© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.

Introduction

Knee osteoarthritis (OA) is a major musculoskeletal problem a ecting 630 million people globally [1]. Given the aging population and the increasing trend of obesity globally, the prevalence of knee OA will increase sub-

to the senior physical therapist. In the initial section of the Google form, the study title was presented in the title case. Below the title, participants were required to acknowledge a statement con rming that their participation in the study was voluntary and that con dentiality would be maintained. e participants were then prompted to provide their email addresses, which served as their consent to participate in the study. Following this, they were prompted to complete the questionnaire. In response to item 17 of the questionnaire, if participants selected the option "never," the Google form was programmed to automatically end the session and submit their responses. Conversely, if they chose any other option, the form allowed them to proceed and complete the remaining sections of the questionnaire. Reminder emails were sent to the participants at two-week intervals. e survey was conducted between July 2018 and October 2018.

e participants who completed all the items of the Google Forms questionnaire were included in the study. ose who did not provide their email address, failed to complete any item of the form, or selected "never" for item 17 were excluded from the study. e number of participants who submitted responses was visible on the Google Forms dashboard. Once the target number of responses was achieved, the data were prepared for analysis.

Ethics approval and consent to par0 0 9r

were male. Approximately half of the participants (49.7%) had a postgraduate quali cation. Approximately one-third of the participants (29.4%) had 4 to 7 years of clinical experience. Nearly half of the participants (49.5%) worked in a private setting. Most of the participants were located in the Dammam region (44.7%), followed by the Riyadh region (30.5%). Half of the participants specialized in general practice, while approximately one-third (30.1%) specialized in musculoskeletal/orthopedic conditions. More than half (58.5%) of the participants were not registered with the Saudi Physical erapy Association.

e participants' responses to the questions related to manual therapy training are presented in Table 2. Approximately one-third (35.2%) of the participants did not receive any formal manual therapy training, whereas the others received formal manual therapy training in undergraduate (23.8%) or postgraduate (40.9%) studies. More than half (69.4%) of the participants participated in any manual therapy workshops. Most of the participants (41.1%) attended a total duration of 1–2 days of workshops, followed by 3–5 days of workshops (26.5%). Most of the participants (52%) attended a workshop on the Mulligan mobilization technique followed by the Maitland mobilization technique (33.7%). Only approximately one-third of the participants (29.9%) were quali ed as certi ed manual therapy practitioners.

e responses of the participants to questions related to the utilization of manual therapy in the treatment of knee OA are given in Table 3. Most of the participants (57%) responded that they used manual therapy according to the patient's condition. Most of the participants reported that they commonly see 0–2 patients with knee OA daily. Most of the participants (66.1%) responded that their patients were in the 50–70 years age group. e sex of the patients was evenly distributed [male (40.6%) versus female (39.6%)], as reported by the participants. Most of the participants (31.9%) responded that they often prescribe 7–8 treatment sessions. Most of the participants (39.5%) responded that they often provide a

Questions	Frequency (%)
Do you use manual therapy in treating knee OA?	
Routinely	33 (17.1)
Occasionally	21 (10.9)
Never	29 (15)
Depends on the patients' condition	110 (57)
Frequency of patients seen with knee OA	
0–2/daily	81 (42.4)
0–5/week	72 (37.7)
0–10/month	38 (19.9)
The average age of the patients seen with knee OA (years)	
< 30	2 (1)
30–50	59 (30.7)
50–70	127 (66.1)
> 70	4 (2.1)
Gender of patients seen with knee OA	
Male	78 (40.6)
Female	76 (39.6)
Both	38 (19.8)
Total number of treatment sessions provided	
0–1	3 (1.6)
2–3	17 (8.9)
4–6	51 (26.7)
7–8	61 (31.9)
> 8	59 (30.9)
Length of treatment sessions provided (in minutes)	
0–10 m	3 (1.6)
10–20 m	13 (6.8)
20–30 m	63 (33.2)
30–45 m	75 (39.5)
45–60 m	36 (18.9)
Types of manual therapy used for treating knee OA*	
Maitland mobilization	35 (19.9)
Kaltenborn mobilization	7 (4)
Mulligan mobilization	71 (40.3)
Cyriax techniques	13 (7.4)
Therapeutic Massage	39 (22.2)
Neural mobilization	11 (6.3)
Combination	75 (42.6)
Others	35 (19.9)
Aims of treatment in selecting manual therapy in knee OA*	
Pain reduction	156 (84.8)
Improve range of motion	142 (77.2)
Improve Function	102 (55.4)
Increase mobility	107 (58.2)
Reduce swelling	80 (43.5)
Improve joint position sense	66 (35.9)
Improve balance	42 (22.8)
Improve muscle control	61 (33.2)
Placebo	20 (10.9)
Types of knee OA treated with manual therapy	
Patellofemoral	35 (19.1)
Tibiofemoral	9 (4.9)
Both	139 (76)

participants (65.6%) reported that manual therapy was an important treatment option in the treatment of knee OA.

e majority of the participants gave a rating of 6–8 on a 10-point scale for manual therapy as a treatment option for knee OA.

Discussion

that the inclusion of manual therapy and supervised exercise provides greater improvements in patients with knee OA.

e current study has potential limitations. Using a self-report questionnaire could lead respondents to overestimate their responses, and it is di cult to validate the accuracy of the information from respondents. However, since participation was voluntary and identi cation data were anonymous, there were fewer chances of incorrect information regarding patient management. e questionnaire used in this study was adapted from a previous study [14–16, 32], but its psychometric properties were not evaluated, which may have a ected the quality of the data. Furthermore, data speci c to the widely practiced McKenzie method of manual therapy were not collected separately, limiting the study's ability to draw critical insights regarding this technique. Future research should aim to address these limitations to o er more comprehensive and valuable information for interested readers.

Conclusions

Physical therapists in Saudi Arabia are equipped with formal training in manual therapy, both at the undergraduate and postgraduate levels. ey demonstrate a strong, positive attitude toward integrating manual therapy into the treatment of knee osteoarthritis (OA). However, their insights highlight that the optimal approach for managing knee OA lies not in manual therapy alone but in a strategic combination of manual therapy techniques and targeted exercise therapy. is combined approach provides a deeper understanding of the multifaceted needs of knee OA patients and underscores a commitment to delivering comprehensive, evidence-based care.

Abbreviations

OA	Osteoarthritis
PTs	Physiotherapists
SPTA	Saudi Physical Therapy Association
SPSS	Statistical Package for the Social Sciences

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-024-1611649.700805664Tm [(s)-6(e)1j EMC89112.ojec05664Tm [(a)9(tnumbe)14(A).H)6(owe)-19(ver)73(,t)6.1(h3sts)]TJ ETang(en-US)/MCID832>>BDC 14629.830

16. Jan MH, Tang PF, Lin JJ, et al. E□cacy of a target-matching foot-stepping exercise on proprioception and function in patients with knee osteoarthritis. J Orthop Sports Phys Ther. 2008;38(1):19–25.
17. Şekir U, Gür H. A multistation proprioceptive exercise program in patients with bilateral knee osteoarthrosis: functional capacity, pain and sensoriomotor function. A randomized controlled trial. Osteoarthritis Cartilage. 2005;13(8).
18. Lange A, Vanwanseele B, Fiatarone Singh MA. Strength training for treatment of osteoarthritis of the knee: a systematic review. Arthritis Rheum. 2008;59(10):1488–94.
19. Zhang W, Nuki G, Moskowitz R, et al. OARSI recommendations for the management of hip and knee osteoarthritis: part III: changes in evidence following systematic cumulative update of research published through January 2009. Osteoarthritis Cartilage. 2010;18(4):476–99.
20. Fransen M, McConnell S. Exercise for osteoarthritis of the knee. Cochrane