Neck condition	17 (7.8%)
Elbow, wrist, or hand condition	12 (5.5%)
Ankle condition	10 (4.6%)
Hip condition	7 (3.2%)
Weight loss	1 (0.5%)
Other condition	31 (14.3%)
Comorbidity (not primary reason for clinic attendance)	
Other musculoskeletal disorders	
Back condition	25 (11.5%)
Shoulder condition	33 (15.2%)
Neck condition	41 (18.9%)
Knee condition	36 (16.6%)
Hip condition	25 (11.5%)
Elbow, wrist, or hand condition	18 (8.3%)
Ankle condition	14 (6.5%)
Osteoporosis	18 (8.3%)
Osteoarthritis (multiple joints affected)	38 (17.5%)
Other health conditions	
Depression	41 (18.9%)
Hypertension	39 (18.0%)
Diabetes	38 (17.5%)
Heart condition	25 (11.5%)
Eye or vision problems	23 (10.6%)
Asthma	23 (10.6%)
Cancer	22 (10.1%)
Digestive problems	10 (4.6%)
Kidney disease	9 (4.1%)
Hay fever/allergies	8 (3.7%)
Fibromyalgia	4 (1.8%)
Epilepsy	4 (1.8%)
Stroke (past)	4 (1.8%)
Other conditions	37 (17.1%)

Results

Participant characteristics

The questionnaire was completed by 217 participants (73.3% of eligible patients). Participant demographics, BMI, and clinical characteristics are presented in Table 1. In summary, the

mean (standard deviation) age was 53 (15) years, and approximately half (n=113, 52.1%) were male. The most frequent reasons for clinic attendance were back (n=83, 38.2%) and shoulder (n=37, 17.1%) conditions, among an assortment of conditions affecting all body regions. A total of 140 (64.5%) participants self-reported height and weight that equated to a BMI classified as overweight or obese. The most common (nonmusculoskeletal) conditions reported by patients were depression (n=41, 18.9%), hypertension (n=39, 18.0%), and diabetes (n=38, 17.5%). A total of 112 (51.6%) participants reported having three or more health conditions.

Barriers to physical activity

Five major themes describing perceived barriers for undertaking physical activity were identified. These were "health conditions", "time restrictions", "poor physical condition", "emotional, social, and psychological barriers", and "access to exercise opportunities". Each theme comprised a number of categories, which are displayed in Table 2. While some categories could potentially have been assigned to more than one theme, allocations were made on the basis of consensus. For example, the researchers agreed that the "comorbid conditions" category was most closely aligned under the "health conditions" theme, although responses in this category may have also been related to "physical condition". Direct respondent quotes illustrating elements of each of the overarching physical activity-barrier themes are presented in Table 3. Selected quotes are also included in the theme descriptions to follow.

Theme 1: health conditions

Respondents reported a broad range of perceived physical activity barriers related to health conditions. Musculoskeletal conditions featured prominently among this population as a barrier to physical activity, with patients often reporting being unable to exercise due to "my lower back problems" (or other relevant affected body region); many patients believed that physical activity would worsen their condition. Other respondents made reference to specific symptoms, eg, "sciatica [with] pain, numbness, and a lack of energy in [my] leg" as barriers to being active. Statements about pain as a physical activity barrier were also reported independently of reference to another health condition or specific body region. For example, one patient stated "[I just get] pain and discomfort," while another reported that "pain in my body" when undertaking physical activity was a barrier. Some patients mentioned other specific comorbid health conditions as barriers. For example, one patient reported being unable to exercise "[because I have had] two pulmonary aneurisms", while another stated difficulty being active because of "muscle loss and large skin graft, which needs protection with [a] garment" following a previous traumatic injury. Others reported more general statements about their health being a barrier to physical activity, eg, "My [chronic] health conditions make it hard to be active." These general statements were often followed by statements that related to other themes, particularly physical condition and emotional and psychological barriers. Painkillers or other medications that caused drowsiness or gastrointestinal complaints were also reported by some patients as barriers to undertaking physical activity.

Theme 2: time restrictions

Patients reported time restrictions in their everyday lives to be a substantial barrier to undertaking physical activity. Competing time demands that acted as barriers to physical activity were broad-ranging, and included reference to

Table 2 Perceived barriers to undertaking physical activity

Health conditions	Time restrictions	Poor physical condition	Emotional, social, and psychological	Access to exercise opportunities
1. Musculoskeletal conditions (n=108)	1. Work (n=22)	1. Movement restriction (n=31)	1. Lack of motivation (n=17)	1. Lack of money (n=9)
2. Pain (n=72)	2. Being a caregiver (n=22)	2. Lack of flexibility and/or strength (n=19)	2. Depression (n=10)	2. Difficulty with transport (n=6)
3. Comorbid conditions (n=51)	3. Unspecified time restrictions (n=19)	3. Breathing difficulties (n=8)	3. Fear and anxiety (n=6)	3. Weather-related concerns (n=3)
4. Specific medication effects (n=2)	4. Domestic duties (n=4)	4. Lack of energy or stamina/feeling tired (n=8)	4. Lack of social support (n=4)	4. Lack of people to exercise with (n=3)
	5. Study (n=3)	5. Overweight (n=6)		5. Lack of skills to use local exercise facilities (n=3)
	6. Lack of physical activity routine (n=3)	6. Age-related frailty/poor balance (n=4)		6. Distance (n=2)

Table 3 Quote excerpts illustrating patient-perceived barriers to undertaking physical activity

Health conditions	Time restrictions	Poor physical condition	Emotional, social, and psychological	Access to exercise opportunities
"I have spinal damage, so I can't do most exercise" (1)	"I'm a mother of two children; I'm always behind with my work" (1, 2)	"I have a poor sleeping pattern that leaves me very tired" (4)	"I'm not really motivated at the moment" (1)	"I don't drive, so I can't easily go to a gym" (2)
"I have heart failure; it's hard to do any activity" (3)	"I'm not allocating enough time to do exercise" (6)	"I'm feeling weak recovering from surgery and radiation" (2)	"I'm not feeling good mentally" (due to depression) (2)	"It's too cold to swim in an unheated pool" (3)
"I can't exercise because of the pain in my arms and back" (2)	"Working and commuting leaves me little time for exercising" (1)	"I get short of breath when I walk uphill" (3)	"Just laziness" (1)	"Going to the pool is too expensive" (1)

Note: Category numbers from each theme in parentheses.

specific sources of competing requirements, such as "[caring for] my 16-month-old daughter", as well as more general comments about the "business of life in general", "family and work commitments", and "keeping up at home" with domestic duties. In addition to competing time demands, there was also recognition by some patients that they did not assign a high priority to physical activity in comparison to their other activities of daily life, or did not plan to undertake physical activity when scheduling their time.

Theme 3: poor physical condition

Many patients described aspects of their current physical condition as a barrier to undertaking physical activity. Some patients associated their current level of physical activity with an existing or past health condition (including past injuries). For example, one patient perceived they did not have the physical capacity to undertake physical activity due to the "metal plate in my knee" (from a past injury). On the other hand, other physical capacity-related factors were more general and not associated with a health condition or injury. For example, one individual reported being "short of breath when I walk uphill" as a barrier to undertaking physical activity, while another reported that the "long time of being inactive" was a barrier to becoming active again. Physical condition-related barriers that were associated with medical conditions included potentially modifiable physical condition elements, as well as some that were nonmodifiable. For example, some aspects of physical conditions potentially associated with nonpermanent musculoskeletal conditions may be considered modifiable, as may being overweight or obese. On the other hand, such barriers as "having trouble breathing [due to the] asbestos in [my] lungs" could be considered somber and foreboding barriers to undertaking physical activity. A few described unusual perceived physical condition barriers, such as lacking the energy to undertake physical activity due to "fluoridation in the water supply". Aging-related factors were also prevalent in the responses of a number of patients, including fear of falling due to poor balance, as well as a more general sentiment of being unable to exercise "because I am too old".

Theme 4: emotional, social, and psychological barriers

Emotional and psychological barriers consisted of three categories (Table 2). Lack of motivation to undertake physical activity was the most prominent reported barrier aligned under this theme. It is noteworthy that numerous respondents who noted lack of motivation also identified pain and other physical activity barriers associated with musculoskeletal conditions. Most responses pertaining to feelings of depression, fear, and anxiety did not appear to be made with reference to a diagnosed mental health condition. As such, they were not categorized under the "health conditions" theme, but were highlighted under this separate theme, which also reflected their relative importance. Numerous fear- and anxiety-related responses centered on a fear of making their musculoskeletal condition(s) worse by undertaking physical activity.

Theme 5: access to exercise opportunities

While responses falling under this theme were fewer than previous themes, some participants noted that difficulty with gaining access to exercise opportunities was a barrier to undertaking physical activity. Responses included variants of fiscal, social, and environmental barriers. Lack of money was the response category with the most frequent responses under this theme, often limiting access to preferred activity types rather than all forms of physical activity. For example, one patient reported that they did "not [have] enough money to go to a gym or pool [regularly]". Other responses indicated that patients considered not being able to access their preferred exercise locations as a barrier. For example, one respondent

reported it is "too far to travel; I live 30 km from [the] town". Responses in the weather category most frequently related to it being "too cold" to undertake preferred physical activities, despite the subtropical location of the study.

Facilitators of physical activity

Perceived physical activity facilitators were also aligned under five themes, namely "improved health state", "social, emotional, and behavioral supports", "access to exercise environment", "opportunities for physical activities", and "time availability". There were elements of reciprocity between some reported facilitators and the aforementioned barrier themes (Table 2), but enough discrepancies to warrant a separate theme structure for facilitators (Table 4). As previously, several response categories could have been potentially assigned to more than one overarching theme. These response categories were tabulated under the theme with which they were most closely aligned. Direct patient quotes are presented in Table 5 to illustrate elements of each of the overarching physical activity-facilitator themes in the patients' own words.

Theme 1: improved health state

Many participants described improvement in health state as a facilitator of physical activity. The benefits of reduced pain, as well as improved strength and range of movement associated with interventions for musculoskeletal conditions, were specifically mentioned as contributing to undertaking physical activity. Further, some patients believed that losing weight would assist them to be physically active, although it is noteworthy that this was typically mentioned in the future tense, not from a position of having lost weight. Some participants noted that an improved health state, including being more active, would in itself facilitate further physical activity. For example, one patient stated that "breaking the vicious cycle of inactivity, bad health, depression, more inactivity, and so on" would facilitate them being physically active in the future.

Theme 2: social, emotional, and behavioral supports

Patients described a variety of social, emotional, and behavioral supports that assisted them in undertaking physical activity. Interestingly, phrases relating to this theme often overlapped with more than one category. For example, some responses that identified exercise as beneficial noted parallel benefits, such as greater motivation or enjoyment in the physical activity being undertaken and gaining assistance with transiting to or from an exercise location. Responses in this theme pertaining to assistance typically made reference to assistance with domestic duties and caring for children that would facilitate the respondent in being able to undertake physical activity or assistance with transit to or from an exercise location.

Theme 3: access to exercise environment

Being able to access suitable and preferred exercise environments was considered a facilitator of patients' physical activity. This included access to specific exercise locations, particularly gymnasiums or swimming pool facilities. Patients also identified access to exercise equipment, such as treadmills or stationary cycles in their homes, as beneficial to undertaking physical activity. Some older patients noted mobility equipment, such as walking sticks or frames, as enabling them to undertake physical activity. Some patients also reported other environmental factors, including favorable weather conditions or being able to walk at indoor locations, as facilitating their physical activity.

Table 4 Facilitators to undertaking physical activity as perceived by participants

Improved health state	Social, emotional, and behavior supports	Access to exercise environment	Opportunities for physical activity	Time availability
1. Health-condition intervention(s) (n=39)	1. Motivation (n=19)	1. Access to suitable exercise facilities or locations (n=17)	1. Physiotherapy (including aquatic physiotherapy) (n=29)	1. Free time (n=16)
2. Pain relief (n=26)	2. People to exercise with (n=17)	2. Equipment (n=11)	2. Getting from place to place (n=8)	2. Work flexibility (n=5)
3. Being well rested (n=9)	3. Assistance (n=15)	3. Weather (n=8)	3. Activities of daily living (including domestic tasks) (n=8)	3. Time management (n=4)
4. Optimizing posture and movement (n=8)	4. Mood and exercise enjoyment (n=9)		4. Children (n=7)	
5. Improved fitness (n=7)	5. Encouragement and emotional support (n=5)		5. Pets (n=7)	
6. Weight loss (n=5)			6. Active work (n=3)	

Table 5 Quote excerpts illustrating perceived facilitators to undertaking physical activity

Improved health state	Social, emotional, and behavior supports	Access to exercise environment	Opportunities for physical activity	Time availability
"Not having my knee problem would make it easier to be active" (1)	"Having company makes it more fun to do, and you're kept accountable" (1, 2, 4)	"My gym has a crèche, so I can take my children there" (1)	"Doing my basic physiotherapy exercises makes a big difference" (1)	"Making more time available for exercise" (1)
"Medication for pain relief makes moving around a lot easier" (2)	"My husband accompanies me on walks and helps when it is painful" (2, 3)	"Proximity to an open space with walking tracks" (1)	"When I take my kids to their training, I go for a run when I'm down there" (4)	"I'm a sole trader, which means freedom from regular work hours" (2)
"Stretching regularly to keep my muscles from becoming too tight" (5)	"Having someone to go exercise with" (2)	"I have a treadmill in case of rain" (2)	"I ride a bike from my front door" (2)	"Having an organized daily schedule helps me" (3)

Note: Category numbers from each theme in parentheses.

Theme 4: opportunities for physical activities

Respondents identified having opportunities for physical activity built into their everyday activities as a facilitator for being physically active. These included physical activities undertaken as part of interventions provided at the participating clinics, particularly exercise prescribed by their physiotherapist, including both land- and water-based exercises. Some participants also identified the benefits of active occupation, domestic, and transit activities in promoting regular physical activity. Patients with children in their household also identified undertaking activities with their children or grandchildren as facilitating physical activity. Opportunity to exercise while other family members, particularly children, were taking part in organized sport training or competition at sporting venues was also identified as a potential physical activity facilitator.

Theme 5: time availability

The "time availability" theme had the least number of responses attributable to it. Some participants reported "having plenty of free time" as something that facilitates being physically active. Other patients reported that flexible work schedules or scheduling physical activity into their daily routine was beneficial for fostering physical activity. However, it was noteworthy that at least one patient remarked, "Exercise is the first thing to go when things get busy."

Discussion

Main findings and interpretation

Patients with musculoskeletal conditions reported a broad array of perceived physical activity barriers and facilitators. Some of the reported barriers and facilitators were consistent with investigations among other population groups, including concerns about pain, safety, and motivation.[28–30,36] The key findings from the current study, however, are the diversity of factors noted by participants and the multiple constellations of factors across participants. As reflected in Tables 2 and 4, responses included a variety of physical, functional, social, psychological, motivational, environmental, lifestyle, and other factors. It was not surprising that responses relating to musculoskeletal conditions and pain had the highest frequencies of responses, given the nature of the clinical population. However, given the diversity of other perceived barriers and facilitators, it would appear that even in a hospital-based physical therapy clinic, meaningful interventions must encompass an array of strategies. Further, it would appear that for such interventions to be effective, they should be tailored to address the specific concerns of each individual. This diversity of responses also suggests that an individualized "goal-setting"-type approach rather than a "one-size-fits-most" approach is more likely to facilitate the promotion of physical activity among people with musculoskeletal disorders.

The relative priorities reported by patients highlight the importance of considering the impact of their existing musculoskeletal conditions, pain, and other comorbid health conditions when designing and implementing interventions to assist inactive patients to become more physically active. In addition, inactive patients will likely perceive their own poor physical condition or excess adiposity to act as a barrier to becoming physically active. This suggests that clinical settings where patients interact with health professionals that have in-depth knowledge of patients' conditions are perhaps also an ideal setting for correcting any misinterpretation of health-related barriers, and the safe initiation of physical activity behavior-change interventions. Findings from this investigation also reflected the importance of social and psychological supports as potential facilitators of physical activity among this clinical group, where physical difficulties were not the only perceived barriers to being physically active.

Some perceived barriers reported by patients may be considered nonmodifiable, or at the very least difficult to modify with a narrow physical activity intervention. On the other hand, the interrelated nature of many of the barriers and facilitators suggests that starting with such an intervention may have mitigating effects on other perceived barriers for inactive patients from this clinical population. Perhaps the most encouraging findings were derived from the physical activity facilitators reported by patients in this sample. Some of the perceived facilitators were direct reflections of perceived barriers and dealt with comparable content matter. For example, strategies to improve patients' health states, reduce pain, and identify accessible opportunities to undertake physical activity could directly address key perceived barriers to undertaking physical activity in this population. The thematic representation of potential physical activity facilitators reported by patients (Table 4) provides a rich framework of ideas for consideration in the design of individually targeted physical activity interventions for this clinical population.

Specific considerations for physical activity interventions

There are at least four considerations that are useful for informing the development and implementation of physical activity-promoting interventions among patients with musculoskeletal disorders. First, physical activity-promoting interventions should be integrated with health services that are being accessed by this clinical group. Patients frequently reported a range of health conditions or physical capacity factors as barriers, and many of these may be remedied by appropriate clinical interventions. This is not limited to interventions for the primary presenting musculoskeletal disorder and associated pain, but potentially for a range of other conditions that are prevalent in this population, including diabetes, cardiovascular conditions, and depression. Second, it is important that interventions designed to promote physical activities among a cross-section of patients include a range of potential physical activity types with which patients can engage in the context of their daily lives. This should include physical activities that are easily accessible, appropriate for patients' state of health, not dependent on the availability of financial or other resources, and permit flexible scheduling of activities. Third, it will likely benefit patients to clearly understand the types and duration of activities that they should (or should not) undertake due to their existing health conditions to ensure that well-intentioned patients are not needlessly avoiding safe physical activities that they inadvertently perceive to be hazardous. Fourth, interventions that promote physical activity among this clinical population should be founded in suitable behavior-change theory with the potential to address nonphysical health barriers and facilitators, including social factors and motivation.

Strengths and limitations

There are several strengths and limitations that may influence extrapolation from these findings. The inclusion of a relatively large sample (for a qualitative investigation) from a cross-section of patients with musculoskeletal disorders may be considered both a strength and a weakness. This cross-section of patients ensured that a wide range of responses was obtained and patients with a variety of conditions, ages, and health states were represented in the sample, consistent with the underlying clinical population and in concordance with the research objectives. However, the larger sample also had pragmatic drawbacks, with only two open-ended questions being addressed. A smaller sample participating in a series of focus groups or one-on-one interviews may have yielded more in-depth discussion, prompted further reflection, and explored patients' preparedness to change their physical activity behaviors.

The investigators also considered clustering the sample into subgroups on the basis of their primary reason for presentation, or other patient characteristics, to try to draw out specific recommendations for relevant patient subgroups, but this was not possible due to the nature of the sample. It was evident that patients frequently had various combinations of musculoskeletal conditions, obesity, and a range of common comorbidities. Therefore, stratification into subgroups was problematic, as each potential subgroup would not be independent of the others. The potential interpretation from nonindependent subgroups would be fraught, and the subsequent thematic frameworks from subgroups with overlapping characteristics would largely cover the same content. On the other hand, retaining only the comparatively few patients with single diagnoses and characteristics that did not overlap more than one subgroup to attain independence in each respective subgroup would have yielded findings drawn from nonrepresentative data and a lack of clinical utility that would impede the ability to generalize findings to clinical settings where multiple conditions and comorbidities are the norm.

Another consideration when interpreting findings from this study is that it specifically dealt with patient perceptions. While this successfully addressed the research aim, there was no process to identify whether perceived barriers

were verifiably correct. For example, a patient may have reported that they were not able to do physical activity due to a specific health condition, but the accuracy of this perception was not verified with their treating clinical team. It is plausible that patients may have under- or overestimated the amount or types of physical activity that they were capable of undertaking with their existing condition(s). Furthermore, participants included patients currently receiving conservative management for musculoskeletal disorders in one geographical region. Patients from dissimilar clinical populations or societies may not have reported comparable responses. Finally, interpretation of the current findings will note the limiting effect of the focus on patients who were receiving treatment in a hospital clinic. It might be expected that patients recruited in the context of a physical treatment program would focus on physical factors (perhaps more so than those with similar conditions, not seeking or receiving treatment). Despite this, these results, suggesting a broad diversity of factors, indicate that the study enabled participants to express something of the extent of their perceptions of barriers and facilitators.

Future research directions

This investigation identified a range of potential barriers and facilitators to undertaking physical activity, which can inform the development of targeted strategies to boost physical activity for this clinical group. On this basis, future investigations should examine other important questions that pertain to intervention development and evaluation, patients' willingness to participate in physical activity interventions, their preferences for how such interventions should be delivered, and whether (or how) they should be integrated within existing health services. Addressing these questions, and the subsequent development and evaluation, including cost-effectiveness, of interventions to promote physical activity for this clinical population remains a priority.

Conclusion

People attending clinics for musculoskeletal conditions are a crucial target for interventions that seek to promote physical activity. Likewise, clinic staff would appear ideally positioned to offer such interventions in the course of and complementary to current therapies. This study provides important data to inform this promising approach. It comprises a thematic analysis and categorization of the perceived barriers and facilitators of physical exercise from the perspective of a considerable number of patients (n=217), who would be the target group. The findings reflect the importance these patients placed on their existing musculoskeletal conditions, pain, and other comorbid health conditions as barriers to physical activity. As a result, it may be inferred that intervention in the course of and complementary to therapy addressing these concerns is indeed a key potential strategy.

However, it is also clear from the breadth of the data that meaningful supports and interventions must be multidimensional. They should have the capacity to address a variety of physical, functional, social, psychological, motivational, environmental, lifestyle, and other perceived barriers. It would appear that for such interventions to be effective, they should be flexible enough to address a variety of specific concerns. Musculoskeletal clinics typically place considerable emphasis on physical therapy and have formidable time demands. The challenge facing clinicians in such clinics is how to meaningfully integrate holistic and sustainable interventions that appreciate a patient's situation to the extent that they can work with them in context to address the barriers and reinforce the key facilitators for that person to successfully promote physical activity.

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Author contributions

SMM contributed to research conception, study design and conduct, analysis and interpretation, principal manuscript drafting, appraisal, and editing. MS contributed to study design, data collection, analysis and interpretation, manuscript appraisal, and editing. ALM and PK contributed to study design, manuscript appraisal, and editing. MW contributed to data analysis and interpretation, manuscript appraisal, and editing. All authors gave approval to the final manuscript.

Disclosure

The authors report no conflicts of interest in this work.

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