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Original article

Work-related interventions are not commonly included in physiotherapy management of lower limb osteoarthritis: A cross-sectional survey of Australian Physiotherapists

Yousef S. Alyousef^{a,b}, Venerina Johnston^{a,c}, Michelle D. Smith^{a,*}^a The University of Queensland, School of Health and Rehabilitation Sciences, Physiotherapy, Brisbane, QLD, Australia^b Majmaah University, College of Applied Medical Sciences, Al Majma'ah, Saudi Arabia^c University of Southern Queensland, School of Health and Medical Sciences, Ipswich, QLD, Australia

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ABSTRACT

Background: Lower limb osteoarthritis (OA) is a leading cause of disability and can affect an individual's ability to work.

Objectives: To explore Australian physiotherapists' use of work-related interventions in managing patients with lower limb OA, and identify current management practices.

Methods: Physiotherapists with at least two years of experience treating patients with lower limb OA were invited to complete an online survey to understand how physiotherapists manage patients with lower limb OA, specifically regarding interventions related to work.

Results: A total of 132 physiotherapists completed the survey. In free text responses, only 1.5% and 2.3% of physiotherapists nominated work-related items in their key components of treatment or educational topics discussed with patients with lower limb OA, respectively. From a range of work-related activities presented, over half of physiotherapists indicated they regularly/always provided education about the benefits of remaining in work (63.5%) and advice on managing symptoms at work (57.4%). Less than 10% of physiotherapists regularly/always used a validated scale to identify barriers for work (9.6%), discussed absences from work (9.6%), conducted a workplace assessment (4.4%), and discussed submitting workers' compensation claims (2.6%). Exercise and patient education were the most frequently nominated physiotherapy treatments in free text (96.2% and 86.3%, respectively) and fixed response (99.2% and 93.9%, respectively) questions.

Conclusion: Many physiotherapists do not address work-related activities in their management of patients with lower limb OA. In light of work-related challenges commonly experienced by individuals with lower limb OA, this is an important aspect of management of this condition.

1. Introduction

Osteoarthritis (OA) is a prevalent musculoskeletal condition affecting millions of people worldwide (Plotnikoff et al., 2015), and commonly occurring in the lower limb (Moskowitz, 2009). It is characterized by pain, stiffness, and functional impairments, and results in considerable physical disability (Wilkie et al., 2012). OA has conventionally been considered a disease affecting the older population (Australian Bureau of Statistics, 2005). However, in Australia, approximately two million individuals with arthritis are of working age (between 15 and 64 years), and of these, 52,000 individuals are unable to work due to their arthritis (Arthritis Australia, 2022).

OA has considerable economic and societal costs due to work loss (Kotlarz et al., 2010). The total economic cost of OA in Australia, including indirect costs such as lost work productivity, is estimated to be over \$8.5 billion each year (Arthritis Osteoporosis Victoria, 2013). A 2011 systematic review found that individuals with hip and knee OA were more likely to report occupational limitations and reduced work capacity than the general population (Bieleman et al., 2011). This was supported by a more recent review that found young/middle-aged adults with arthritis have poorer work outcomes (e.g., work productivity and participation) than healthy populations (Berkovic et al., 2021). Approximately two-thirds of working-age adults with hip and knee OA report difficulty with work-related tasks directly impacting their ability

* Corresponding author. The University of Queensland, School of Health and Rehabilitation Sciences, Physiotherapy, Brisbane, QLD, 4072, Australia.

E-mail address: m.smith5@uq.edu.au (M.D. Smith).

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to work and requiring assistance to remain employed (Ackerman et al., 2015). Adults with ankle OA have financial concerns associated with decreased ability to work in physical jobs as a consequence of their condition (Alanazi et al., 2023).

Guidelines from the National Institute for Health and Care Excellence (National Institute for Health and Care Excellence, 2022) and the Royal Australian College of General Practitioner (The Royal Australian College of General Practitioners, 2018) recommend that education, exercise, and weight management (for those overweight) are core treatments for all individuals with knee and hip OA. These guidelines also recommend a holistic assessment, including assessing the impact of OA on an individual's ability to perform their job, but they don't mention interventions to support individuals at work. In contrast, a review identified that facilitating the continuation or resumption of work was a consistent recommendation across clinical practice guidelines for musculoskeletal pain conditions (Lin et al., 2020). Recommendations from the European League against Rheumatism recognise the benefits of work on health outcomes and suggest it receive greater attention in healthcare consultations for people with rheumatic and musculoskeletal conditions (Gwinnutt, 2023). Physiotherapists are a core care provider for individuals with OA (Briggs et al., 2019). In light of the importance of work and recommendations to address work participation in people with rheumatic and musculoskeletal disease, there is a need to understand whether work-related interventions are being included in typical physiotherapy management of individuals with lower limb OA.

The primary aim of this study is to explore management strategies specifically related to work that physiotherapists typically deliver to their patients with lower limb OA. The secondary aim is to identify the current physiotherapy management practices for patients with lower limb OA. This information will identify potential gaps in services that need to be addressed to better support people with lower limb OA.

2. Method

2.1. Design

This study was a cross-sectional online survey of Australian physiotherapists conducted between December 2020 and August 2021.

2.2. Participants

Physiotherapists were invited to participate in this research via the Australian Physiotherapy Association (e.g., inclusion in their newsletter) and social media (e.g., Twitter and Facebook). Eligibility criteria were: registered as a physiotherapist with the Australian Health Practitioner Regulation Agency, ≥ 2 years of experience managing individuals with lower limb OA, and fluent in the English language. Data from the Australian National Health Workforce dataset indicates that there were 29,508 registered physiotherapists working in Australia in 2019, with 53% of these working in musculoskeletal physiotherapy as their principle scope of practice ($n = 15,610$) (Australian Government Department of Health, 2019). In 2021, 53% of Australian physiotherapists were members of the Australian Physiotherapy Association.

2.3. Data collection

Data was collected using an online survey hosted on the Qualtrics^{XM} platform (Provo, Utah, USA). The survey was developed by the research team after reviewing the literature and was piloted by members of the research team before distribution. The opening page included information about the study, the expected time for completion, how data would be stored and protected, investigator contact details, and ascertained informed consent.

The survey contained three sections about how physiotherapists manage patients with lower limb OA (defined as hip, knee, ankle or foot OA). The first section prompted participants to reflect on their

management of patients with lower limb OA. It contained two free text questions asking participants to *outline the key components of their treatment for patients with lower limb OA* and then to *outline the topics they discuss with their patients with lower limb OA*.

The second section of the survey focused on interventions and education topics using four fixed response questions. Participants were asked to select interventions that they regularly included in their management of patients with lower limb OA from a list of 20 options (e.g., *exercises for muscle strength/endurance*; Table 1). They were then asked to order the selected interventions in terms of their most important to least important treatment priority. The next two questions asked participants to select the topics that they include in their education with patients with lower limb OA from a range of 23 options (e.g., *explaining the diagnosis/condition*; Table 2), and then to order the topics on treatment priority. For each question, participants were able to select as many answer options as they wished and nominate other topics not listed in fixed response options. The options included in the fixed response questions were identified based on clinical practice guidelines for managing OA (National Institute of Health and Care Excellence (National Institute for Health and Care Excellence, 2022), Osteoarthritis Research Society International (Bannuru et al., 2019), and the American College of Rheumatology (Kolasinski et al., 2020)), research on work-related management of musculoskeletal conditions (Oswald et al., 2017; Hutting et al., 2020; Shaw et al., 2011; Bartys, 2019), and discussion amongst the research team.

Table 1

Percentage (number) of participants who reported they regularly use the treatment in their management of patients with lower limb osteoarthritis, and those who listed the item as their top treatment priority and the within their top five treatment priorities.

Treatment	Regularly used in management	Listed as top (1st) treatment priority	Listed within top 5 treatment priorities
Exercises for muscle strength/endurance	99.2 (130/131)	35.7 (45/126)	96.0 (121/126)
Patient education	93.9 (123/131)	56.3 (67/119)	87.4 (104/119)
Self-management	88.5 (116/131)	6.2 (7/113)	64.6 (73/113)
Sensorimotor/balance exercises	85.5 (112/131)	3.7 (4/109)	59.6 (65/109)
Cardiovascular/aerobic exercise	77.9 (102/131)	2.0 (2/100)	67.0 (67/100)
Weight control/loss	74.8 (98/131)	5.3 (5/95)	47.4 (45/95)
Aquatic exercise	63.4 (83/131)	1.3 (1/79)	39.2 (31/79)
Manual therapy	63.4 (83/131)	7.5 (6/80)	47.5 (38/80)
Assistive devices (e.g., cane, walker)	59.5 (78/131)	0 (0/74)	22.9 (17/74)
Strategies to manage difficulties at work	56.5 (74/131)	1.4 (1/73)	15.1 (11/73)
Taping or bracing	50.4 (66/131)	0 (0/65)	27.7 (18/65)
Massage	48.1 (63/131)	0 (0/60)	45.0 (27/60)
Medication	38.9 (51/131)	2.0 (1/50)	24.0 (12/50)
Motivational interviewing	29.8 (39/131)	8.1 (3/37)	56.8 (21/37)
Workplace assessment and modifications	22.9 (30/131)	0 (0/30)	10.0 (3/30)
Manual (e.g., materials and people) handling training	22.1 (29/131)	0 (0/28)	7.1 (2/28)
Mind-body exercise (e.g., Yoga, Tai Chi)	20.6 (27/131)	0 (0/26)	11.5 (3/26)
Acupuncture	19.8 (26/131)	4.0 (1/25)	32.0 (8/25)
Cognitive behavioural therapy	18.3 (24/131)	4.1 (1/24)	29.2 (7/24)
Electrotherapy	18.3 (24/131)	0 (0/23)	26.1 (6/23)

Data is expressed percentage (number/total). The denominator for participants who regularly used the intervention in management is the number of participants who responded to this question. The denominator for participants who listed the intervention as their top or within their top 5 treatment priorities is the number of participants who ordered the intervention in their treatment priorities.

Table 2

Percentage (number) of participants who reported they regularly discussed the topic with patients with lower limb osteoarthritis, and those who listed the topic as their top educational priority and the within their top five educational priorities.

Topic options	Discussed the education topic	Listed as top (1st) educational priority	Listed within top 5 educational priorities
Explaining the diagnosis/condition	100 (127/127)	84.5 (98/116)	93.9 (109/116)
Staying physically active	97.6 (124/127)	7.8 (9/115)	73.9 (85/115)
Self-management	96.0 (122/127)	4.5 (5/112)	66.1 (74/112)
Load and activity modification	92.9 (118/127)	3.7 (4/108)	38.9 (42/108)
Pain/symptom management	91.3 (116/127)	9.9 (11/111)	57.7 (64/111)
Surgical and non-surgical management	89.8 (114/127)	2.9 (3/103)	57 (59/103)
Reducing sedentary behaviour	81.1 (103/127)	4.2 (4/96)	43.8 (42/96)
Weight loss/management (for overweight patients)	78.7 (100/127)	3.3 (3/92)	36.9 (34/92)
Patients as active partners in management	74.8 (95/127)	6.8 (6/89)	76.4 (68/89)
Assistive devices (e.g., cane, walker)	66.9 (85/127)	0 (0/81)	9.9 (8/81)
Work/rest schedule	62.9 (80/127)	1.4 (1/73)	13.7 (10/73)
Footwear or orthotics	61.4 (78/127)	2.8 (2/71)	9.9 (7/71)
Medication use	59.8 (76/127)	2.7 (2/73)	17.8 (13/73)
Thermotherapy (e.g., local heat or cold)	59.0 (75/127)	1.4 (1/70)	14.3 (10/70)
Pacing at work	51.2 (65/127)	1.7 (1/59)	11.9 (7/59)
Strategies to manage difficulties at work	50.4 (64/127)	0 (0/59)	10.2 (6/59)
Managing psychological concerns (e.g., depression, anxiety)	48.0 (61/127)	0 (0/58)	13.8 (8/58)
Sleep hygiene	42.5 (54/127)	0 (0/49)	10.2 (5/49)
Diet and nutrition	40.2 (51/127)	0 (0/46)	23.9 (11/46)
The osteoarthritis care team	26.8 (34/127)	0 (0/29)	37.9 (11/29)
Self-help groups	14.9 (19/127)	0 (0/16)	12.5 (2/16)
Dietary supplements	13.4 (17/127)	0 (0/14)	28.6 (4/14)
Sick leave and time off work	11.8 (15/127)	0 (0/13)	0 (0/13)

Data is expressed percentage (number/total). The denominator for participants who regularly used the intervention in management is the number of participants who responded to this question. The denominator for participants who listed the intervention as their top or within their top 5 treatment priorities is the number of participants who ordered the intervention in their treatment priorities.

The third survey section asked questions about physiotherapists' management of patients with lower limb OA who are working. This section was prefaced with two questions enquiring about the proportion of patients that *ask for advice on managing their symptoms at work*, and *indicate they have difficulties at work due to their OA* (four response options ranging from '<20%' to '80% to 100%'). Participants were then presented with 17 work-related management options and asked to indicate the frequency with which they undertook each management option when managing working patients with lower limb OA (e.g., *discuss modifications to work*; Table 3). Frequency was scored on a 5-point Likert

Table 3

Physiotherapist self-reported frequency of work-related activities when managing working patients with lower limb OA (n = 115).

Strategy	Regularly/Always	Sometimes	Never/Rarely
Educate patients regarding the benefits of remaining in work	63.5 (73)	20.0 (23)	16.5 (19)
Provide advice on managing symptoms at work (e.g., work-rest schedules, pacing, active recovery strategies)	57.4 (66)	25.2 (29)	17.4 (20)
Include at least one work-related goal or outcome as part of treatment	43.4 (50)	29.5 (34)	26.9 (31)
Address barriers for work during treatment	42.6 (49)	34.8 (40)	22.6 (26)
Discuss the relationship between work and osteoarthritis	38.3 (44)	26.0 (30)	35.7 (41)
Screen patients to identify barriers for work	37.4 (43)	26.1 (30)	36.5 (42)
Include work simulation as part of rehabilitation	34.8 (4)	25.2 (29)	40.0 (46)
Discuss future working life	30.4 (35)	36.5 (42)	33.0 (38)
Include a structured discussion about work	29.6 (34)	40.0 (46)	30.4 (35)
Discuss modifications to working hours or duties	27.8 (32)	41.7 (48)	30.4 (35)
Document the patient's physical and mental job demands work	25.2 (52)	26.9 (31)	27.8 (32)
Encourage patients to discuss concerns about coping at work with supervisor	20.9 (24)	33.0 (38)	46.1 (53)
Discuss disclosure of their osteoarthritis condition to their employer	10.4 (12)	16.5 (19)	73.0 (84)
Discuss absence from work	9.6 (11)	36.5 (42)	53.9 (62)
Use a validated scale to identify barriers for work	9.6 (11)	21.8 (25)	68.7 (7)
Conduct a workplace assessment	4.4 (5)	13.9 (16)	81.7 (94)
Discuss submitting a claim for workers' compensation	2.6 (3)	22.6 (26)	74.8 (86)

*Data is expressed percentage (number), with percentage calculated from the number of participants responding to this question (n = 115).

scale ranging from 'never' to 'always'.

Survey sections were presented in the same order for each participant. Participants were unable to return to the preceding sections to prevent them changing responses after moving to subsequent sections. Demographic information (e.g., age, sex), years of experiences, academic qualifications, and professional development relevant to OA were collected to describe the study sample.

2.4. Data analysis

Raw data were imported to Microsoft Excel (Microsoft Corporation, USA) for analysis and checked for missing responses. Participants who provided data on their management of lower limb OA were included in analysis. Descriptive statistics were presented as mean (standard deviation) for continuous data and frequency (number) for ordinal data.

Data provided for free text questions were grouped into topics and reported as frequency (percentage (number) of participants who nominate the intervention out of those who answered the question). Management practices in fixed response questions are also reported as frequency. Data from questions asking participants to order their selected interventions based on treatment priority are presented as the frequency (number) of participants who listed the fixed-response item as their top (most important) treatment priority and the frequency (number) who listed each item within their top five most important treatment priorities (out of those who ordered the intervention in their treatment priorities). Responses to the 5-point Likert scale that measured the frequency with which participants undertook work-related interventions were collapsed to three categories – Never/Rarely, Sometimes and Regularly/Always – due to low cell counts in some response options.

3. Results

3.1. Characteristics of the participants

A total of 215 individuals responded to study advertisements with 189 individuals meeting eligibility criteria (88%) and 186 providing consent (87%). After excluding individuals who did not provide data relating to the research aim (e.g., did not respond to questions relating to their treatment of lower limb OA; n = 54), 132 participants were included in the final analysis (completion rate: 70% of eligible individuals who responded to study advertisements). Participant characteristics are shown in Table 4. The majority of participants were female with 15 or more years of physiotherapy experience.

3.2. Key management strategies reported to be used

When participants were asked to *outline the key components of your treatment for patients with lower limb OA* via free text responses, only two participants (1.5%; n = 2/132) mentioned home/work modifications. Exercise (96.2%; n = 127) and education (86.3%, n = 114) were the most common treatments nominated. The specific types of exercise reported were strength/endurance exercise (50.7%, n = 67), range of motion/stretching (18.9%, n = 25) and sensorimotor/balance exercise (13.6%, n = 18). While less common, participants also stated the following in their key components of management: manual therapy/massage (31%, n = 41), external devices (e.g., orthotics, assistive devices) (22.7%, n = 30), and electrophysical agents (e.g., thermotherapy, electrotherapy) (12.8%, n = 17). Educational topics participants reported they discussed with their patients with lower limb OA (free text responses) were: pain/symptom management (29.5%, n = 39), weight loss/management (27.2%, n = 36), physical activity/exercise (12.8%, n = 17), and load/activity modification (12.1%, n = 16).

Data from the fixed response questions asking participants to select and prioritise the interventions they regularly include in their treatment of patients with lower limb OA are shown in Table 1. Of the three work-related items included in the fixed response options, *strategies to manage difficulties at work* was reported to be included by 56.5% (n = 74/131) of participants, *workplace assessment and modifications* by 23% (n = 30) of participants, and *manual handling training* by 22.1% (n = 29) of participants. Patient education and exercises for muscle strength/endurance were ranked as the most important treatment priorities by 56.3% (n = 67/119) and 35.7% (n = 45/126) of participants respectively, and within the top five most important treatment priorities by 87.4% (n = 104/119) and 96.0% (n = 121/126) of participants respectively.

Table 4
Participant characteristics.

Characteristic	Participants (n = 132)
Age, years ^a	43.7 (11.7)
Sex	
Female	68.9 (91)
Male	30.3 (40)
Prefer not to say	0.8 (1)
Years of experience, years ^a	20.0 (11.9)
Completion of professional development courses on OA	40.2 (53)
Academic qualifications	
Bachelor degree	57.6 (76)
Master/Doctorate entry level degree	12.1 (16)
Master clinical specialty degree	27.3 (36)
Research Masters or PhD	3.0 (4)

Data is presented as percentage (number of participants).

^a Data for age and years of experience is presented as mean (standard deviation).

3.3. Education topics reported to be discussed with patients with lower limb OA

Analysis of free text responses about *topics discussed with patients with lower limb OA* identified that only three participants (2.3%; n = 3/130) mentioned workplace assistance. The most commonly discussed topics were physical activity/exercise (79.2%, n = 103) and pain/symptom management strategies (51.5%, n = 67). Other less commonly discussed educational topics included: diagnosis and pathology of OA (44.6%, n = 58); weight loss/management (40.7%, n = 53); load/activity modification and pacing (39.2%, n = 51); surgical and non-surgical management (34.6%, n = 45); understanding pain and symptoms (29.2%, n = 38); diet/nutrition and supplements (15.3%, n = 20); and orthotics, bracing, and assistive devices (14.6%, n = 19).

Data from the fixed response questions asking participants to select and prioritise education topics they use in their management of patients with lower limb OA are shown in Table 2. The most frequently selected work-related education topics from the fixed-responses were *work/rest schedule* (62.9%; n = 80), *pacing at work* (51.2%; n = 65) and *strategies to manage difficulties at work* (50.4%; n = 64). Only 12% (n = 15) of participants indicated that they would discuss *sick leave and time off work*.

3.4. The frequency of work-related activities undertaken

Approximately two-thirds of participants reported that less than 20% of their patients with lower limb OA indicated they had difficulties at work due to their OA (63.5%, n = 73) and asked for advice on managing their symptoms at work (67.8%, n = 78). The frequency with which participants reported undertaking each of 17 work-related management activities with their working patients with lower limb OA (presented in a fixed response question) is shown in Table 3. Over half of participants indicated that they regularly/always *educate patients regarding the benefits of remaining in work* (63.5%; n = 73/115) and *provide advice on managing symptoms at work* (e.g., *work-rest schedules, pacing, active recovery strategies*) (57.4%; n = 66). In contrast, less than 15% of participants stated that they regularly/always *conduct a workplace assessment* (4.4%; n = 5), *discuss submitting a claim for workers' compensation* (2.6%; n = 3), *use a validated scale to identify barriers for work* (9.6%; n = 11), *discuss absence from work* (9.6%; n = 11), and *discuss disclosure of their OA condition with their employer* (10.4%; n = 12).

4. Discussion

This is the first study to our knowledge to document management strategies related to work that physiotherapists typically deliver to their patients with lower limb OA. The findings suggest that participants do not immediately consider work-related concerns and interventions when asked to nominate the key components of their treatment for patients with lower limb OA. However, when prompted to consider their use of work-related management options, many participants indicated their inclusion of such interventions in their management. Participants in this study indicated that exercise, patient education (primarily physical activity/exercise and pain/symptoms management), self-management and weight control were their most commonly employed treatment strategies for patients with lower limb OA.

When participants were asked to reflect on their management and education of patients with lower limb OA, work-related management was not commonly nominated as a key treatment component. However, when provided with specific options of work-related interventions, over half of participants indicated they regularly include strategies to manage difficulties and symptoms at work, such as work/rest scheduling and pacing, and education on the benefits of remaining at work in their management of working patients with lower limb OA (although not commonly within their top treatment priorities). The inclusion of work-related interventions is encouraging as the health benefits of work are well documented (Tausig, 2013), and the continuation/resumption of

work is recommended for people with musculoskeletal pain conditions (Lin et al., 2020). Work is central to an individual's life providing financial and social benefits, improving general health and wellbeing, and reducing psychological distress (Tausig, 2013; Royal Australasian College of Physicians, 2011). Surprisingly, other strategies beneficial to supporting a person remain at work, such as identifying barriers for work (Oakman et al., 2017a), a workplace assessment (National Institute for Health and Care Excellence, 2022) and encouraging individuals to disclose and discuss their OA with their employer (Oakman et al., 2017a), were used by less than 15% of participants in their management of patients with lower limb OA. Identifying and addressing barriers to work is strongly recommended for the prevention of work disability (Berkovic et al., 2020; Oakman et al., 2017b). However, as most of this literature has emerged from management of compensable injuries, participants may not consider its relative value for injuries such as OA which generally do not meet the eligibility criteria for workers' compensation.

There are a number of explanations as to why participants may not consider and/or prioritise addressing work-related concerns in their management of patients with lower limb OA. First, participants in our study indicated that only 20% of patients asked for work-related advice or reported difficulties at work. This suggests that the patients seen by the physiotherapists in our study may not have been concerned about or required assistance in relation to work, were not working, or alternatively, were not comfortable raising work concerns with physiotherapists or did not recognise work difficulties as within the scope of physiotherapy care. As treatment priorities are based on individual patient concerns and goals, if patients are not communicating concerns or difficulties at work to physiotherapist, then physiotherapists are not likely to prioritise this as part of their management. Second, it is possible that participants are focused on managing clinical symptoms of OA (e.g., pain), perhaps in relation to daily activity and exercise participation, or in relation to overall participation and function without discerning work from other participation and functional goals. While this may assist in managing work difficulties in some individuals, more tailored work-specific management may be needed for those with more physical and complex occupational requirements (Xie et al., 2021). Third, participants may feel that work-related management, such as workplace assessments, are not part of their professional role as a physiotherapist or they may not feel confident performing such assessments and interventions (Johnston et al., 2012). Finally, participants may not perceive work to be a priority in managing patients with lower limb OA due to lack of specific inclusion of work-related management in hip and knee OA clinical practice guidelines (National Institute for Health and Care Excellence, 2022; The Royal Australian College of General Practitioners, 2018). Evidence suggests that the most effective strategies to manage difficulties at work involve an inter-professional team and communication with the employer (Cullen et al., 2018). As many physiotherapists work in private practice and may not be part of inter-professional teams (Australian Government Department of Health, 2019), addressing the complexity of work participation may be difficult. Qualitative research is needed to better understand why physiotherapists do not include work-related activities in their management of working patients with lower limb OA.

Almost all participants in this study selected exercise and patient education as interventions they regularly deliver for people with lower limb OA, and their top treatment priorities. This is consistent with recommendations from clinical practice guidelines (National Institute for Health and Care Excellence, 2022; The Royal Australian College of General Practitioners, 2018) and Arthritis Australia (Arthritis Australia, 2014), and supported by high level evidence (Fernandes et al., 2013). It has been suggested that exercise is beneficial in both the management of OA (Bennell et al., 2011) and for overall health (Hinman et al., 2023). The top priority education topics nominated by participants – explaining the diagnosis/condition and staying physically active – are consistent with evidence-based practice and systematic review findings that

education (e.g., information related to the disease) combined with physical activity is the most effective non-surgical treatment for knee and hip OA (Holden et al., 2021).

While we do not know the number of Australian physiotherapists who were eligible to participate in this study (those with ≥ 2 years of experience managing individuals with lower limb OA), our study sample ($n = 132$) equates to approximately 1% of physiotherapists with musculoskeletal physiotherapy as their principle scope of practice. Our sample of participants is similar to the Australian physiotherapy workforce in terms of sex (68.9% female in our sample compared to 64.3% of the physiotherapy workforce), but slightly older (mean age of 43.7 years compared to 37.8 years in the physiotherapy workforce) with more years of clinical experience (mean of 20.0 years compared to 12.8 years) (Australian Government Department of Health, 2019). While there is not published data available on the education level of the Australian physiotherapy workforce, 30% of our sample had a clinical or research post-graduate degree (and 40% reported completing professional development courses on OA), which may be greater than that in the physiotherapy workforce. This comparison of demographics suggests that our study findings may represent perspectives from a sub-set of the Australian physiotherapy workforce who is older and more experienced.

A strength of this study is the use of a comprehensive survey using free text followed by fixed response questions to understand physiotherapists' use of work-related interventions for patients with lower limb OA. There were several opportunities for participants to indicate their work-related management: a free text section (which was completed before any mention of work), a list of various potential treatments and education options, followed by a list of work-specific activities. The survey was designed so that participants were unable to return to preceding sections to edit their responses. This was done to avoid subsequent fixed-response sections providing suggestions for answers to open-ended question; however, it also did not allow participants to reconsider their response once moving beyond the question.

This study has limitations to consider. First, reliance on self-report data means that bias may have been present, with participants reporting treatments perceived to be professionally appropriate rather than reflecting actual practice. Second, the survey was distributed through the Australian Physiotherapy Association and via social media platforms so the response rate cannot be determined, and participants self-selected into the study. As not all Australian physiotherapists are members of the Australian Physiotherapy Association, social media was used to reach physiotherapists who were not members. Self-selection bias may have been present with participants with interest or expertise managing patients with lower limb OA over-represented in the sample. Third, 30% of eligible respondents to study advertisements did not complete the survey, resulting in a 70% completion rate. Fourth, data on physiotherapy practice setting (e.g., public hospital, private practice) was not collected in the survey so we are unable to describe participants on this characteristic. Finally, we only included physiotherapists in this study to understand physiotherapy practice in relation to work-related interventions and activities used when managing patients with lower limb OA. Including other healthcare professionals would be valuable and a consideration for future studies. Despite these limitations, this study contributes to the knowledge about work-related physiotherapy management practices in patients with lower limb OA.

While many people with OA experience problems at work or retire early (Nakata et al., 2018; Laires et al., 2018), work-related assessment and interventions are not routinely included by many of our physiotherapy participants in their management of patients with lower limb OA. Healthcare professionals, including physiotherapists, have the potential to improve work-related outcomes in individuals with musculoskeletal conditions, including lower limb OA, and support people to remain at work. There is a need to support and develop physiotherapists' knowledge and skills in the area of work management, so they recognise the need, and feel confident in their ability, to address work concerns and facilitate individuals with lower limb OA to remain in or return to

the workforce. It is important that healthcare professionals and employers work together to establish efficacious strategies to support workers with lower limb OA at work.

5. Conclusion

Findings from this study suggest that the key interventions used by study physiotherapists to manage people with lower limb OA are consistent with current clinical guidelines, and over half include strategies and advice to manage difficulties at work and educate patients on the benefits of remaining at work. In light of work-related challenges commonly experienced by individuals with lower limb OA, the importance of work on well-being and the recognised need for holistic care, addressing concerns and developing strategies to manage at work are important considerations in the management of this condition.

Ethics information

This study was approved by the institutional Human Research Ethics Committee (Approval #2019002852). All participants provided informed consent prior to study participation.

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CRedit authorship contribution statement

Yousef S. Alyousef: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Venerina Johnston:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Michelle D. Smith:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

All authors declare they have no conflicting interests.

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