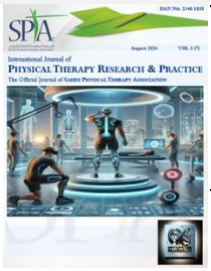

INTERNATIONAL JOURNAL OF
PHYSICAL THERAPY RESEARCH & PRACTICE
AN OFFICIAL JOURNAL OF SAUDI PHYSICAL THERAPY ASSOCIATION

Original Article

Assessing and Comparing Musculoskeletal Knowledge and Red Flag Identification Skills: A Cross-Sectional Study of Physical Therapists and Primary Care Physicians

Rahaf Almedlej[1*], Hana Alsobayel[2], Samiha Abdelkader[2], Faris Alodaibi[2]

1. Riyadh Second Health Cluster, King Khaled Hospital, Majmaah, Saudi Arabia.
2. Health Rehabilitation Sciences Department, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia.

*Corresponding Authors: ralmedlej@moh.gov.sa

Article info

Received : Aug 16, 2024
Accepted : Aug 19, 2024
Published : Aug 30, 2024

To Cite: Almedlej, R., Alsobayel, H., Abdelkader, S., & Alodaibi, F. Assessing and Comparing Musculoskeletal Knowledge and Red Flag Identification Skills: A Cross-Sectional Study of Physical Therapists and Primary Care Physicians. International Journal of Physical Therapy Research &Amp; Practice, 3(7), 317–324. https://doi.org/10.62464/ijoprp.v3i7.44.

Abstract

Background: Musculoskeletal disorders are one of the most common health issues often managed at the level of primary health care. Enabling physical therapists to be first-contact practitioner for patients with musculoskeletal disorders could improve patient access, expedite management, enhance outcomes and reduce costs. However, this role requires a high level of musculoskeletal knowledge and the ability to detect red flags. **Objectives:** To assess and compare the musculoskeletal knowledge and abilities to identify red flags between physical therapists and primary care physicians (PCPs). **Methods:** A cross-sectional study was undertaken using an electronic survey assessed participants' musculoskeletal knowledge and ability to identify red flags. Study participants included physical therapist and PCPs practicing at Ministry of Health hospitals and/or primary care centers in Riyadh, Saudi Arabia**. Results:** A total of 60 physical therapists and 76 PCPs participated. Good knowledge levels (total score ≥ 75%) were found for 7% of physical therapists compared to 18% of PCPs, and moderate knowledge levels (total score 60-75%) were found in 70% of physical therapists compared to 62% of PCP participants (P=.003). **Conclusion:** Physical therapists and PCPs demonstrated an overall moderate level of musculoskeletal knowledge and the ability to identify red flags. The results suggest that with further education on red flags identification, physical therapists in Saudi Arabia could potentially act as first-contact practitioners for patients with musculoskeletal conditions.

Keywords: Musculoskeletal knowledge, red flags, physical therapists, primary care physicians, Saudi Arabia.

Introduction

Musculoskeletal disorders are one of the most common health problems worldwide, affecting 20-30% of people globally and leading to significant disability (WHO, 2022). The prevalence of these disorders varies by age and 20-30%, but they consistently contribute to years lived with disability. In many countries, individuals with musculoskeletal conditions can self-refer for

physical therapy, making physical therapists (PTs) first-contact health care practitioners (Crout et al., 1998; Piano et al., 2017). Studies have shown direct access to physical therapy for musculoskeletal disorders is effective, safe and beneficial in terms of health care cost and patient satisfaction (Crout et al., 1998, Demont et al., 2019).

In Saudi Arabia, musculoskeletal conditions rank among the top 10 contributors to disability (Vos et al., 2016). Traditionally, these cases are managed by Primary Care Physicians (PCPs), with PTs providing care only after a referral (Asmri et al., 2019; Saudi Ministry of Health, 2017; Al-Sobayel et al., 2014; Al-Abbad and Madi, 2020). However, integrating PT services at the primary level could be beneficial (Al-Abbad and Madi, 2020).

The Saudi Arabian government has prioritized healthcare development, recently making PT and rehabilitation services available at some primary healthcare centers (Okaz newspaper, 2019). This change could facilitate PTs first-contact practitioners for musculoskeletal conditions, especially given the increasing number of PT graduates and the relative scarcity of primary care physicians (Saudi Ministry of Health, 2020). This integration could lead to easier access, earlier management, and reduced load on PCPs, resulting in better outcomes and lower costs (Saudi Ministry of Health, 2017).

To serve effectively as first-contact practitioners, PTs must possess core competencies, including medical assessment knowledge, the ability to identify red flags, and a broad knowledge base (Langridge, 2019; Suckley, 2012). Previous studies suggested that experienced PTs have musculoskeletal knowledge comparable to PCPs (Childs et al., 2005; and Jette et al., 2006). However, there may be deficiencies in their ability to identify and respond correctly to red flags (Ferguson et al., 2015 and Ladeira, 2016). In Saudi Arabia, PTs have shown a fair to moderate ability to differentiate mechanical low back pain from serious pathologies (Moslem, Alrwaily, & Almarwani, 2020).

Objectives: To date, no studies in Saudi Arabia have assessed PTs' knowledge of musculoskeletal conditions and their ability to identify red flags. Therefore, the objective of this study is to fill that gap by assessing and comparing the knowledge and abilities of PTs and PCPs in this regard.

Methods

Study Design and Setting

A cross-sectional study using an electronic survey was conducted to measure the level of musculoskeletal knowledge and ability to identify red flags among PTs and PCPs in Saudi Arabia. The study involved Ministry of Health hospitals with physical therapy services, including King Fahad Medical City, King Saud Medical City, Prince Mohammed Bin Abdulaziz Hospital, King Salman Hospital and Alyamamh Hospital, as well as 20 primary care centers in Riyadh, Saudi Arabia. Ethical aboral was obtained from the Institutional Review Board (IRB) at King Saud University (KSU) and King Fahad Medical City (KFMC). An electronic survey and consent form were then sent via email to eligible PTs and PCPs, and data privacy was ensured by anonymizing all responses before analysis.

Participants

Saudi and non-Saudi PTs working primarily with adult patients with musculoskeletal conditions in Ministry of Health hospitals in Riyadh were invited for participation through a letter circulated to all relevant departments. Heads of departments were contacted personally by the first author (RA). Saudi and non-Saudi PCPs, including family medicine physicians and general practitioners working in Ministry of Health primary care centers involved in the management of adult patients with musculoskeletal conditions in Riyadh, were also invited. Students, interns, residents and non-practicing clinicians were excluded from participation.

Outcome Measure

An online survey was purposely designed for this study based on the most recent validated assessment tool of musculoskeletal knowledge (MSK30 exam) as a reference standard (Cummings, Smith, Merrigan, and Leggit, 2019). This tool contains 30 musculoskeletal case scenarios with multiple-choice questions covers musculoskeletal knowledge, red flags, differential diagnosis and clinical management. Adaptations were made to meet the specific objectives of this study, including deleting clinical management and pediatric case questions and modifying to the questions and case scenarios because due to the availability of the original exam answers. The modified survey comprised 18 case scenarios, half focusing on participants' knowledge of red flags and the other half on differential diagnoses. The survey was reviewed by two experts (a musculoskeletal physical therapy consultant and a university professor who was also a family medicine consultant, both with postgraduate degree over five of years of clinical experience). Based on their feedback, minor changes were made. A pilot study involving 14 participants (7 PTs, 7 PCPs) was conducted to seek additional feedback on the readability and comprehensibility of the questions, determine the internal consistency and reliability, and estimate the time needed to complete the survey. Based on the pilot study results, further changes were made, including deleting two questions that were the least reliable as measured by internal consistency. The final survey comprised 16 case scenarios (see supplementary material).

Sample Size

The total number of PTs working with musculoskeletal disorders in the five Ministry of Health hospitals in Riyadh was 80. Therefore, a sample of 60 PT participants was determined using the G*power formula (confidence level = 95%, margin of error = 5%). The total number of PCPs (excluding dentists and gynecologists) in the Riyadh region was 1,608, with an estimated 241 working in primary care centers inside Riyadh city (Saudi Ministry of Health, 2020). A sample of 148 PCP participants was calculated using the G*power formula (confidence level = 95%, margin of error = 5%).

Data Analyses

Data were extracted from the online survey responses, coded, and entered into the statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analyses were conducted using two tailed tests, with a p-value of less than 0.05 considered statistically significant. For the 16 case scenarios, each correct answer was scored one point, and a total score was calculated. Each participant's total score was categorized as poor knowledge (less than 50% or 7 points), moderate knowledge (60-75% or 8-11 points), and good knowledge (75% or more or more ≥ 12 points).

Descriptive analyses were performed for all variables. Crosstabulation was used to assess the distribution of knowledge and the ability to identify red flags according to participants' specialty. Relationships between scores and other variables were tested using Pearson's chi-square test and an exact probability test for small frequency distributions. An Independent Samples t-test was used to compare mean scores between groups (Plackett, 1983).

Result

A total of 202 participants completed the survey, with 136 (68%) deemed eligible and 66 excluded for not meeting the eligibility criteria. The eligible participants included 60 (44%) PTs and 76 (56%) PCPs, divided into 43 family medicine physicians and 33 general practitioners. Table 1 summarizes the personal characteristics and work-related data of the participants.

Significant differences were observed between the groups regarding age, gender and nationality. More PTs participants worked in government hospitals, while more PCPs worked in primary health care centers (P = 0.001). PTs reported seeing a significantly higher percentage of patients with musculoskeletal conditions weekly compared to PCPs (P = 0.001).

Main outcomes

Figure 1 illustrates the distribution of total survey scores among the 60 PT and 76 PCP participants. The mean score for both groups was 6, with PTs scoring between 2 and 15 and PCPs between 2 and 16.

Significant differences were noted in the correct identification of answers between the groups, with PCPs performing better on the red flags case scenarios (questions 2, 3, 11, 14; P = 0.001). Conversely, PTs correctly identified more answers for certain differential diagnosis case scenarios (questions 8, 9, 12; P < 0.023). Table 2 provides the number and percentage of correct responses for each of the 16 case scenarios by group.

When categorized total scores into poor, moderate, or good knowledge levels, the majority of both groups fell into the moderate knowledge category, with no significant difference between them (P=.415). However, a higher percentage of family medicine physicians demonstrated good knowledge levels compared to general practitioners and PTs (P = 0.003) (Figures 2 and 3).

Table 1: Personal characteristics, qualifications, and work information for the 136 participants

	Total N=136		Physical Therapists N = 60		Primary Care Physicians N = 76		P Value
	N	%	N	%	N	%	
Age (years)							
< 30	56	41	31	52	25	33	
30 - 40	59	43	21	35	38	50	0.086
> 40	21	15	8	13	13	17	
Gender							
Male	66	49	16	27	50	66	0.001*
Female	70	52	44	73	26	34	
Nationality							
Saudi	107	79	54	90	53	70	0.004*
Non-Saudi	29	21	6	10	23	30	
Qualification							
Bachelor or equivalent	108	79	52	87	56	74	
Masters or equivalent	21	15	8	13	13	17	0.038*#
Ph.D. or equivalent	7	5	0	0	7	9	
Country where you trained							
Saudi Arabia	106	78	56	93	50	66	
Arabian country	14	10	0	0	14	18	0.001*
Others	16	12	4	7	12	16	
Work setting							
Governmental hospital	65	48	55	92	10	13	0.001*
Primary health care center	71	52	5	8	66	87	
Clinical experience (years)							
< 1	22	16	5	8	17	22	
01-Feb	45	33	16	27	29	38	0.016*
03-May	29	21	18	30	11	15	
Percentage of people with MSK conditions usually seen weekly							
< 30	52	38	6	10	46	61	
30 - 60	48	35	20	33	28	37	0.001*#
> 60	36	27	34	57	2	3	

0.05 (significant). #: Exact probability test

Table 2: Number and percentage of correct responses for each of the 16 survey questions according to group

Q#	Overall N=136	Physical Therapist N=60	Primary Care Physicians N=76	P-Value
1	102 (75%)	39 (65%)	63 (83%)	0.017*
2	110 (81%)	41 (68%)	69 (91%)	0.001*
3	60 (44%)	15 (25%)	45 (59%)	0.001*
4	62 (46%)	20 (33%)	42 (55%)	0.011*
5	93 (68%)	44 (73%)	49 (65%)	0.27
6	96 (71%)	47 (78%)	49 (65%)	0.078
7	58 (43%)	27 (45%)	31 (41%)	0.622
8	75 (55%)	44 (73%)	31 (41%)	0.001*
9	103 (76%)	53 (88%)	50 (66%)	0.002*
10	79 (58%)	39 (65%)	40 (53%)	0.147
11	106 (78%)	39 (65%)	67 (88%)	0.001*
12	69 (51%)	37 (62%)	32 (42%)	0.023*
13	83 (61%)	41 (68%)	42 (55%)	0.121
14	44 (32%)	9 (15%)	35 (46%)	0.001*
15	68 (50%)	23 (38%)	45 (59%)	0.016*
16	109 (80%)	41 (68%)	68 (90%)	0.002*

**P < 0.05 (significant)*

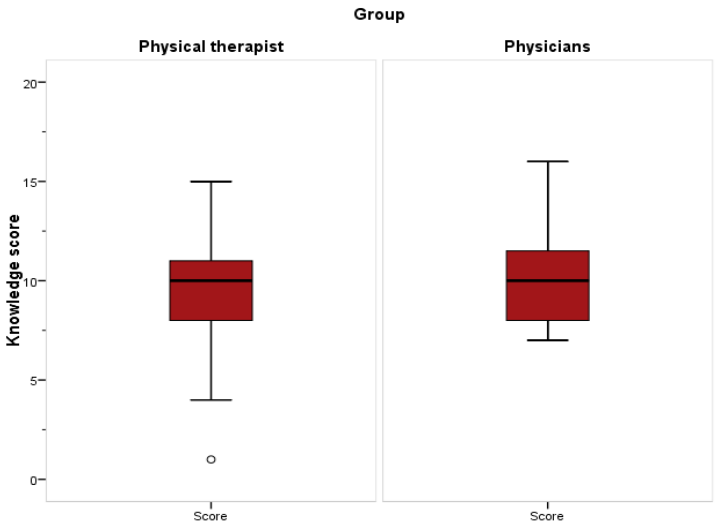

Figure 1: Survey scores for knowledge and ability to identify red flags for the 60 physical therapist and 76 PCP participants

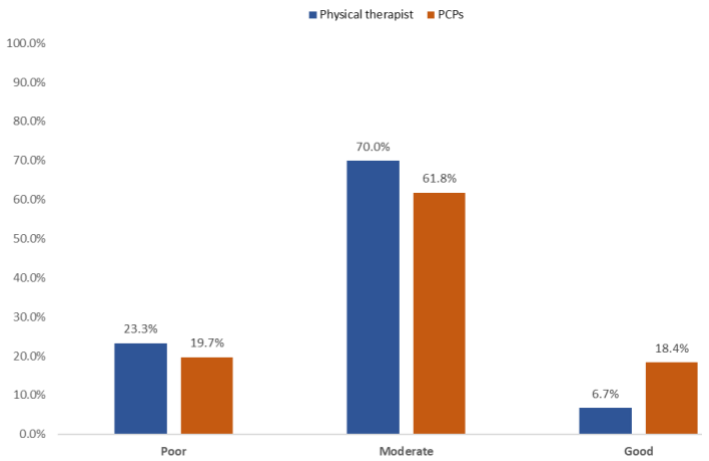

Figure 2: Knowledge level and ability to identify red flags among the 60 physical therapist and 76 PCP participants

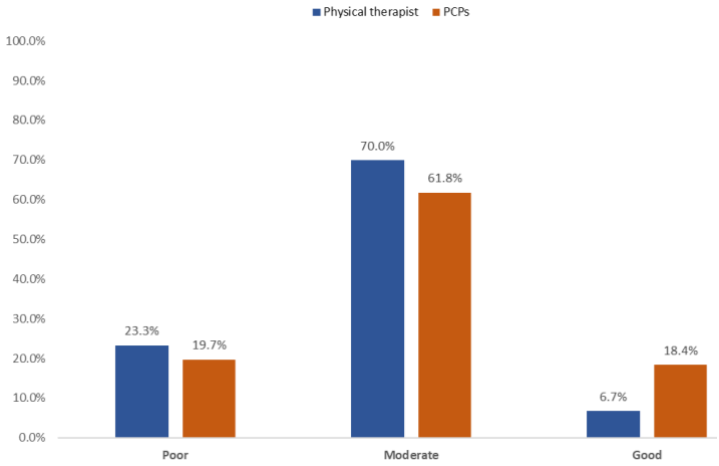

Figure 3: The overall knowledge score and ability to identify red flags between physical therapist, family medicine and general practitioner

Discussion

The aim of this study was to assess the level of musculoskeletal knowledge and ability to identify red flags among PTs and compare these findings with PCPs in Saudi Arabia. Overall, the majority of PT and PCP participants demonstrated a moderate level of musculoskeletal knowledge, with family medicine physicians outperforming both PTs and general practitioners. PTs were more proficient in differential diagnosis case scenarios but less so in red flags case scenarios.

Most of previous studies have examined the level of knowledge between PTs and other physicians

primarily in cross of LBP. Our findings, however, contrast with those of Ross and colleagues (2014, 2018), who reported similar knowledge levels between these groups in managing patients with LBP (Ross et al., 2014; Ross et al., 2018). This discrepancy may be due to the broader assessment of musculoskeletal knowledge in our study compared to the focus on LBP in previous research.

Family medicine physicians were capable of recognizing red flags, except for those specifically related to LBP, where both groups (PPTs and PCPs) showed high knowledge. This finding contradicts previous studies (Ladeira, 2018; Moslem et al., 2020; De Souza et al., 2017) which reported lower red flag detection abilities among PTs. Differences in the assessment tools used make direct comparison challenging (De Souza, Ladeira, and Costa, 2017).

Findings from the current study and previous research showed that PTs demonstrated a moderate ability to recognize signs and symptoms of serious medical conditions but often chose to continue with physical therapy rather than referring the patient for further medical investigations and deferring physical therapy interventions (Ferguson et al., 2015; Moslem, Alrwaily, and Almarwani, 2020). This suggests a hesitance in referring patients for further investigation, potential due to deficiencies in screening for referral skills and knowledge of red flags among PTs. It is plausible that entry-level education might not adequately prepare therapists in these areas. Additionally, PTs may rely on physician referrals without independently verifying the accuracy of the diagnosis. For this reason, patient safety is often cited as the reason to maintain medical referral due to a perceived results association with patient self-referral. However, other studies have showed positive result that contradicting this assumption (Babatunde et al., 2020). For example, a study in the UK concluded that patient self-referral to physical therapy within their health systems was safe and that PTs are competent to practice in this way (Bishop et al., 2021).

Our findings underscore the need for improved training among first-contact practitioners, including PTs, to enhance their skills in differential diagnosis and red flags identification. It is recommended that undergraduate physical therapy training be expanded to include more comprehensive education on musculoskeletal conditions and, in particular, the screening for red flags. The use of red flag screening tools such as the Optimal Screening for Predicting Referral and Outcome-Review of Systems (George et al., 2018) may enhance patient safety. This study had a several limitations, including the small, convenience sample from Ministry of Health facilities in Riyadh city only. These limitations may impact the generalizability of our findings. Future research should include larger samples across various regions of Saudi Arabia to enhance the representativeness of the study population.

Furthermore, continuous education programs should be considered to improve the core competencies of healthcare practitioners dealing with musculoskeletal conditions. Future research could explore the impact of such programs on knowledge levels and patient outcomes.

Conclusion

This study showed a moderate level of musculoskeletal knowledge and ability to identify red flags among PTs and PCPs. Enhancing the competencies of these practitioners is critical to improve early access to rehabilitation, reduce waiting times, cut healthcare costs, and ultimately lead to better patient outcomes.

Findings

We found a moderate level of musculoskeletal knowledge and ability to identify red flags among PTs and PCPs.

Clinical Implications

Our findings underscore the need for improved training among first-contact practitioners, including PTs, to enhance their skills in differential

diagnosis and red flags identification as reported in discussion part.

Acknowledgements

We would like to thank Dr. Ahmad Alhowimel and Dr. Abdulaziz Alrabiah for their cooperative in review the survey. We also thank all the PTs and physicians who participated in this study. Finally, we are thankful to KSU and the research center in MOH for their cooperation in facilitating our work during the study

Authors' Contributions

R. Almedlej, was responsible for the conception and design of the study, data collection and statistical analysis; and H. Alsobayel, were involved in revising the processing, statistical analysis of data and drafting of the manuscript; F. Alodaibi and S. Abdulkader were contributed to the interpretation of the data for the work and revising it critically for important intellectual content. All the authors finally approved the manuscript. All authors have read and agreed to the published version of the manuscript.

Reference

Al-Abbad H, Madi S. Perception of tertiary care clients toward the availability of physical therapy service at primary health care centers in Saudi Arabia: a cross-sectional survey. J Phys Ther Sci. 2020;32(5):323–31.

Al-Sobayel H, Aleisa E, Buragadda S, Rao G. (2014). Rehabilitation services in Saudi Arabia: An overview of its current structure and future challenges. Journal of General Practice, 2(6), 184.

Asmri M Al, Almalki MJ, Fitzgerald G, Clark M. (2020). The public health care system and primary care services in Saudi Arabia: a system in transition. Eastern Mediterranean Health Journal, 26(4), 468-476.

Babatunde OO, Bishop A, Cottrell E, Jordan JL, Corp N, Humphries K, et al. A systematic review and evidence synthesis of non-medical triage, self-referral and direct access services for patients with musculoskeletal pain. Plos One [Internet]. 2020 Jul 1 [cited 2023 Aug 5];15(7). Available from: https://pubmed.ncbi.nlm.nih.gov/32628696/

Bishop A, Chen Y, Protheroe J, Ogollah RO, Bailey J, Lewis M, et al. Providing patients with direct access to musculoskeletal physiotherapy: the impact on general practice musculoskeletal workload and resource use. The STEMS-2 study. Physiotherapy [Internet]. 2021 Jun 1 [cited 2023 Aug 5];111:48. Available from: /pmc/articles/PMC8120844/

Crout KL, Tweedie JH, Miller DJ. Physical therapists' opinions and practices regarding direct access. Phys Ther. 1998;78(1):52–61.

Cummings DL, Smith M, Merrigan B, Leggit J. MSK30: A validated tool to assess clinical musculoskeletal knowledge. BMJ Open Sport Exerc Med. 2019;5(1):2018–20.

Childs JD, Whitman JM, Sizer PS, Pugia ML, Flynn TW, Delitto A. A description of physical therapists' knowledge in managing musculoskeletal conditions. BMC Musculoskelet Disord. 2005;6:32.

De Souza FS, Ladeira CE, Costa LOP. Adherence to Back Pain Clinical Practice Guidelines by Brazilian Physical Therapists. Spine (Phila Pa 1976). 2017;42(21).

Demont A, Bourmaud A, Kechichian A, Desmeules F. The impact of direct access physiotherapy compared to primary care physician led usual care for patients with musculoskeletal disorders: a systematic review of the literature. Disabil Rehabil. 2019;43(12):1637–48. Available from: https://www.tandfonline.com/doi/abs/10.1080/09638288.2019.1674388

Ferguson FC, Morison S, Ryan CG. Physiotherapists' understanding of red flags for back pain. Musculoskeletal Care. 2015;13(1):42–50.

George SZ, Beneciuk JM, Lentz TA, Wu SS, Dai Y, Bialosky JE, et al. Optimal screening for prediction of referral and Outcome (OSPRO) for Musculoskeletal pain conditions: Results from the validation cohort. J Orthop Sports Phys Ther. 2018;48(6) :460-469.

Jette DU, Ardleigh K, Chandler K, mcshea L. Decision-making ability of physical therapists: Physical therapy intervention or medical referral. Phys Ther. 2006;86(12):1619–29.

Langridge N. The skills, knowledge and attributes needed as a first-contact physiotherapist in musculoskeletal healthcare. Musculoskeletal Care. 2019;17(2):253–60.

Ladeira CE. Physical therapy clinical specialization and management of red and yellow flags in patients with

low back pain in the United States. J Man Manip Ther. 2018;26(2):66–77. Available from: http://doi.org/10.1080/10669817.2017.1390652

Moslem WM, Alrwaily M, Almarwani MM. Adherence to low back pain clinical practice guidelines by Saudi physical therapists: a cross-sectional study. Physiother Theory Pract. 2020 Aug 25;1–14. Available from: https://www.tandfonline.com/doi/full/10.1080/09593985.2020.1806420

Okaz newspaper. The opening of physiotherapy clinic in primary health care centers in Jeddah – Saudi News | Okaz newspaper. 2019 [cited 2023 Jan 26]; Available from: https://www.okaz.com.sa/people-situations/na/1729649

Piano L, Maselli F, Viceconti A, Gianola S, Ciuro A. Direct access to physical therapy for the patient with musculoskeletal disorders, a literature review. J Phys Ther Sci. 2017;29(8):1463–71.

Plackett RL. Karl Pearson and the Chi-Squared Test. Int Stat Rev / Rev Int Stat [Internet]. 1983 Apr;51(1):59. Available from: https://www.jstor.org/stable/1402731?Origin=crossref

Ross M, Adams K, Engle K, Enser T, Muehlemann A, Schenk R, et al. The knowledge of low back pain management between physical therapists and family practice physicians. J Man Manip Ther. 2018;26(5):264–71.

Ross MMD, Ret U, Col L, Childs JD, Middel MC, Kujawa CPTJ, et al. Physical Therapist vs . Family Practitioner Knowledge of Simple Low Back Pain Management in the U.S. Air Force. Mil Med. 2014;179(2):162–8.

Rundle R, Roberts J, Whitney G, Mankins S, Dille C, Donaldson M, et al. A Comparison Between Civilian and Military Physical Therapists' Knowledge in Managing Musculoskeletal Conditions: a Descriptive Study. Int J Sports Phys Ther. 2016;11(1):115–25. Available from: http://www.ncbi.nlm.nih.gov/pubmed/26900506%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?Artid=PMC4739040

Saudi Ministry of Health. Ministry of Health Statistical Yearbook 2020. 2020; Chapter 2. Available from: https://www.moh.gov.sa/Ministry/Statistics/book/Pages/default.aspx

Saudi Ministry of Health. Transformation Strategy. Model Archit Pract. 2017;265–7. Available from: https://www.moh.gov.sa/en/Ministry/vro/Documents/Healthcare-Transformation-Strategy.pdf

Suckley j. Core clinical competencies for extended-scope physiotherapists working in musculoskeletal (msk) interface clinics based in primary care: a Delphi consensus study. J Chem Inf Model. 2012;53(9):1689–99.

Vos T, Allen C, Arora M, Barber RM, Brown A, Carter A, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet. 2016 Oct 8;388(10053):1545–602. Available from: http://www.thelancet.com/article/S0140673616316786/fulltext

World Health Organization. Musculoskeletal health. 2022. Available from: https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions