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Mapping Pain: A Journalist's Guide to Chiropractic Healing

OPEN ACCESS

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ARTICLE INFO

The story of sciatica is a human-interest story on a profound scale, one that calls for more excitement than clinical observation can provide. Chiropractic care becomes an intriguing way to explore and tackle sciatic nerve pain as healthcare joins narrative in journalism.

Pain as a text has been written in traditional biomedical narratives in the form of a symptom to be treated or attenuated. Chiropractic in offering reads an editorial perspective as radical: seeing the experience of the patient as a story of healing in its fullness, and not as a medical case file.

The investigative elements are remarkable. What triggers sciatic pain? How are environmental, occupational and lifestyle factors involved in the development of this common condition? These questions solve a medical issue in terms of a rich, complex narrative of human experience.

Spinal manipulations are removed from being mere technical procedures and turn into interviews with the body, to find out what the body wants to say, to narrate realignment, stress and potential recovery. Fundamental premise is knowing body's structural ability to heal when equilibrium has been restored.

Just like in a journalistic piece, sources are beginning to show that they have compelling evidence. Recent clinical studies finally document significant improvements in patient outcomes, contradicting previous medical narratives and providing new views on pain management.

Modern chiropractic care includes methods that go past spinal manipulation alone. Treatment plans that integrate exercises work with soft tissue therapy to show patients how to use their workspace better plus help them lead better lives. The comprehensive treatment plan gives patients the tools they need to join their recovery process.

The medical methods of healthcare share major similarities with how professional journalists work. Chiropractic work aligns with journalism's methods because both depend on keen interest, good listening skills, extensive study, and determined exploration for facts. They want us to study deeper into issues than basic facts and go straight to total information discovery. Chiropractors need to partner with medical experts who build special care plans using patient stories and health results.

Our shared purpose goes beyond recording symptoms because we function as healthcare experts and professionals who craft stories. We have to create new forms of treatment that return patients to their former health while keeping alive their wish for recovery. Through chiropractic care, patients receive a form of treatment that aligns with a distinct way of perceiving health based on how different aspects of life affect each other.

Accepting whole-person views turns pain treatment into a human-led process of regaining health and comprehending the healing experience.

01

Original Article

Knowledge Towards Artificial Intelligence among Physical Therapists Working in Pakistan

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ARTICLE INFO

ABSTRACT

AI is a software system that simulates human intelligence in performing tasks and actions. In modern healthcare system, key aspects of AI include diagnosis, treatment, and prevention of disease. **Objective:** To determine the knowledge about AI among physical therapists working in Pakistan and to find out level of agreement related to advantages of AI, regarding use of AI in Rehabilitation and impact of AI on future of Rehabilitation. **Methods:** The study used convenience sampling in Pakistani hospitals and clinics, collecting data from 305 physiotherapists via hospital visits and an online questionnaire. Analysis was done using SPSS 23. **Results:** Out of 305 participants, 120 were males and 185 were females. 116 were employed in public sector and 186 were employed in private sector. The frequency of physiotherapists who are familiar with AI came out to be 92.5%. About 56.4% physical therapist agreed about uses of AI in rehabilitation. 55.1% physical therapist believed that there are advantages of AI in rehabilitation and there will be a positive impact of AI on rehab in future according to 53.8% of physical therapist. **Conclusions:** The findings suggest that high frequency of knowledge of AI among physical therapist working in Pakistan. Many physical therapists believed that AI has the positive impact on rehabilitation.

INTRODUCTION

A machine's capacity to execute an essential activity under the supervision of an intelligent human is known as artificial intelligence (AI) [1]. It has reduced human intervention from minimum to none. AI, which blesses the non-living machines with the humanly trait of intelligence, was born in 1956[2]. AI is referred to as the fourth industrial revolution as it has drawn tremendous interest recently [3]. The basic principles, of artificial intelligence, Virtual (informatics), or physical (robotics) can be employed by Physiotherapy clinics to educate patients and track their progress [4]. The virtual branch incorporates informatics techniques that include everything from deep learning and information management to the oversight of health management systems, such as electronic health records, and actively assists physicians and therapists in their decision of choosing the appropriate treatment [2]. The use of robotics in rehabilitation turns the repetitive exercises into challenging games, motivating the patient to do it. Robots provide assistance and analyse the activity quantitatively which demonstrates the use of robots in daily life [5]. The initial use of robotic technology in orthopaedic surgery began in 1992 [6]. Nowadays, diverse healthcare research disciplines incorporate AI technology and researchers are looking into the potential applications of these tools. AI has been utilized in physiotherapy to enhance patient care by helping physiotherapists with a variety of tasks, such as conducting thorough assessments, forecasting patient outcomes, and

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diagnosing patients. Furthermore, AI has played a part in problems related to X-ray diagnosis and in designing the treatment protocol for patients. The above-mentioned functions are the basic components of the physiotherapy profession [1]. And also, there are methods that are assisted by AI technology to enhance balance and fitness, gait and locomotion and functions of upper and lower limbs [7].

This study is essential to assess physiotherapists' knowledge and perceptions of AI in rehabilitation, ensuring its effective integration into clinical practice.

METHODS

The cross-sectional study was carried out in public and private hospitals of Pakistan from June 2024 to November 2024. A sample size of 305 participants was selected which was calculated by using WHO calculator. Data was gathered by visiting hospitals and also through an online questionnaire (Saudi Arabian Questionnaire, Exploring Physical Therapists' Opinion Regarding Artificial Intelligence Applications in Healthcare and Rehabilitation) facilitated by google doc. Data was analyzed through SPSS 23. Non-probability convenient sampling was used to select the participants. The physiotherapists having 2 years' experience were included in the study. The study excluded physiotherapists with less than two years of experience, students, interns, those unwilling to consent, those working outside Pakistan, and those with incomplete or inconsistent responses. Descriptive statistics were used to summarize categorical variables such as knowledge AI, understanding of AI, and gender, and experience, year of graduation workplace as frequencies and percentages. After applying Shapiro Wilk Test for normality, non-parametric, Chi-square test was applied to determine the association between the physical therapists' knowledge and year of experience.

RESULTS

Out of 305 participants, 120 (39.3%) were males and 185 (60.7%) were females. 116 participants we're working in public sector and 189 were working in private sector. The frequency of physiotherapists who are familiar with AI came out to be 92.5%. (Figure 1).

Figure 1: Familiarity with AI

About 56.4% physical therapist agreed about uses of AI in rehabilitation. 55.1% physical therapist believed that there are advantages of AI in rehabilitation and there will be a positive impact of AI on rehab in future according to 53.8% of physical therapist (Table 1). Chi square test was applied to check association between gender and qualification of physical therapists. Gender and Qualification significantly influenced the knowledge towards AI with p-value <0.05, mostly females and physiotherapists with masters having more familiarity with AI in accordance to the results of study.

Table 1: Different Point of Views of Participants Regarding AI

Variables	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Uses of AI in Rehabilitation	24.3%	55.1%	18.4%	1.3%	1%
Advantages of AI in Rehabilitation	26.6%	56.4%	15.1%	1.3%	0.7%
Positive impact of AI on Rehab in future	21.6%	53.8%	22%	3%	0.2%

Data was collected from participants belong to different cities of Pakistan. Mostly participants from the Islamabad and Rawalpindi which showed the higher interest (Figure 2).
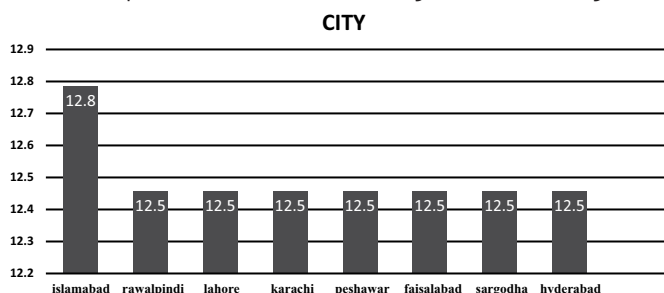
Figure 2: Working City of Participants

DISCUSSION

To the best of knowledge, the noted fact regarding knowledge towards Artificial Intelligence among physical therapists working in Pakistan is meager, as previous studies only integrated medical students and doctors from all specialties leaving behind physical therapists. The current study with sample size of 305, out of which 92.5% showed familiarity with AI, while 71.5% heard about AI technology being used in rehabilitation. In 2022, Ea Perrier *et al.,* concluded from the results of study carried out in France, where 90% pediatricians had basic understanding of AI, coherent with the current study findings [8]. Approximately 44% physical therapists didn't come across any AI application at workplace, as these results were consistent with the findings of qualitative study in UK carried out by Simone Castagno and Mohamed Khalifa in 2020 [9]. Majority of participants had prior information about AI was remarkably through Social Media (66.9%), harmonized with the findings of research conducted in USA [10]. Up to the level of agreement, 55.1% agreed that the AI's capacity to reduce physical therapists work load, easing patient care and preventing disease were aligned with the facts documented by Tasneem Burhani in systematic review of 2021 [11]. Artificial intelligence (AI) is increasingly transforming healthcare by enhancing diagnostic accuracy, optimizing treatment plans, and improving patient outcomes, as stated by Al Kuwaiti *et al.,* in 2023 [12]. Machine learning-powered assistive devices are revolutionizing physical therapy by enhancing patient mobility and rehabilitation efficiency, as highlighted by Xiao *et al.* in 2021 [13]. The findings of current study reported, approximately 76% physical therapist agreed that AI applications should be taught in rehabilitation curriculum coinciding with the similar outcomes of previous study [10]. Chi-square test was applied to see the correlation where Gender and qualification significantly influenced the knowledge towards AI with p-value <0.05. Mostly females and Physiotherapists with masters had more familiarity with AI in concordance to the previous study results reported by Sarya Swed in Syria [14]. Majority of Physical therapists (74.8%) gave importance to clinician's judgement over AI's, complementary to the research of Shihab Sarwar *et al.,* in 2019 [15]. The perspectives of healthcare students on artificial intelligence play a crucial role in shaping its integration into medical education and practice, as discussed by Teng et al. in 2022 [16]. Similarly, Habib *et al.,* in 2024 investigated the knowledge, attitudes, and perceptions of healthcare students and professionals regarding AI in healthcare, providing insights into their readiness and potential barriers to AI adoption [17]. Expanding on this theme, Khan *et al.,* in 2024 assessed the understanding and acceptance of Extended Reality (XR) technology within Pakistan's healthcare community, emphasizing the role of AI in medical training and patient management [18]. Furthermore, Khan *et al.,* in 2024 explored AI-enabled telehealth rehabilitation for brachial plexus injuries, demonstrating how deep-reinforcement-learning-assisted telepresence robots can enhance in-home elbow rehabilitation [19]. In a broader context, Kitsios and Kamariotou in 2021 discussed AI's impact on business strategy and digital transformation, presenting a research agenda on how AI-driven innovations optimize efficiency and decision-making across industries, including healthcare [20]. Collectively, these studies underscore the transformative potential of AI and emerging technologies in reshaping healthcare, rehabilitation, and strategic business applications.

CONCLUSIONS

To sum up, this study looked at Pakistani physical therapists' attitudes and understanding of AI in rehabilitation. The results showed a sizable information vacuum about the real-world uses of AI in physical therapy. Despite being aware of the potential advantages of AI, many therapists are hesitant to use these technologies in therapeutic settings. The lack of AI resources in Pakistan and worries about AI displacing human knowledge are also major obstacles to its use in the rehabilitation sector.

Authors Contribution

Conceptualization: IH
Methodology: NA, RA
Formal analysis: MTA, MRA
Writing, review and editing: FM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

REFERENCES

[1] Alsobhi M, Khan F, Chevidikunnan MF, Basuodan R, Shawli L, Neamatallah Z. Physical therapists' knowledge and attitudes regarding artificial intelligence applications in health care and rehabilitation: cross-sectional study. Journal of Medical Internet Research. 2022 Oct;24(10):e39565. doi: 10.2196/39565.

[2] Hamet P and Tremblay J. Artificial intelligence in medicine. Metabolism. 2017 Apr;69:S36-40. doi:10.1016/j.metabol.2017.01.011.

[3] Ahmed Z, Bhinder KK, Tariq A, Tahir MJ, Mehmood Q, Tabassum MS *et al.* Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Pakistan: A cross-sectional online survey. Annals of Medicine and Surgery. 2022 Apr; 76: 103493. doi: 10.1016/j.amsu.2022.103493.

[4] Alsobhi M, Sachdev HS, Chevidikunnan MF, Basuodan R, KU DK, Khan F. Facilitators and barriers of artificial intelligence applications in rehabilitation: a mixed-method approach. International Journal of Environmental Research and Public Health. 2022 Nov; 19(23): 15919. doi: 10.3390/ijerph192315919.

[5] Babaiasl M, Mahdioun SH, Jaryani P, Yazdani M. A review of technological and clinical aspects of robot-aided rehabilitation of upper-extremity after stroke. Disability and Rehabilitation: Assistive Technology. 2016 May; 11(4): 263-80. doi: 10.3109/17483107.2014.1002539.

[6] Beyaz S. A brief history of artificial intelligence and robotic surgery in orthopedics & traumatology and future expectations. Joint Diseases and Related Surgery. 2020 Sep; 31(3): 653. doi: 10.5606/ehc.2020.75300.

[7] Feys P and Straudi S. Beyond therapists: Technology-aided physical MS rehabilitation delivery. Multiple Sclerosis Journal. 2019 Sep; 25(10): 1387-93. doi: 10.1177/1352458519848968.

[8] Perrier E, Rifai M, Terzic A, Dubois C, Cohen JF. Knowledge, attitudes, and practices towards artificial intelligence among young pediatricians: A nationwide survey in France. Frontiers in Pediatrics. 2022 Dec; 10: 1065957. doi: 10.3389/fped.2022.1065957.

[9] Castagno S and Khalifa M. Perceptions of artificial intelligence among healthcare staff: a qualitative survey study. Frontiers in Artificial Intelligence. 2020 Oct; 3: 578983. doi: 10.3389/frai.2020.578983.

[10] Wood EA, Ange BL, Miller DD. Are we ready to integrate artificial intelligence literacy into medical school curriculum: students and faculty survey? Journal of Medical Education and Curricular Development. 2021 Jun; 8: 23821205211024078. doi: 10.1177/23821205211024078.

[11] Burhani T and Naqvi WM. Impact of artificial intelligence in the physiotherapy rehabilitation of distal radial fracture patients: a review. Journal of Pharmaceutical Research International. 2021 Dec; 33(60B): 1982-8. doi: 10.9734/jpri/2021/v33i60B34889.

[12] Al Kuwaiti A, Nazer K, Al-Reedy A, Al-Shehri S, Al-Muhanna A, Subbarayalu AV *et al.* A review of the role of artificial intelligence in healthcare. Journal of personalized medicine. 2023 Jun 5; 13(6): 951. doi: 10.3390/jpm13060951.

[13] Xiao X, Fang Y, Xiao X, Xu J, Chen J. Machine-learning-aided self-powered assistive physical therapy devices. ACS nano. 2021 Dec; 15(12): 18633-46. doi: 10.1021/acsnano.1c10676.

[14] Swed S, Alibrahim H, Elkalagi NK, Nasif MN, Rais MA, Nashwan AJ *et al.* Knowledge, attitude, and practice of artificial intelligence among doctors and medical students in Syria: a cross-sectional online survey. Frontiers in Artificial Intelligence. 2022 Sep; 5: 1011524. doi: 10.3389/frai.2022.1011524.

[15] Sarwar S, Dent A, Faust K, Richer M, Djuric U, Van Ommeren R *et al.* Physician perspectives on integration of artificial intelligence into diagnostic pathology. Non-profit Journalism Digital Medicine. 2019 Apr; 2(1): 28. doi: 10.1038/s41746-019-0106-0.

[16] Teng M, Singla R, Yau O, Lamoureux D, Gupta A, Hu Z *et al.* Health care students' perspectives on artificial intelligence: countrywide survey in Canada. JMIR medical education. 2022 Jan; 8(1): e33390. doi: 10.2196/33390.

[17] Habib MM, Hoodbhoy Z, Siddiqui MR. Knowledge, attitudes, and perceptions of healthcare students and professionals on the use of artificial intelligence in healthcare. medRxiv. 2024 Jan: 2024-01. doi: 10.1101/2024.01.08.24300977.

[18] Khan Z, Adil T, Oduoye MO, Khan BS, Ayyazuddin M. Assessing the knowledge, attitude and perception of Extended Reality (XR) technology in Pakistan's Healthcare community in an era of Artificial Intelligence. Frontiers in Medicine. 2024 Oct; 11: 1456017. doi: 10.3389/fmed.2024.1456017.

[19] Khan MN, Altalbe A, Naseer F, Awais Q. Telehealth-enabled in-home elbow rehabilitation for brachial plexus injuries using deep-reinforcement-learning-assisted telepresence robots. Sensors. 2024 Feb; 24(4): 1273. doi: 10.3390/s24041273.

[20] Kitsios F, Kamariotou M. Artificial intelligence and business strategy towards digital transformation: A research agenda. Sustainability. 2021 Feb; 13(4): 2025. doi: 10.3390/su13042025.

05

Original Article

The Prevalence of Core Muscles Weakness and Fatigue in 18-to 25-Year-Old Medical College Students

Gulzar Ahmad[1*] and Areeba Shahzad[1]

[1]Johar Institute of Professional Studies, Lahore, Pakistan

ARTICLE INFO

ABSTRACT

Core muscles play a significant role in the stability of the back spine, ribcage, and lumbopelvic region by influencing daily living activities and balance. **Objectives:** To investigate core muscles weakness among male and female medical college students aged 18-25 and to evaluate their core muscle endurance using the McGill core endurance tests. Also, to assess fatigue levels among participants using the Rating of Fatigue Scale (ROF). **Methods:** A total of 246 participants were recruited from Rashid Latif Medical College (RLMC) and Johar Institute of Professional Studies (JIPS), Lahore, using non-probability convenient sampling. The sample size was determined using Epitool software. To assess core muscle endurance, the McGill Core Endurance Test was administered. Additionally, the Rating of Fatigue Scale was used to evaluate fatigue levels among participants. Data were entered and analyzed using SPSS version 27.0. Numeric data are presented as mean and standard deviation. **Results:** 92.68% of participants exhibited core muscles weakness during the 60º Spinal Flexion Test, and 96.75% of participants exhibited core muscles weakness during the Side Plank Tests. Another Rating of fatigue is a prevalent issue among the participants, with only 10.2% reporting no fatigue. The majority of participants (43.5%) experienced mild fatigue, while a significant proportion (37%) reported moderate fatigue. Furthermore, 8.5% of participants experienced severe fatigue, and 0.8% reported the worst fatigue. **Conclusions:** It was concluded that a remarkably high prevalence of core muscles weakness was found among medical college students. Furthermore, failure to engage core muscles during daily activities likely contributes to this prevalent weakness.

INTRODUCTION

The core muscles work together in coordination in order to facilitate the stability of the back, ribcage, and lumbo-pelvic region [1]. Core muscles surround the spine, abdominal cavity, hips, and Lumbopelvic area. They are essential for proper loading balance and performing movements in the neutral position of the lumbar and pelvis [2]. People experience back pain and musculoskeletal (MSK)-related issues in their daily living activities [3]. Lower back pain affects 60-80% of students worldwide, posing a significant risk factor for subsequent health problems [4]. It is difficult to maintain balance, and they have trouble lifting heavy weights during certain tasks [5]. These issues can significantly impact an individual's functions, leading to a decreased quality of life and an increased risk of falls and injuries [6]. Core muscles are classified into two different units. The outer unit is the local mobilizer, in which the internal oblique, external oblique, rectus abdominis, and superficial erector Spinae muscles help to generate movements and control range of motion (ROM)[7]. The inner unit is a global stabilizer that includes the deep erector Spinae (Multifidus), diaphragm, transverse abdominis, pelvic floor muscles, and hip girdle muscles, which help to stabilize the vertebral column, ribcage, and pelvis [8]. The inner unit creates some of the boundaries of the abdominal cavity. If the back stabilizes, the ultimate extremities with a stable base can move [9]. Core endurance is the capacity to maintain position and posture while performing multiple repetitions over an

interval of time [10]. Core stability provides an intervertebral neutral zone within anatomical and physiological limitations [11]. Core endurance training includes low-weight exercise training with a duration of 30 to 45 seconds, and isometric exercises can significantly improve core muscles [12]. Core endurance is used for rehabilitation purposes in low back pain patients and is assessed by a battery of tests, including an isometric back endurance test, an abdominal test, and a lateral flexion test [13]. A cross-sectional study was conducted to find individual risk factors for reduced core endurance, specifically in female, along with a relationship between core endurance, fatigue, physical activity, and low back pain in 2023. After analysis, results established that there is a significant reason for reduced core weakness in females: physical inactivity that affects fatigue level. Another LBP, age, gender, body mass index (BMI), smoker, and alcohol user were not at risk of physical inactivity; they were enhancing their physical activity by improving core endurance [14]. A cross-sectional study conducted by Evia Fallahsady and his colleagues in 2022 evaluated a correlation between the McGill Test, functional movement screen (FMS) score tool, and lumbar Lordosis angle in females. After evaluation, the result established that the Functional Movement Screen score has no correlation with the McGill test except stability in the trunk pushup, and lordosis angle might impact core muscles endurance but not their functional movement pattern [15]. The group of core muscles maintains spinal stability. Weakness of core muscles can lead to poor muscles endurance and imbalance, which increase the risk of back injuries and instability of lower extremity [16]. However, treating core weakness with the core strengthening exercise plan is a powerful method [17]. Core muscles weakness is a pervasive issue among medical students, with far-reaching consequences on their overall health and quality of life [18]. Despite its significance, core muscles weakness remains poorly understood, particularly among medical college students. This knowledge gap necessitates a comprehensive investigation into the prevalence and correlates of core muscles weakness in this population.

This study aims to identify areas for improvement and inform effective prevention and treatment strategies, ultimately promoting the physical and mental well-being of medical students.

METHODS

The study employed a cross-sectional design. Data were collected from the Johar Institute of Professional Studies and Rashid Latif Medical Complex in Lahore. The overall duration of the study was six months following the approval of the synopsis, from June 2024 to November 2024 (JIPS/SPT-24-65). The sample size for this study was calculated using Epitool software to estimate a single proportion or apparent prevalence. This calculation was based on an estimated true proportion (p) of 0.2, with a desired precision of ±5% (e=0.05) and a confidence level of 95%. Using the Z Score standard normal distribution, the estimated critical value for a 95% confidence level was 1.96. Based on these parameters, the calculated sample size (n) was determined to be 246 individuals, who were subsequently recruited for the study. A non-probability convenience sampling technique was utilized. The study included medical college students from the following disciplines: pharmacy, physiotherapy, and medical lab technology, aged 18-25 years, with both males and females participating. Participants willingly agreed to take part in the study. However, students who had suffered a fracture or undergone surgery of their back, pelvis, hips, or knees within the past year were excluded. Athletes or professional sports person were also excluded. The McGill Core Endurance Test evaluated the endurance of core muscles, including anterior, back, and oblique musculature.

60-degree trunk flexion: The participant lies on a support surface with the upper body at a 60-degree angle, knees and hips bent at 90 degrees, and arms crossed over the chest. The feet are secured under straps to maintain the position. The test ends when the body falls below a 60-degree angle. Trunk extension: The participant lies face down on a table, with the body hanging off the edge. Straps secure the lower body, and the participant lifts their arms in front of their chest until fatigued or their body deviates from a horizontal position.

Lateral musculature tests: The participant lies on their side and raises their body, supporting themselves with one elbow and foot. They maintain a straight line from head to heel and perform the test on both sides. The test ends when the participant is unable to maintain the position, and their body no longer maintains alignment, or the pelvis rotates.

Rating of Fatigue Scale (ROF): A self-reporting tool measuring fatigue severity on an 11-point scale, ranging from 0 (not fatigued) to 10 (totally fatigued) [19].

Both tools demonstrated high reliability and validity. The McGill Core Endurance Test reliability coefficients exceeded 0.97, and the ROF exhibited good face validity and convergent validity, making them suitable for assessing core endurance and fatigue in this population [19, 20]. By gathering demographic information from participants, including age, gender, height, and weight, and screening participants for inclusion and exclusion criteria to ensure suitability for the McGill core endurance test. Informed consent was taken from all participants before measurements. The data were analyzed using SPSS-27.0 software, which provided a comprehensive overview of the

study sample's characteristics through basic descriptive statistics. These statistics included measures of central tendency (means) and variability (standard deviations), as well as frequency distributions, which were visually represented through bar charts and pie charts. This study was conducted under ethical principles, prioritizing the rights and welfare of participants. Before data collection, all subjects provided informed consent, ensuring they were fully aware of the research study's measurements and procedures. To maintain confidentiality, participants' personal information was kept anonymous and secure. The study protocol was submitted to and approved by the Institutional Ethical Review Board, ensuring compliance with ethical standards. Furthermore, all data collected were treated as confidential and will not be shared with anyone outside the research team, maintaining participants' privacy and trust.

R E S U L T S

Results showed that out of 246 participants, 83 (33.74%) are underweight, 139(56.50%) are Normal, and 24 (9.76%) participants are overweight (Table 1).

Table 1: Frequency and Percentage of Age, Gender, and BMI

Variables		Frequency (%)
Age	18-20	28 (58.13%)
	21-23	96 (39.03%)
	24-25	7 (2.84%)
Gender	Male	111 (45.1%)
	Female	135 (59.9%)
BMI	<18.5 (Underweight)	83 (33.74%)
	18.5-24.9 (Normal)	139 (56.50%)
	25-29.9 (Over Weight)	24 (9.76%)

Results of the 60° spinal flexion test showed that out of 246 participants, 228 (92.68%) participants showed low endurance, 14 (5.69%) showed normal endurance, and 4 (1.63%) showed high endurance value. Results of the spinal flexion test showed that out of 246 participants, 210 (85.37%) participants showed Low Endurance, 24(9.76%) Normal Endurance and 12(4.88%) showed High Endurance Value (Table 2).

Table 2: Frequency and Percentage of 60 ° Spinal Flexion Test and Spinal Flexion Test

Variables	Frequency (%)
60 ° Spinal Flexion Test	
Low Endurance	228 (92.68%)
Normal Endurance	14 (5.69%)
High Endurance	4 (1.63%)
Spinal Extension Test	
Low Endurance	210 (85.37%)
Normal Endurance	24 (9.76%)
High Endurance	12 (4.88%)

Results showed that out of 246 participants, 238 (96.75%) participants showed Low Endurance, 7(2.85%) Normal Endurance and 1(0.4%) showed High Endurance Value (Figure 1).

Figure 1: Frequency and Percentage of Right Side Plank Test (n=246)

Results showed that out of 246 participants, 238 (96.75%) participants showed low endurance, 6 (2.44%) normal endurance, and 2 (0.81%) showed high endurance value (Figure 2).

Figure 2: Frequency and Percentage of Left Side Plank Test

Results showed that out of 246 participants, 238 (96.75%) participants showed low endurance, 6 (2.44%) normal endurance, and 2 (0.81%) showed high endurance value (Figure 2).
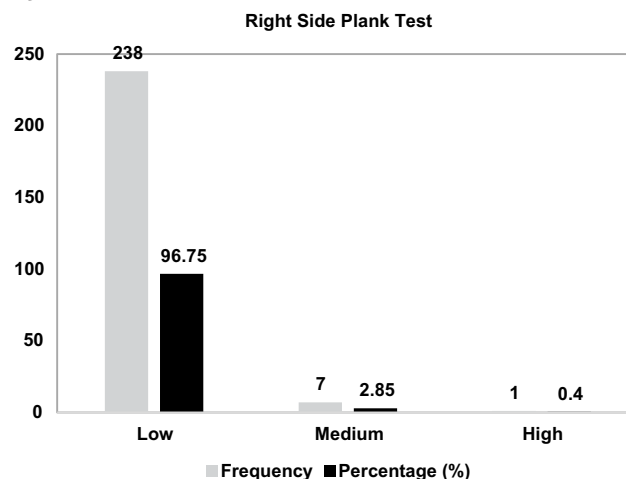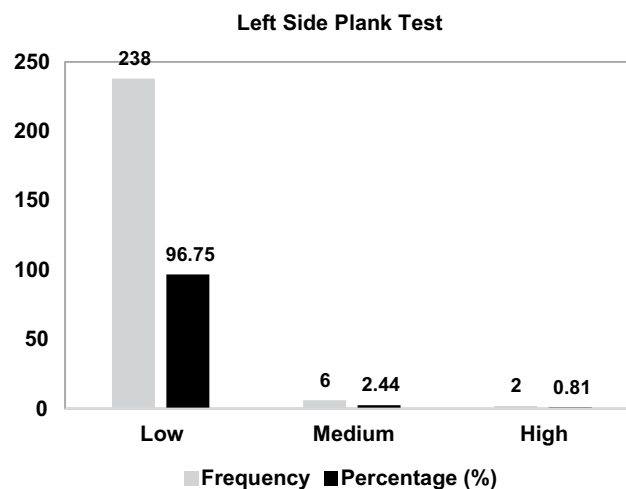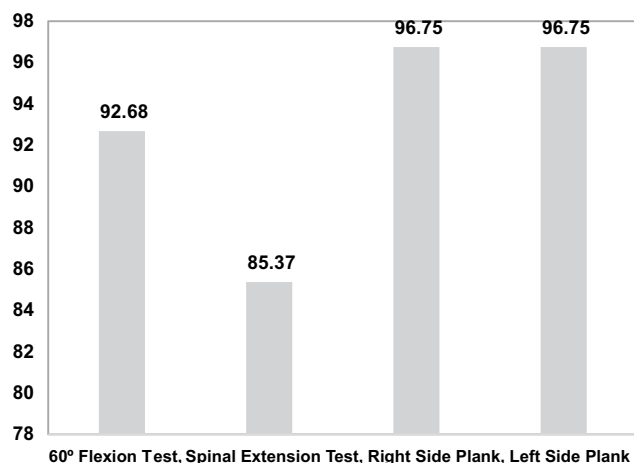
Figure 3: Grand Total Percentages of McGill Core Endurance Test

Results showed 25(10.2%) participants showed none Fatigue, 107(43.5%) mild fatigue, 91(37%) moderate fatigue, 21(8.5%) severe fatigue and 2(0.8%) participants showed worst fatigue (Figure 4).
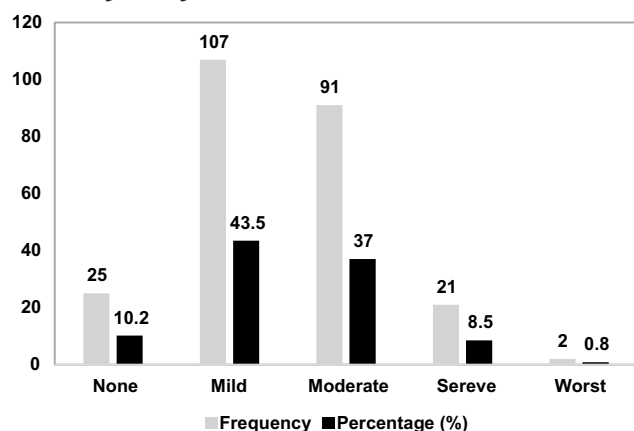

Figure 4: Frequency and Percentages of Rating of Fatigue Scale(ROF)

DISCUSSION

This study investigated core muscles weakness among 246 medical college students (111 male, 135 female) and found a significant prevalence of core muscles weakness. The results showed that 92.68% of students exhibited weakness in the 60º Flexion Test, 85.37% in the Spinal Extension Test, and 96.75% in both Right and Left Side Plank Tests. Comparison with normative values: Low Endurance (1–50 seconds), Medium Endurance (50.1–75 seconds), High Endurance (>75.1 seconds), revealed that most students had low core muscles endurance, emphasizing the need for core muscles strengthening exercises and proper postural alignment to improve overall physical fitness and well-being among medical students. According to a study conducted by Rakholiya et al., founded, core weakness in females have significant weakness by testing through McGill core endurance tests,

including a 60º flexion test with a weakness value of 65.40%, a spinal extension test weakness value of 86.73%, a right side plank test with a weakness value of 83.89% and left side plank weakness value 76.30% from 212 healthy female, and concluded that 18-25 year old female have weak core muscles by assessing through McGill core endurance tests [7]. However, the current study revealed even higher prevalence rates of core muscles weakness among medical college students, with 92.68% exhibiting weakness in the 60º Flexion Test, 85.37% in the Spinal Extension Test, and 96.75% in both Right and Left Side Plank Tests. These findings suggest that medical students, regardless of gender, may be at a higher risk of core muscles weakness, emphasizing the need for targeted interventions to improve core strength and overall physical fitness in this population. Bhore et al., demonstrated that core muscles weakness affects older bank employees within the age range of 45-50 years [18]. The current investigation demonstrated that younger medical college students between 18 and 25 years had a substantial incidence of core muscles weakness. Normal BMI males showed weaker core muscles, but the current research indicated equal noticeable core muscles weakness between male and female medical students. Research shows core muscles weakness occurs frequently throughout various demographic groups, including aged bank employees and medical college students, thus demanding specific intervention programs to enhance core strength and physical fitness. Akduman et al., analyzed the link that exists between physical exercise and core endurance within university students. McGill core endurance tests, together with the International Physical Activity Questionnaire (IPAQ), revealed that core muscles endurance fails to demonstrate a statistical relationship against physical activity level [21]. Results from this current study match the findings reported by Akduman et al., because they discovered that university student core muscles endurance does not relate to physical activity levels [21]. The latest research showed that medical college students experienced significant core muscles weakness problems while continuing physical activity. Data from this study suggests that participating in physical activities only provides inadequate results for core muscles endurance improvement; thus, specialized core muscles exercises remain necessary for young adults. Priyadarshini and Gopalswami, studied how core muscles strengthening exercises affect both postural sway and fall risk in their research. The study included exercises for core strengthening, which included lower abdominal series, semi sit-ups, and lateral bridges as part of the program. When testing the stabilization effects, the core strengthening program displayed positive results yet both

study groups maintained similar levels of postural sway [22]. Experimental core strengthening training methods like those applied by Priyadarshini and Gopalswami, edshow promise for improving elementary muscles strength and total fitness among medical students based on current study findings. The study conducted by Sarac *et al.,* in detail analyzed how core muscles endurance measures alongside balance and physical activity levels and fatigue and thoracic kyphosis angle relate to each other. The research demonstrated that core muscles endurance possessed meaningful links with the physical activity level and three outcome measures, including fatigue and balance, yet failed to generate connections with the thoracic kyphosis angle [23]. Results from this investigation indicate that medical students do not eliminate their core muscles weakness even though they participate in physical activity. Additional research is necessary for a complete understanding of core muscles endurance relationships with physical activity and other factors across different groups of people. Results from the present study about medical college student core muscles weakness need evaluation against Fallahasady *et al.,* which examined core muscles endurance with functional movements and lordosis-angular measurements in females. This study demonstrates that medical students should receive core muscles weakness treatment because there was no correlation between core muscles endurance and functional movement patterns [24]. The results from the present study regarding core muscles weakness in medical college students coincide with those from Abhilash *et al.,* as they established a strong connection between core endurance and static balance in students with forward head posture. The findings of this study identify core muscles weakness as a cause of reduced static balance therefore, medical students need proper core muscles endurance training to stop possible balance disorders [25]. The present study demonstrates different core muscles weakness prevalence rates in medical college students than Esfahani *et al.,* research showed no significant differences in core endurance between those with sedentary lifestyles and those without low back pain [26]. This research confirmed through its results that medical college students demonstrate significant weakness in their core muscles. Worldwide core muscles weakness in medical college students arises from physical inactivity combined with classroom-based sitting and faulty postures which create intense stress on the spine and diminish muscular strength and balance while using improper handling techniques and equipment and lower extremity health issues and unsuitable workplace positions and lack of fitness and extensive sedentary behavior [27]. Unresolved medical student health

problems will lead to an increased number of core weakness cases in this population. Addressing these issues currently remains vital because neglecting them will produce permanent outcomes, including musculoskeletal disorders and weaker general health status. Firstly, the study was conducted on a limited budget, which restricted the scope of the research. Additionally, the time duration for the study was short, which may not have allowed for a comprehensive exploration of the topic. Furthermore, the sample size was limited, which may not be representative of the larger population. Lastly, the study did not delve deeply into the underlying causes and mechanisms of core muscle weakness. It is recommended to develop clinical guidelines for implementing core exercise programs in medical education to promote physical fitness and overall well-being. Conduct a cohort study to assess the progression of core muscles weakness over time and identify potential risk factors. Evaluate the effectiveness of core muscle strengthening exercises and ergonomic modifications in reducing core muscles weakness. Investigate the correlation between the core muscle weakness and factors such as stress, sleep, academics, and level of physical activity to identify potential underlying causes. Conduct a Randomized controlled trial to evaluate the effectiveness of specific exercise programs and ergonomic modifications in strengthening core muscles and reducing weakness.

CONCLUSIONS

It was concluded that the study revealed a high prevalence of core muscles weakness among medical college students, emphasizing the importance of implementing exercises to enhance core muscles strength and endurance.

Authors Contribution

Conceptualization: GA
Methodology: GA, AS
Formal analysis: GA
Writing review and editing: GA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1]   Saki F, Shafiee H, Tahayori B, Ramezani F. The Effects of Core Stabilization Exercises On the Neuromuscular Function of Athletes with ACL Reconstruction.

Scientific Reports. 2023 Feb; 13(1): 2202. doi: 10.1038/s41598-023-29126-6.

[2] Shalamzari MH, Henteh MA, Shamsoddini A, Ghanjal A. Comparison of the Effects of Core Stability and Whole-Body Electromyostimulation Exercises On Lumbar Lordosis Angle and Dynamic Balance of Sedentary People with Hyperlordosis: A Randomized Controlled Trial. BioMed Central Sports Science, Medicine and Rehabilitation. 2024 Apr; 16(1): 91. doi: 10.1186/s13102-024-00879-5.

[3] Øverås CK, Nilsen TI, Nicholl BI, Rughani G, Wood K, Søgaard K *et al.* Multimorbidity and Co-Occurring Musculoskeletal Pain Do Not Modify the Effect of the SELFBACK App on Low Back Pain-Related Disability. BioMed Central Medicine. 2022 Feb; 20(1): 53. doi: 10.1186/s12916-022-02237-z.

[4] Behera P, Majumdar A, Verma M, Kumarasamy AP, Mishra N. Musculoskeletal Pain Affecting Undergraduate Nursing Students: A Cross Sectional Study On the Prevalence and the Associated Factors. Journal of Professional Nursing. 2023 Nov; 49: 135-44. doi: 10.1016/j.profnurs.2023.09.012.

[5] Devries MC and Giangregorio L. Using the Specificity and Overload Principles to Prevent Sarcopenia, Falls and Fractures with Exercise. Bone. 2023 Jan; 166: 116573. doi: 10.1016/j.bone.2022.116573.

[6] Alshehri MM, Alqhtani AM, Gharawi SH, Sharahily RA, Fathi WA, Alnamy SG *et al.* Prevalence of Lower Back Pain and Its Associations with Lifestyle Behaviors Among College Students in Saudi Arabia. BioMed Central Musculoskeletal Disorders. 2023 Aug; 24(1): 646. doi: 10.1186/s12891-023-06683-5.

[7] Rakholiya P, Mistry I, Patel R, Tank P, Sonpal D. Prevalence Core Muscle Weakness in 18–25 Years Old Females. International Journal of Advanced Researche. 2021; 7(9): 37-40.

[8] Hooker DN and Prentice WE. Rehabilitation of Injuries to the Spine. In Rehabilitation Techniques for Sports Medicine and Athletic Training. 2024 Jun: 785-840. doi: 10.4324/9781003526308-28.

[9] Meyers WC and Editor. Introducing the Core: Demystifying the Body of an Athlete. Taylor and Francis. 2024 Jun. doi: 10.4324/9781003524670.

[10] Esteban-García P, Jiménez-Díaz JF, Abián-Vicén J, Bravo-Sánchez A, Rubio-Arias JÁ. Effect of 12 Weeks Core Training On Core Muscle Performance in Rhythmic Gymnastics. Biology. 2021 Nov; 10(11): 1210. doi: 10.3390/biology10111210.

[11] Norris C. Back Rehabilitation: Core Stability Re-examined. Routledge. 2023 Jul. doi: 10.4324/9781003366188.

[12] Palmer TG and McCabe M. The Effect of a Novel Weight-Supported Kinetic Chain Resistance Training Program on Proximal Core Muscular Endurance, Trunk to-Arm Muscular Power, and Bat Swing Speed. The Journal of Strength and Conditioning Research. 2023 Nov; 37(11): 2130-40. doi: 10.1519/JSC.0000000000004520.

[13] Nam-guk S. Comparison of the Effects Of 12-Week Online-Delivered Isometric and Dynamic Core Stability Exercises On Functional Movement, Dynamic Postural Control, and Core Endurance in Healthy Young Adults. 2022.

[14] Karaçay BÇ and Konar NM. Risk Factors for Reduced Core Endurance, Fatigue and Physical Inactivity in Medical Students. Anatolian Clinic Journal of Medical Sciences. 2023 May; 28(2): 139-48. doi: 10.21673/anadoluklin.1165830.

[15] Ghorbani M, Yaali R, Sadeghi H, Koumantakis GA. The Impact of Flatfeet on the Correlation Between Functional Movement Scores, Balance, Agility, and Core Muscle Strength in Young Females: A Cross-Sectional Study. Scientific Reports. 2025 Feb; 15(1): 5077. doi: 10.1038/s41598-025-89364-8.

[16] Lusk CB. The Impact of Stability Exercises on Core Muscle Imbalances and Subsequent Low Back Pain. Auburn University. 2021.

[17] Oliva-Lozano JM and Muyor JM. Core Muscle Activity During Physical Fitness Exercises: A Systematic Review. International Journal of Environmental Research and Public Health. 2020 Jun; 17(12): 4306. doi: 10.3390/ijerph17124306.

[18] Bhore PR, Bathia K, Kanase S, Jadhav A. Prevalence of Core Weakness in Bank Employees. Journal of Clinical and Diagnostic Research. 2019 Mar; 13(3). doi: 10.7860/JCDR/2019/40155.12697.

[19] McGill S. Core Training: Evidence Translating to Better Performance and Injury Prevention. Strength and Conditioning Journal. 2010 Jun; 32(3): 33-46. doi: 10.1519/SSC.0b013e3181df4521.

[20] Micklewright D, St Clair Gibson A, Gladwell V, Al Salman AJ. Development and Validity of the Rating-of-Fatigue Scale. Sports Medicine. 2017 Nov; 47: 2375-93. doi: 10.1007/s40279-017-0711-5.

[21] Akduman V, Özay ZG, Sarı Z, Polat MG. Is There A Relationship Between Physical Activity Level and Core Endurance?. Kocaeli Üniversitesi Sağlık Bilimleri Dergisi. 2019 Nov; 5(2): 60-5. doi: 10.30934/kusbed.478109.

[22] Priyadarshini S and Gopalswami AD. Efficacy of Core Musculature Strengthening on Postural Sway. Journal of Clinical and Diagnostic Research. 2019 Jul; 13(7). doi: 10.7860/JCDR/2019/34644.12995.

[23] Sarac DC, Bayram S, Tore NG, Sari F, Guler AA, Tufan A *et al.* Association of Core Muscle Endurance Times with Balance, Fatigue, Physical Activity Level, and

Kyphosis Angle in Patients with Ankylosing Spondylitis. Journal of Clinical Rheumatology. 2022 Jan; 28(1): e135-40. doi: 10.1097/RHU.000000000000 1641.

[24] Fallahasady E, Rahmanloo N, Seidi F, Rajabi R, Bayattork M. The Relationship Between Core Muscle Endurance and Functional Movement Screen Scores in Females with Lumbar Hyperlordosis: A Cross-Sectional Study. BioMed Central Sports Science, Medicine and Rehabilitation. 2022 Oct; 14(1): 182. doi: 10.1186/s13102-022-00567-2.

[25] Abhilash P, Priya S, Kheriwala MK. Correlation Between Static Balance and Core Endurance Among College Student with Forward Head Posture. International Journal of Science and Healthcare Research. 2021; 6: 244-50. doi: 10.52403/ijshr.20210 742.

[26] Esfahani NH, Dommerholt J, Rezaeian ZS. Core Muscles Endurance in Sedentary Staffs with and without Nonspecific Chronic Low Back: A Cross-sectional Study. Muscles, Ligaments and Tendons Journal. 2021 Jan; 11(1). doi: 10.32098/mltj.01.2021.15.

[26] Kapre TM and Alexander JO. A Correlation Study of Weak Core Muscles with Hamstring Muscles Flexibility in Young Adults. Bulletin of Faculty of Physical Therapy. 2024 Nov; 29(1): 79. doi: 10.1186/s 43161-024-00244-0.

Original Article

Prevalence of Scapulocostal Syndrome in Healthcare Professionals

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ARTICLE INFO

ABSTRACT

Scapulocostal syndrome is a musculoskeletal condition characterized by pain and dysfunction between the scapula and rib cage. It is particularly prevalent among healthcare professionals due to repetitive movements, poor posture, and prolonged static positions during patient care. **Objective:** To determine the prevalence of scapulocostal syndrome in healthcare professionals. **Methods:** It was a cross-sectional study design. A sample size of 286 was selected. The Numerical Pain Rating Scale (NPRS) and Pressure Pain Threshold (PPT) are used to assess pain. SPSS version 26.0 was used for data analysis. Functional disability was checked by using the DASH scale. PPT and trigger point palpation were used exclusively for diagnostic confirmation of SCS (per Simons' criteria) and participant eligibility. **Results:** The study involved 286 participants aged 25 to 45 years, with a majority being female (55.9%). The mean height was 1.69 ± 0.09 m, and the mean weight was 71.27 ± 14.29 kg, with 60.8% classified as overweight. Among affected muscles in scapulocostal syndrome, the rhomboid (22.0%) and serratus posterior superior (21.3%) were most common. 52.1% exhibited forward head posture (ranging from slight to severe), and 51.0% showed scapular position abnormalities. The average cervicovertebral angle was 49.75° ± 5.73°. Participants reported moderate pain levels (4.98 ± 3.24 NPRS) and moderate functional disability, with a mean DASH total score of 52.19 ± 6.70. **Conclusions:** Scapulocostal syndrome primarily affects the rhomboid and serratus posterior superior muscles. Most participants showed forward head posture, which is linked to pain and reduced function. Moderate pain and disability levels highlight the condition's impact on physical abilities.

INTRODUCTION

Scapulocostal syndrome (SCS) is a chronic myofascial pain condition that primarily affects the thoracic and scapular regions of the body [1, 2]. The pain associated with SCS is typically persistent and lasts for more than three months, qualifying it as a chronic condition. The prevalence of thoracic spine pain in the general population varies significantly, ranging from 3.0% to 55.0% annually, with a lifetime prevalence of upper back pain reaching 59.5%. SCS is particularly common among middle-aged individuals, especially those between the ages of 18 and 60 years, and is more prevalent in female than in male [3, 4]. The syndrome is notably prominent in the adult working population, which suggests that occupational factors may contribute significantly to its onset. Poor sitting posture, especially while working or using digital media, is considered a key risk factor for the development of SCS. This is largely due to the repetitive and improper use of the muscles around the scapulae, resulting in overuse disorders [5, 6]. The affected muscles involved in SCS are located around the scapulae, including the levator scapulae, upper trapezius, rhomboid major and minor, teres major and minor, infraspinatus, serratus anterior, and serratus posterior superior muscles [7]. These muscles, which are commonly involved in myofascial trigger points (MTrPs), contribute to the dysfunctional biomechanics of the scapulae and can impact the shoulder and upper back movement [8]. Furthermore, several of the muscles involved in SCS are directly attached to the rib cage, which can lead to

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alterations in chest expansion during respiration [9]. The scapular muscles, a subset of the postural muscles, play a critical role in controlling posture and facilitating efficient respiration [10]. Postural muscles serve two primary functions: maintaining posture and supporting respiratory function. The interaction between the scapular muscles and the diaphragm, a major muscle of respiration, is crucial for optimal chest expansion and diaphragmatic mobility [11]. Therefore, dysfunction in these muscles can not only impair postural control but also affect respiratory mechanics, leading to reduced functional capacity during activities that involve both posture and respiration [12]. The core muscles of the body, which stabilize the spine and pelvis, also play a significant role in supporting upper and lower limb movements [13-15].

This study aims to determine the prevalence of scapulocostal syndrome in healthcare professionals.

METHODS

This cross-sectional observational study was conducted at the Outpatient Musculoskeletal Clinic between January 2023 and June 2023, designed to evaluate the point prevalence of Scapulocostal Syndrome (SCS) and its associated factors. The sample size was calculated using Cochran's formula for prevalence studies ($n = Z^2 * P(1-P) / e^2$, where Z = 1.96, p=0.50, and e=0.05), initially targeting 437 participants. However, due to time constraints and strict inclusion criteria requiring participants aged 18–65 years with scapular pain intensity ≥5 on the Numeric Pain Rating Scale (NPRS) and at least one active myofascial trigger point (MTrP) in scapular muscles (levator scapulae, trapezius, rhomboids, etc.) per Simons' criteria only 286 participants were enrolled. Exclusion criteria included recent upper extremity trauma (<6 months), prior shoulder surgery, and systemic inflammatory conditions. A post-hoc power analysis (G*Power 3.1) confirmed sufficient statistical power (82% for NPRS pain scores, 79% for PPT-DASH correlations). Data were collected via non-probability convenience sampling and analyzed using SPSS version 28.0, with prevalence reported as proportions (95% CIs) and associations tested via specific tests (a=0.05). Participants underwent comprehensive evaluation using validated tools: NPRS (ICC=0.95; validity r=0.89 vs. VAS) for pain (score ≥5 indicating significance); Pressure Pain Threshold (PPT) via digital algometer (ICC=0.88–0.92), measured three times per site; the DASH questionnaire (α=0.96; ICC=0.96) for disability assessment (0–100 scale); and the craniovertebral angle (CV-angle) for postural analysis. SCS diagnosis required referred pain and MTrPs identified through palpation of taut bands and pain referral patterns. Scapular asymmetry was assessed via the scapular position test (≥1.5 cm difference indicating dyskinesis). These standardized protocols ensured

systematic identification of SCS and its functional impacts. Participants' responses were collected. The data were analyzed using SPSS version 26.0 and interpreted to derive further results. Descriptive statistics of categorical data, such as frequency, percentage, cross-tabulation, bar charts, and pie charts, were used to represent variables. For non-categorical (continuous) data, (mean, median), dispersion (standard deviation, range), and histograms were used to summarize and interpret the data.

RESULTS

The study represents the descriptive statistics of age among the participants (n=286). The data indicates that the highest proportion of respondents (27.6%) were in the 25–30 years' age group, followed by 25.9% in the 36–40 years' age group. Participants aged 31–35 years accounted for 24.1% of the total sample, while those in the 41–45 years' group made up 22.4%. The study also represents the gender distribution of the participants (n = 286). The majority of respondents were female, comprising 55.9% of the total sample, while males accounted for 44.1%. This indicates a higher representation of female physical therapists in the study population (Table 1).

Table 1: Descriptive Statistics of Age and Gender (n=286)

Variables	Frequency (%)
Age (Years)	
25-30 Years	79 (27.6%)
31-35 Years	69 (24.1%)
36-40 Years	74 (25.9%)
41-45 Years	64 (22.4%)
Gender	
Male	126 (44.1%)
Female	160 (55.9%)

The results present the descriptive statistics for the DASH (Disabilities of the Arm, Shoulder, and Hand) scores. The mean total DASH score was 52.19 ± 6.70, with individual domain scores as follows: Physical Domain (3.01 ± 0.30), Symptoms Domain (2.97 ± 0.78), and Social/Work Domain (2.96 ± 0.63). These values suggest a moderate level of disability and symptom burden among the participants (Table 2).

Table 2: Graphical Representation of DASH (n=286)

Variables	DASH Physical	DASH Symptoms	DASH Social Work	DASH Total
Mean ± SD	3.0102 ± 0.29961	2.9708 ± 0.77545	2.9687 ± 0.62676	52.1938 ± 6.70574
Minimum	2.19	1.00	1.50	32.76
Maximum	4.05	5.00	4.33	69.83

DISCUSSION

The current study primarily investigated muscle involvement, pain levels, forward head posture (FHP), and functional disability using DAHS among individuals. It found

that the rhomboid and serratus posterior superior muscles were most commonly affected, and a majority of participants presented with FHP, contributing to pain and disability. Similarly, Karaagaç et al. found that among participants with SCS, 74.67% were also diagnosed with MMP, suggesting a strong comorbidity. Positive correlations were identified between pain intensity and pressure pain threshold (PPT) in both SCS and MMP, as well as between scapular muscle sensitivity (PPT). Compared to the current study, which focused on the prevalence of muscle involvement, posture, and functional disability in SCS, this research expands the clinical understanding by linking SCS with orofacial dysfunction [16]. In the current study, there were some participants whose scapula position was not normal; it could be due to the tightness of muscles around scapula, mostly the serratus anterior and rhamnoid muscles. Srijessadarak et al. and Narulkar et al. called Scapulocostal Syndrome (SCS), referred to as "snapping scapula," emphasizing its mechanical and anatomical origins. Unlike the current study, which focuses on the prevalence of muscle involvement, postural alterations, and functional limitations associated with SCS, Weksler's account explores less common structural causes, such as post-traumatic bony changes. The highlighted case involving a rib fracture that led to a bony callous and snapping scapula illustrates the importance of considering anatomical abnormalities in SCS diagnosis, particularly in post-trauma scenarios. While both studies recognize the role of physical therapy in management, both draw attention to surgical options when conservative treatment fails due to structural defects. Together, these findings suggest that although SCS often presents as a muscular and postural condition, as shown in the current research, clinicians must remain vigilant for underlying anatomical contributors that may warrant surgical evaluation [17, 18]. Liaqat et al. examined the prevalence of Levator Scapulae Syndrome (LSS) among beauticians, linking it to prolonged static postures and repetitive tasks. Similar to the current study, which also identified postural abnormalities, particularly forward head posture, as contributing factors. Both studies emphasize the role of poor ergonomics and posture in musculoskeletal syndromes affecting the scapular region [19]. Mishra et al. discussed SCS (also referred to as levator scapulae syndrome) as a condition with symptoms often confused with cervical or visceral issues. It highlights the levator scapulae as a central pain source and notes common risk factors like poor posture, clerical work, and heavy lifting. The current study aligns with these findings by identifying scapular muscle involvement (particularly the levator scapulae and rhomboid) and poor posture in most participants, reinforcing the importance of postural correction and muscle assessment in diagnosis [20].

CONCLUSIONS

It was concluded that scapulocostal syndrome primarily affects the rhomboid and serratus posterior superior muscles. Most participants showed forward head posture, which is linked to pain and reduced function. Moderate pain and disability levels highlight the condition's impact on physical abilities.

Authors Contribution

Conceptualization: NF
Methodology: RS
Formal analysis: NF
Writing review and editing: ST, SS, TA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1] Deka D, Yaduvanshi P, Mozhi A. Effect of Muscle Energy Technique and Myofascial Release in Scapulocostal Syndrome in Collegiate Young Adults. 2023; 72(1): 145-161.

[2] Zahid A, Gull S, Athar M, Khan IU, Maqbool S, Zahid H. Comparative Effectiveness of Scapular Stabilization Exercises with and Without Deep Breathing on Pain and Chest Expansion in Patients with Scapulocostal Syndrome: Scapular Stabilization with Deep Breathing in SCS. Journal of Health and Rehabilitation Research. 2024 Sep; 4(3). doi: 10.61919/jhrr.v4i3.1605.

[3] Alshami AM and AlSadiq AI. Outcomes of Scapulothoracic Mobilisation in Patients with Neck Pain and Scapular Dyskinesis: A Randomized Clinical Trial. Journal of Taibah University Medical Sciences. 2021 Aug; 16(4):540-9. doi:10.1016/j.jtumed.2021.03.006.

[4] Lee SB. The Effect of Scapular Stabilization Exercise and Thoracic Joint Mobilization on the Scapular Function in Adults with Scapular Dysfunction. Journal of Industrial Convergence. 2021;19(3):83-90. doi: 10.22678/JIC.2021.19.3.083.

[5] Pires L, Santos N, Lana JV, de Macedo AP, Costa FR, Azzini GO et al. Upper Crossed Syndrome and Scapulae Upper-Trapping: A Mesotherapy Protocol in Cervicoscapulobrachial Pain—The 8: 1 Block. Bioengineering. 2024 Nov; 11(11):1142. doi:10.3390/bio-engineering11111142.

[6] Thangavelu K. A Comparative Study on the Efficacy of Ischemic Compression and Taping Techniques in Alleviating Levator Scapulae Trigger Point-Induced Cervical Pain. Journal of Health Physiotherapy and Orthopaedics.2025 May; 2(2): 15-22. doi: 10.555 22 /ijti .V2I2.0019.

[7] Kanhachon W and Boonprakob Y. The Correlation Between Scapulocostal Syndrome and Masticatory Myofascial Pain on Selected Pain and Functional Parameters-An Observational Study. Journal of Bodywork and Movement Therapies.2022Jan;29: 198-205. doi: 10.1016/j.jbmt.2021.09.023.

[8] Yoo WG. Upward Pulling Plus Exercise Improves Scapulocostal Pain and Scapular Position. Journal of Physical Therapy Science. 2016; 28(11): 3259-60. doi: 10.1589/jpts.28.3259.

[9] Telli H and Sağlam G. Scapular dyskinesis and Loss of Cervical Lordosis in Myofascial Pain Syndrome and Its Effects on Pain and Posture Disorders. Turkish Journal of Physical Medicine and Rehabilitation. 2022 Dec; 69(2): 188. doi: 10.5606/tftrd.2023.10652.

[10] Kanhachon W and Boonprakob Y. Modified-Active Release Therapy in Patients with Scapulocostal Syndrome and Masticatory Myofascial Pain: A Stratified-Randomized Controlled Trial. International Journal of Environmental Research and Public Health.2021Aug;18(16):8533.doi:10.3390/ijerph181685 33.

[11] Wiranatha MB, Putra IP, Saraswati PA, Kinandana GP. The Relationship Between Upper Cross Syndrome Posture and Shoulder Disability.Physical Therapy Journal of Indonesia.2024Jul;5(2):137-41.doi:10.51 559/ptji.v5i2.209.

[12] Buttagat V, Taepa N, Suwannived N, Rattanachan N. Effects of Scapular Stabilization Exercise on Pain Related Parameters in Patients with Scapulocostal Syndrome: A Randomized Controlled Trial. Journal of Bodywork and Movement Therapies.2016Jan;20(1): 115-22. doi: 10.1016/j.jbmt.2015.07.036.

[13] Mostafaee N, HasanNia F, Negahban H, Pirayeh N. Evaluating Differences Between Participants with Various Forward Head Posture with and without Postural Neck Pain Using Craniovertebral Angle and Forward Shoulder Angle. Journal of Manipulative and Physiological Therapeutics.2022Mar;45(3):179-87. doi: 10.1016/j.jmpt.2022.06.007.

[14] Kim DH, Kim CJ, Son SM. Neck Pain in Adults with Forward Head Posture: Effects of Craniovertebral Angle and Cervical Range of Motion. Osong Public Health and Research Perspectives.2018Dec;9(6): 309. doi: 10.24171/j.phrp.2018.9.6.04.

[15] Mylonas K, Tsekoura M, Billis E, Aggelopoulos P, Tsepis E, Fousekis K. Reliability and Validity of Non-Radiographic Methods of Forward Head Posture Measurement: A Systematic Review.Cureus.2022 Aug; 14(8). doi: 10.7759/cureus.27696.

[16] Karaağaç A, Arslan SA, Keskin ED. Assessment of Pain, Scapulothoracic Muscle Strength, Endurance and Scapular Dyskinesis in Individuals with and without Nonspecific Chronic Neck Pain: A Cross-Sectional Study. Journal of Bodywork and Movement Therapies.2023Jul;35:261-7.doi:10.1016/j. jbmt.2023 .04.008.

[17] Srijessadarak T, Arayawichanon P, Kanpittaya J, Boonprakob Y. Diaphragmatic Mobility and Chest Expansion in Patients with Scapulocostal Syndrome: A Cross-Sectional Study. In Healthcare.2022May; 10(5): 950. doi: 10.3390/healthcare10050950.

[18] Narulkar R, Welling A, Gurudut P, Kage V. Comparing the Efficacy of 3-Dimensional Release Technique and Modified Active Release Therapy on Pain, Scapular Position and Craniovertebral Angle in IT Workers with Scapulocostal Syndrome: A Randomised Clinical Trial'. Journal of Bodywork and Movement Therapies. 2025 May. doi: 10.1016/j.jbmt.2025.05.033.

[19] Liaqat R, Ahmad A, Ali Z, Rehman Q, Rasool A, Zafar M. Prevalence of Levator Scapulae Syndrome and Its Association with Neck Pain and Disability in Beauticians: Levator Scapulae Syndrome in Beauticians.Journal of Health and Rehabilitation Research.2024Sep;4(3):1-4.doi:10.61919/jhrr.v4i3.15 67.

[20] Mishra A, Goyal M, Sharma S, Kumar P, Ahmed S. Establishing the Inter-Rater and Test–Retest Reliability of the Levator Scapulae Index in Women with Chronic Mechanical Neck Pain: A Reliability Study. International Journal of Therapy and Rehabilitation.2022 Oct;29(10):1-8.doi:10.1296 8/ijtr. 2022.0022.

Original Article

OPEN ACCESS

Exercise Practices and Awareness of Physiotherapy among Psoriatic Arthritis Patients Attending a Dermatology Clinic: A Cross-sectional Study

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ARTICLE INFO

ABSTRACT

Psoriatic arthritis causes joint pain and stiffness, and while physical therapy can help manage symptoms, awareness of its benefits is limited among patients. **Objectives:** To explore the frequency of physiotherapy utilization and exercise practices among individuals diagnosed with psoriatic arthritis attending a dermatology clinic. **Methods:** A cross-sectional study was conducted among 217 patients with psoriatic arthritis using a convenience sampling technique at a dermatology and dental clinic in Bahria Town, Lahore, over 4 months. Participants aged 18–50 years, diagnosed with psoriatic arthritis and attending dermatology consultations at the study site, were included. Data were collected via a structured questionnaire assessing knowledge, attitudes, and practices related to psoriatic arthritis and physical therapy. The questionnaire was adapted from a previously validated Indian study and administered in English and Urdu during dermatology clinic visits after obtaining informed consent. Data were analyzed using SPSS version 24.0. **Results:** A total of 153 participants with a mean age of 40.61 ± 6.73 years were included, with a slightly higher proportion of female (53.6%). Most were single (58.2%) and had an education ranging from primary to postgraduate. While 69.9% had heard of psoriasis, only 49% were aware of psoriatic arthritis. Nearly half had symptoms for more than a year, yet 26.1% were unaware of their current diagnosis. Rheumatologist visits were infrequent, and only 35.3% reported full compliance with therapy. **Conclusions:** Most participants knew about psoriasis and had long-term symptoms, but had limited awareness of psoriatic arthritis and poor engagement with physiotherapy practices.

INTRODUCTION

Psoriatic arthritis (PsA) is a chronic inflammatory disease that primarily affects the joints and entheses, the sites where tendons and ligaments attach to bones [1]. It is closely associated with psoriasis, a skin condition characterized by red, scaly plaques, and is classified as a seronegative spondyloarthropathy, meaning it does not involve rheumatoid factor positivity like rheumatoid arthritis. PsA is a systemic disease, meaning it can also impact other organs, including the cardiovascular system and metabolic processes [2]. The prevalence of PsA varies, with studies estimating that between 20–30% of individuals with psoriasis will develop this condition [3]. It affects men and women equally and can arise at any age,

though it typically manifests between the ages of 30 and 50 [4]. The global incidence of PsA differs depending on geographic and genetic factors, with estimates ranging from 0.1% to 1% of the population [5]. The underlying pathophysiology of PsA involves immune system dysfunction, where genetic, environmental, and immunological factors contribute to chronic inflammation in the joints and surrounding tissues [6]. Over activation of T cells and cytokines such as TNF-α, IL-17, and IL-23 plays a central role in triggering inflammatory pathways [7]. This results in synovitis, the inflammation of the synovial membrane that lines the joints, and enthesitis, the inflammation of the tendon and ligament attachment

points [8]. Over time, the chronic inflammatory response leads to structural changes, including both bone erosion and excessive bone formation, which can cause joint deformities [9]. PsA also has systemic effects, contributing to an increased risk of metabolic disorders, cardiovascular diseases, and psychological conditions [10]. PsA can affect both peripheral and axial joints. The most commonly involved areas include the fingers, wrists, knees, and ankles, as well as the spine and sacroiliac joints. Enthesitis is a hallmark feature of the disease, often affecting areas such as the Achilles tendon and the plantar fascia. Additionally, the skin and nails are frequently involved, with psoriasis plaques and nail abnormalities, such as pitting and onycholysis (nail separation), being common manifestations [11]. Several factors contribute to the development of PsA, with genetic predisposition playing a significant role. A family history of PsA or psoriasis, particularly in individuals carrying the HLA-B27 gene, increases the risk of developing the condition [12]. Psoriasis itself is the strongest risk factor, especially in those with nail involvement [12]. Environmental triggers, including infections, physical trauma, and lifestyle factors such as smoking and obesity, can also influence disease onset. Additionally, metabolic syndrome, which includes obesity, diabetes, and hypertension, has been linked to a higher severity of PsA and may worsen disease progression [13]. The treatment of psoriatic arthritis (PsA) focuses on reducing inflammation, preventing joint damage, and improving quality of life. Disease-modifying antirheumatic drugs (DMARDs) are the primary treatment, including conventional synthetic DMARDs (csDMARDs) like methotrexate, as well as biologic (bDMARDs) and targeted synthetic DMARDs (tsDMARDs) that target inflammatory pathways [14]. Despite advancements, many patients still experience unmet treatment needs, as PsA presents with diverse symptoms and severities [9]. Given its impact on both physical and mental well-being, incorporating patient preferences into treatment strategies is essential [15]. Research continues to explore treatment adherence, particularly concerning methotrexate use, while non-pharmacological approaches, such as lifestyle modifications, are also gaining recognition [3, 16]. Raising awareness of physical therapy (PT) in psoriatic arthritis (PsA) is essential, as many patients underutilize it due to a lack of knowledge [17]. Despite its benefits in improving mobility, reducing pain, and enhancing quality of life, PT remains overlooked in PsA management. Limited awareness prevents patients from considering it alongside medical treatment. Additionally, the lack of high-quality research on the impact of physical therapy has further limited its recognition in the management of psoriatic arthritis (PsA).

This study aims to assess the frequency of physiotherapy utilization and exercise habits among individuals diagnosed with psoriatic arthritis attending a dermatology clinic.

METHODS

This cross-sectional survey-based study was conducted on patients diagnosed with psoriatic arthritis, with a total sample size of 217 individuals selected using a convenience sampling technique. Initially, data collection took place at the Derma and Dental Clinic in Bahria Town, Lahore, and the study duration was four months following the approval of the synopsis (July 2024 to October 2024). Although 217 patients were included, 153 individuals were ultimately analyzed based on complete and eligible responses. The inclusion criteria for participation involved adults aged between 18 to 50 years who were diagnosed with psoriatic arthritis according to established diagnostic criteria. Participants were required to be attending dermatology settings and willing to complete the study questionnaire. Conversely, the exclusion criteria included individuals unable to respond due to limited literacy, those diagnosed with other forms of arthritis, such as rheumatoid arthritis, individuals with severe cognitive impairments or mental illnesses hindering comprehension of the survey, those undergoing treatments that could influence the study outcomes, and pregnant or breastfeeding women. Data were collected from participants who met the inclusion criteria after informed consent was obtained and the study was explained to them. The questionnaire, adapted from an Indian study assessing the knowledge, attitude, and practice of psoriatic patients, included 35 multiple-choice questions covering demographic details and key areas such as patients' perceptions of psoriatic arthritis, its management, the role of physical therapy, quality of life, and opinions on the care received. The questionnaire was adapted from a previously validated KAP study on psoriatic arthritis patients. It was modified for the local context and administered in English and Urdu to ensure accessibility. Eligible patients completed the questionnaire independently during their visits to participating centers [18]. Data were analyzed using SPSS version 24.0.

RESULTS

The study included 153 participants with a mean age of 40.61 ± 6.73 years (Figure 1).
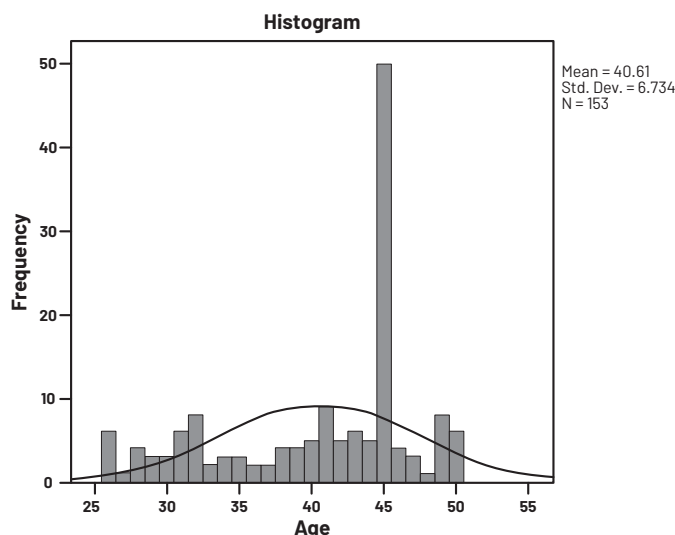
Figure 1: Age Distribution of Psoriatic Arthritis Patients (n=153)

The sample comprised slightly more female (53.6%) than male (46.4%). Most participants were single (58.2%), followed by married (22.2%) and divorced/widowed (19.6%). Educational backgrounds varied, with 29.4% completing high school and 24.8% holding undergraduate degrees. Occupations were diverse, including clerks and students (both 22.2%), teachers (20.3%), shopkeepers (19.0%), and engineers (16.3%). Employment status showed 53.6% were employed, while 46.4% were unemployed (Table 1).

Table 1: Demographic Characteristics of Psoriatic Arthritis Patients

Variables		N
Age	Minimum	26
	Maximum	50
Gender	Male	71
	Female	82
Marital Status	Single	89
	Married	44
	Divorced	30
Job Status	Employed	82
	Unemployed	71
Education	High School	45
	Undergraduate	38
	Post-Graduation	33
Occupation	Shopkeeper	29
	Student	34
	Teacher	31

Regarding family history, 34.0% reported a positive family history of the condition, while an equal percentage were unsure. Most participants (69.9%) had heard of psoriasis, and 51.6% had experienced skin symptoms for over a year. Joint symptoms lasting more than a year were reported by 54.2%. A total of 30.7% visited dermatologists annually, and 23.5% saw rheumatologists once a year. Diagnosis was commonly made by general physicians (36.6%), followed by dermatologists and rheumatologists. Only 26.8% reported being diagnosed with both psoriasis and psoriatic arthritis, and 26.1% were unaware of their diagnosis (Table 2).

Table 2: Clinical and Diagnostic Characteristics of Psoriatic Arthritis Patients (n=153)

Disease Domain		Frequency (%)
Heard Psoriasis	Yes	107 (69.9%)
	No	46 (30.1%)
Duration	Less Than 1 Year	74 (48.4%)
	More Than 1 Year	79 (51.6%)
Joint Symptoms	Less Than 1 Year	70 (45.8%)
	More Than 1 Year	83 (54.2%)
Heard Psoriasis Arthritis	Yes	75 (49.0%)
	No	78 (51.0%)
Time Before Visit to Doctor	less Than 1 years	79 (51.6%)
	More Than 1 Years	74 (48.4%)
Dermatologist Visit Frequency	Once in A Month	27 (17.6%)
	Once in Two Months	23 (15.0%)
	Once in A Three Month	15 (9.8%)
	Once in Six Months	20 (13.1%)
	Once A Year	47 (30.7%)
	Never	21 (13.7%)
Rheumatologist Visit Frequency	Once in A Month	19 (12.4%)
	Once in Two Months	24 (15.7%)
	Once in A Three Month	19 (12.4%)
	Once in Six Months	27 (17.6%)
	Once A Year	36 (23.5%)
	Never	28 (18.3%)
First Diagnosis	Rheumatologist	45 (29.4%)
	Dermatologist	52 (34.0%)
	General Physician	56 (36.6%)
Current Diagnosis	Don't Know	40 (26.1%)
	Psoriasis with Psoriatic Arthritis	41 (26.8%)
	Psoriasis	32 (20.9%)
	Psoriatic Arthritis	40 (26.1%)
Diagnosis	Rheumatologist	34 (22.2%)
	Dermatologist	20 (13.1%)
	Orthopedic	37 (24.2%)
	General Physician	38 (24.8%)
	Others	24 (15.7%)

Medication use was reported by 56.9%, with fatigue and nausea being the most common side effects. OTC medication was used by 56.2%, and pain medicine was most frequently taken 2–4 times a month or less. Biologic therapy was used by 47.1%, and therapy compliance was split nearly evenly across full, partial, and non-compliance (Table 3).

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Table 3: Distribution of Psoriasis and Psoriatic Arthritis Patients

Management Domain	Response	Frequency (%)
Current Medication	Yes	87 (56.9%)
	No	66 (43.1%)
Side Effects	Fatigue	40 (26.1%)
	Nausea	40 (26.1%)
	None	34 (22.2%)
	Weight Gain	39 (25.5%)
OTC Medication	Yes	86 (56.2%)
	No	67 (43.8%)
Pain Medicine Frequent	Once A Day	18 (11.8%)
	Two Or More Times A Day	27 (17.6%)
	2-6 Times A Week	25 (16.3%)
	Once A Week	25 (16.3%)
	2-4 Times A Month	29 (19.0%)
	Less Than Once A Month	29 (19.0%)
Bio Therapy	Yes	72 (47.1%)
	No	81 (52.9%)
Therapy Compliance	Fully Compliant	54 (35.3%)
	Partially Compliant	49 (32.0%)
	Not Compliant	50 (32.7%)

Exercise habits varied, with 20.9% exercising two or more times a day and 15.0% never exercising. Overall, the data reflect a moderately diverse patient population with varying awareness, diagnosis experiences, treatment patterns, and lifestyle practices (Table 4).

Table 4: Quality of Life-Related Behaviours and Lifestyle Factors among Patients with Psoriatic Arthritis

QoL		Frequency (%)
Exercise Frequency	Never	23 (15.0%)
	Daily	29 (19.0%)
	Once A Day	26 (17.0%)
	Two Or More Times A Day	32 (20.9%)
	2-6 Times A Week	22 (14.4%)
	Once A Week	21 (13.7%)
Have You Ever Seen Physiotherapist	Yes	81 (52.9%)
	No	72 (47.1%)
Regular Activity Affected	Yes	75 (49.0%)
	No	78 (51.0%)
What An Affected Employment	Yes	74 (48.4%)
	No	79 (51.6%)
Alcohol Consumes	No	35 (22.9%)
	Smoke	45 (29.4%)
	Consume Alcohol	39 (25.5%)
	Smoke and Consume Alcohol	34 (22.2%)

DISCUSSION

The present study revealed the identification of the major issues in diagnosis, treatment, and rehabilitation with physical therapy of psoriatic arthritis (PsA) clients in a dermatologic clinic. Perhaps the least known statistic was that few of the participants understood or were even aware of PsA, with many of them having years of symptoms. 69.9 % of the respondents were aware of psoriasis, but in comparison, only 49 % knew of psoriatic arthritis, and 26.1 % of the respondents did not know they were diagnosed with psoriasis at all. This is in line with previous findings indicating that as high as 15.5 percent of PsA cases could be un-diagnosed because patients were unaware of this heterogeneous disease and lacked the understanding of its symptoms [19]. Even though the research has not assessed the diagnostic delay in specific months, more than half of the respondents indicated that they had experienced skin (51.6%) and joint (54.2%) symptoms over a year ago. In comparison with previous findings, which documented more than two years in delay of diagnosis in a large proportion of patients [20], with relevant impact on the course of the disease, damage over joints, and response to therapy [21]. Based on our results, the study highlights the importance of early diagnosis, more screenings during dermatology visits, and more cooperation between rheumatologists and dermatologists [22]. Although clinical guidelines suggest early intervention and personalized treatment schemes, only 23.5% of the respondents acted on a rheumatologist regularly, and general physicians were the most frequently initial diagnosing physicians (36.6 %). That trend can possibly be an indication of a specialist access or referral system and highlights the necessity of a better diagnostics infrastructure and patient referral system. It was also observed that the gap between the recognition of healthcare providers and the diagnosis reported by their patients indicates that they may experience communication failure during the visits, which has also been noted in other global studies (16,32). In this study, the rate of therapy compliance was moderate as only 35.3% answered that they are fully compliant, whereas the other half of respondents were either partially compliant (32 %) or non-compliant (32.7%). The most common side effects were fatigue (26.1%), nausea (26.1%), and weight gain (25.5%). Such side effects could have led to withdrawal of the medication. Additionally, 56.2 % relied on over-the-counter medicines, showing that they did not depend on professionals and their counsel and which also may not be in line with best practice. 47.1% one percent of the respondents were under treatment with biologic therapy; however, a large percentage still indicated ongoing symptoms and unmet care needs [19]. Another significant aspect of PsA management is physical activity/ physiotherapy, which continues to be an underused tool. Of the patients in this study, 52.9% had a prior exposure to physiotherapist visits and 15 % had never exercised before. Previous research findings support the argument that

substantial functional decline and low quality of life can be aggravated by physical inactivity and non-provision of rehabilitation services (28,31). Almost all of them did report effects on daily tasks (49.1%) and work (48.4%), yet their physiotherapy and exercise programs' reception and use were poor. These results prompt further inclusion of physiotherapy as a part of PsA management and improvement of educational efforts surrounding the benefits of physiotherapy [23]. Despite the chronicity of symptoms and treatment limitations, a substantial proportion of patients appeared to have adjusted psychologically, with many reporting active employment (53.6%) and consistent daily functioning. This could be partly explained by the comparatively high level of education of the sample, as more than 58% of people were graduates of undergraduate or higher education, associated with higher health literacy and coping abilities [24]. Although 217 patients were initially recruited, only 153 were included in the final analysis due to incomplete or ineligible responses. The research was restrained with an average sample size (153), a 30% attrition rate, and a convenience sampling at one clinic. Patients with low literacy or cognitive impairments were excluded, which could have provided selection bias and limited generalizability.

CONCLUSIONS

This study highlights limited awareness and underutilization of physiotherapy among psoriatic arthritis patients, despite prolonged disease duration. Poor compliance and low referral rates point to gaps in patient education and care integration. Promoting early multidisciplinary intervention and including physiotherapy in routine care could improve outcomes and quality of life for these patients.

Authors Contribution

Conceptualization: MG
Methodology: SS[1]
Formal analysis: ST
Writing review and editing: SS[2], TA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1] Schett G, Rahman P, Ritchlin C, McInnes IB, Elewaut D, Scher JU. Psoriatic Arthritis from A Mechanistic Perspective. Nature Reviews Rheumatology. 2022 Jun; 18(6): 311-25. doi: 10.1038/s41584-022-00776-6.

[2] Merola JF, Patil D, Egana A, Steffens A, Webb NS, Gottlieb AB. Prevalence of Musculoskeletal Symptoms in Patients with Psoriasis and Predictors Associated with the Development of Psoriatic Arthritis: Retrospective Analysis of A US Claims Database. Dermatology and Therapy. 2023 Nov; 13(11): 2635-48. doi: 10.1007/s13555-023-01025-8.

[3] FitzGerald O, Ogdie A, Chandran V, Coates LC, Kavanaugh A, Tillett W et al. Psoriatic Arthritis. Nature Reviews Disease Primers. 2021 Aug; 7(1): 59. doi: 10.1038/s41572-021-00293-y.

[4] Vivekanantham A, McGagh D, Coates LC. Current Treatments and Recommendations for Psoriatic Arthritis. Best Practice and Research Clinical Rheumatology. 2021 Jun; 35(2): 101680. doi: 10.1016/j.berh.2021.101680.

[5] Gupta S, Syrimi Z, Hughes DM, Zhao SS. Comorbidities in Psoriatic Arthritis: A Systematic Review and Meta-Analysis. Rheumatology International. 2021 Feb; 41(2): 275-84. doi: 10.1007/s00296-020-04775-2.

[6] Hailey LH, Amarnani R, Bundy C, Mcgagh D, James L, Kirtley S et al. Lifestyle Modifications and Nonpharmacologic Interventions to Improve Outcomes in Psoriatic Arthritis: A Systematic Review. Clinical Therapeutics. 2023 Sep; 45(9): 841-51. doi:10.1016/j.clinthera.2023.05.009.

[7] Zabotti A, De Lucia O, Sakellariou G, Batticciotto A, Cincinelli G, Giovannini I et al. Predictors, Risk Factors, and Incidence Rates of Psoriatic Arthritis Development in Psoriasis Patients: A Systematic Literature Review and Meta-Analysis. Rheumatology and Therapy. 2021 Dec; 8(4): 1519-34. doi: 10.1007/s40744-021-00378-w.

[8] Stober C. Pathogenesis of Psoriatic Arthritis. Best Practice and Research Clinical Rheumatology. 2021 Jun; 35(2): 101694. doi: 10.1016/j.berh.2021.101694.

[9] Azuaga AB, Ramírez J, Cañete JD. Psoriatic Arthritis: Pathogenesis and Targeted Therapies. International Journal of Molecular Sciences. 2023 Mar; 24(5): 4901. doi: 10.3390/ijms24054901.

[10] Rossella Talotta MD, Aiello MR, Restuccia R, Magaudda L. Non-pharmacological interventions for treating psoriatic arthritis. Alternative Therapies in Health and Medicine. 2024 Mar; 30(3): 36-43.

[11] Dhake P and Shinde SB. Physiotherapy in Psoriatic Arthritis: A Systematic Review. DY Patil Journal of Health Sciences. 2022 Jan; 10(1): 27-32. doi: 10.4103/DYPJ.DYPJ_67_21.

[12] Kessler J, Chouk M, Ruban T, Prati C, Wendling D, Verhoeven F. Psoriatic Arthritis and Physical Activity: A Systematic Review. Clinical Rheumatology. 2021 Nov; 40(11): 4379-89. doi: 10.1007/s10067-021-05739-y.

[13] Kaerts M, Swinnen TW, Dankaerts W, de Vlam K, Neerinckx B. High-Quality Research on Physical Therapy in Psoriatic Arthritis Is Needed: A Systematic Review. Rheumatology Advances in Practice. 2024; 8(3): rkae107. doi: 10.1093/rap/rkae107.

[14] Umezawa Y. Psoriatic Arthritis. Journal of Dermatology. 2021 Jun; 48(6): 741-749. doi: 10.1111/1346-8138.15954.

[15] Kishimoto M, Deshpande GA, Fukuoka K, Kawakami T, Ikegaya N, Kawashima S et al. Clinical Features of Psoriatic Arthritis. Best Practice and Research Clinical Rheumatology. 2021 Jun; 35(2): 101670. doi: 10.1016/j.berh.2021.101670.

[16] Perrotta FM, Scriffignano S, Ciccia F, Lubrano E. Clinical Characteristics of Potential "Difficult-To-Treat" Patients with Psoriatic Arthritis: A Retrospective Analysis of a Longitudinal Cohort. Rheumatology and Therapy. 2022 Aug; 9(4): 1193-201. doi: 10.1007/s40744-022-00461-w.

[17] López-Ferrer A, Laiz A, Puig L. Psoriatic Arthritis. Medicina Clínica (Barcelona). 2022 Jul; 159(1): 40-46. doi: 10.1016/j.medcle.2022.01.013.

[18] Pathak H, Goyal M, Das P, Santhanam S, Khan AK, Malaviya S et al. Awareness, Perspectives and Satisfaction Levels Among Patients with Psoriatic Arthritis: A Multicentric Cross-Sectional Survey. Rheumatology International. 2023 Aug; 43(8): 1531-9. doi: 10.1007/s00296-023-05339-w.

[19] Akhlaq A, Ali HF, Sheikh AB, Muhammad H, Ijaz SH, Sattar MH et al. Cardiovascular Diseases in the Patients with Psoriatic Arthritis. Current Problems in Cardiology. 2023 Jun; 48(6): 101131. doi: 10.1016/j.cpcardiol.2022.101131.

[20] Lubrano E, Ambrosino P, Perrotta FM. Psychological Health in the Management of Patients with Psoriatic Arthritis: An Intricate Relationship. Rheumatology and Therapy. 2025 Mar: 1-3. doi: 10.1007/s40744-025-00759-5.

[21] Samy N, El Sayed AM, Hamza SH, Ibrahim F, Gamal DM. Axial involvement in a cohort of patients with psoriatic arthritis. The Egyptian Rheumatologist. 2025 Apr; 47(2): 74-9. doi: 10.1016/j.ejr.2025.01.002.

[22] Karmacharya P, Chakradhar R, Ogdie A. The Epidemiology of Psoriatic Arthritis: A Literature Review. Best Practice and Research Clinical Rheumatology. 2021 Jun; 35(2): 101692. doi: 10.1016/j.berh.2021.101692.

[23] Mohebbi F, Alavi K, Nadoushan AH, Saeidi M, Mahdiar M, Bakhshijoibari F et al. Evaluation of Met and Unmet Needs in Patients with Severe Psychiatric Disorders and Its Relation to the Quality of Life: A Cross-Sectional Study. Medical Journal of the Islamic Republic of Iran. 2024 Jan; 38: 10. doi: 10.47176/mjiri.38.10.

[24] Hioki T, Komine M, Ohtsuki M. Diagnosis and Intervention in Early Psoriatic Arthritis. Journal of Clinical Medicine. 2022 Apr; 11(7): 2051. doi: 10.3390/jcm11072051.

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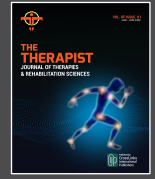
Original Article

Patient Satisfaction with Physical Therapy Management: A Single City Cross-Sectional Study

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ARTICLE INFO

ABSTRACT

A physiotherapist deals with a variety of conditions individually and as part of Multidisciplinary rehabilitation teams. Patient satisfaction is one of the parameters used to determine the quality and efficacy of treatment given in any healthcare department. **Objectives:** To find out the patients' Satisfaction with Physical Therapy Management. **Methods:** It was an observational study conducted after ethical approval. A convenience sampling technique was used to recruit 320 participants from outpatient departments of different public and private hospitals in Sialkot, Pakistan, based on predefined eligibility criteria. Data were collected using the Med Risk patient satisfaction instrument. SPSS was used to analyze the data, with frequencies and percentages calculated for categorical responses and quantitative variables expressed as mean ± standard deviation. **Results:** Respondents' characteristics showed that 202 (63.12%) were male and 118 (36.88%) female. Mean age ± SD of male was 41.82 ± 13.25 and that of female was 38.95 ± 16.55 years. Frequency (percentage) of conditions for which physiotherapy treatment was availed were: 76 (23.74%) for neurology, 107 (33.43%) for orthopedics, 79 (24.68%) for musculoskeletal and 58 (18.12%) others. Overall, 73.71% were satisfied, 10.55% were neutral, and 16.28% were not satisfied. **Conclusions:** A large majority of the participants were found to be satisfied with the physical therapy treatment they received.

INTRODUCTION

Patient satisfaction (PS) is a critical measure of healthcare quality, reflecting patients' perceptions of the services they receive. Various studies highlight the importance of multiple dimensions, such as tangible aspects, reliability, responsiveness, assurance, and empathy, in influencing patient satisfaction levels [1]. Physical therapy is the treatment of disease, disability by using non-surgical and non-pharmacological methods and focusing on the well-being of the patient and providing the patient with a better lifestyle [2]. Patient satisfaction is an outcome which is measured by the physical therapist; the patient may not describe it directly. The satisfaction can be seen by the progress in the patient's condition. The satisfaction depends on how the therapist interacts with the patient, the therapist's communication skills and how efficiently he will explain the procedure to the patient. The stronger the skills of communicating with the patient, the more positive the outcome [3, 4]. A Physical Therapist deals with the patient in two ways: either by using their communication skills or by utilising their clinical skills. A balance between both leads to an increase in the level of satisfaction of the patient. The services given to the patient from the time of admission to the discharge time in hospitalized patients all have an impact on the satisfaction level [5, 6]. Patients taking physical therapy sessions after the total hip arthroplasty showed a positive response as compared to

those who didn't take sessions. Post op physiotherapy sessions rendered the patients satisfied and improved their quality of life. They returned to functional activities very soon. Manual therapy showed more satisfactory results, with proper manual techniques and time given to the patients, the outcome is more positive, with a high level of satisfaction [7]. Various factors are involved in the satisfaction of the patient. The study showed that the result of satisfaction was changed in male and females. Healthy people showed satisfactory responses compared to the patients who were not healthy. The more the patient adheres to their exercise program, the more satisfactory the patient will be [8]. PS depends on the number of factors. The area where the clinic is situated, the place where the cars are parked, and the clinic setting are factors which are other than clinical factors, and these also have an impact on the patient's satisfaction level. If the area where the clinic is situated is away from the populated area, patients will find it difficult to reach the clinic. The interior of the clinic also attracts the patient, and the wide parking area is a necessity for the patient, which should be fulfilled [9]. PS in physiotherapy is directly dependent on compliance with treatment being prescribed, including the home programme, which is outcome dependent. Good compliance leads towards higher satisfaction levels and better outcomes [10]. It has been recognized that satisfaction with physical therapy is a diverse term, and the questionnaire that is used to measure it must contain at least two components. Many studies contain a three-factor structure. The Chest Physiotherapy Satisfaction survey and Patient Satisfaction with Physical Therapy tools provide information on a factor structure [11]. High expenses of the physiotherapy sessions also increase the expectations of the patients and their caregivers. If the expenses are high, treatment should be up to the mark; otherwise, the satisfactory rate will decrease. Continual treatment should be provided to patients with all the services to increase the patient response towards treatment and to increase the satisfaction rate [12]. A different questionnaire has been designed to find out the satisfaction level of the patient. Questionnaires contained different types of questions, including how the physical therapy was performed, did it provided benefit to the patient, how many times it was consumed to reduce the pain, etc. Out of all, only one most reliable [13]. Although some literature is available regarding patient satisfaction with physical therapy services in specific disease conditions from different parts of the country, an overall estimate of the satisfaction from this region is not reported, and this will contribute to identifying the satisfaction level with physical therapy services.

This study aims to find out the patient satisfaction with physical therapy treatment.

METHODS

This observational study was conducted from September 2020 to March 2021, after ethical approval by the institutional ethics review board of Sialkot College of Physical Therapy, with Ref No: IRB-SCPT-DPT-118-2020. The WHO calculator was applied to estimate the sample size using the Cochrane formula; $n = Z2(1-a/2).(P).(1-P)/d2$. Z=1.96 at 95% confidence Interval, P=85.25%= 0.8525 [14], d=0.04 and n= 302+5% (drop out) =317. At least 317 participants were required to achieve the required precision. Data were collected from adult Patients and parents of children and adolescents who were getting physical therapy treatment from different private and government hospitals in Sialkot through the Med-Risk questionnaire instrument [15]. Medrisk Instrument for satisfaction with physical therapy (MRPS) is a 12-item questionnaire with a 5-point Likert scale; out of 12, 1–3 questions are about external factors, 4-10 about internal factors, and 11-12 are global measures of satisfaction. Only outdoor patients who had at least attended five treatment sessions over a period of the last four weeks were included. Response for children and those who could not submit their opinion, their caregivers filled out the questionnaire. Indoor patients, those with cognitive or behaviour problems or psychological disorders and those who were not getting physiotherapy treatment were excluded. A written informed consent document was signed by all the participants. The responses of participants for items of MRPS were expressed in terms of frequencies and percentages, while age was expressed as mean ± standard deviation, using SPSS version 20.

RESULTS

Respondents' characteristics showed that 202 (63.12%) were male and 118 (36.88%) female. Mean age ± SD of male was 41.82 ± 13.25 and that of female was 38.95 ± 16.55 years. Frequency (percentage) of conditions for which physiotherapy treatment was availed was: 76 (23.74%) for neurology, 107 (33.43%) for orthopaedics, 79 (24.68%) for musculoskeletal and 58 (18.12%) others and the average number of visits was 6 (Table 1).

Table 1: Demographic Details of the Participants (n=320)

Variables	Mean ± SD or Frequency (%) or Average		
	Public	**Private**	**Total**
Age (Years)			
Male	41.42 ± 13.80	42.22 ± 12.70	41.82 ± 13.25
Female	39.61 ± 17.20	38.79 ± 16.30	38.95 ± 16.55
Gender			
Male	72 (22.5%)	130 (40.62%)	202 (63.12%)
Female	83 (25.93%)	35 (10.93%)	118 (36.88%)

Condition Suffering			
Neurology	37 (11.56%)	39 (12.18%)	76 (23.74%)
Orthopedic	59 (18.43%)	48 (15%)	107 (33.43%)
Musculoskeletal	38 (11.87%)	41 (12.81%)	79 (24.68%)
Others	21 (6.56%)	37 (11.56%)	58 (18.12%)
Average No. of Visits	6.3	5.7	6

The Findings show the responses to the individual items of Med-Risk Instrument: 17.5% strongly agreed that their therapist thoroughly explained the treatment they received, 66.0% agreed, 10.0% showed a neutral reaction, 5.5% disagreed, 1% strongly disagreed. Almost a quarter of participants (26.5%) strongly agreed that they will return to the office for future services, 62.0% agreed, 8.5% were neutral, 2.5% disagreed, 5% strongly disagreed. About 20% strongly agreed that their therapist answered all their questions, 64% agreed, 9.0% were neutral, 6.0% disagreed, and 1.0% strongly disagreed. A total of 29.0% strongly agreed that their therapist advised ways to avoid future problems, 57.0% agreed, 8.5% were neutral, 5.0% disagreed, 5% strongly disagreed. Did the therapist treat you respectfully? (29.5%) strongly agreed, (66%) agreed, (3%) neither agree nor disagree, (1.5%) disagreed. In terms of overall quality satisfaction, (61.5%) agreed, (27%) strongly agreed and (8%) neither agree nor disagree, and (3.5%) disagree. Did the therapist give detailed instructions regarding home? (31.5%) strongly agree, (54.5) agree, (9%) neither agree nor disagree, (5.5%) disagree. Response to: Was the office used up-to-date equipment (17.5%) strongly agree, (60.5%) agree, (15.5%) neither agree nor disagree. (6.5%) disagreed. About the cleanliness of the office and its facilities, (17.5%) strongly agreed, (67.5%) agreed, (8.5%) neither agreed nor disagreed, (6.5%) disagreed. Did the therapist listen to your concerns? (4.5%) strongly agreed, (8%) agreed, (8%) neither agree nor disagree, (67%) disagree, (12.5%) strongly disagreed. Was the therapist assistant respectful? (18.5%) strongly agreed, (68.5%) agreed, (18%) neither agreed nor disagreed, (3.5%) disagreed, (0.5%) strongly disagreed. Responses to the items of the MRPS questionnaire are given (Table 2).

Table 2: Responses to Items of the Med-Risk Instrument

Individual items of MRPS instrument	SD 1	D 2	N 3	A 4	SA 5
The office receptionist is courteous.	15%	3%	11%	11%	60%
The registration process is appropriate.	8%	12%	5%	8%	67%
The waiting area is comfortable.	5%	5%	19%	51%	20%
My therapist did not spend enough time with me.	15%	9%	13%	36.5%	26.5%
My therapist thoroughly explains the treatment I receive.	1%	5.5%	10.0%	66%	17.5%
My therapist treats me respectfully.	0%	1.5%	3%	66%	29.5%
My therapist does not listen to my concerns.	12.5%	67%	8%	8%	4.5%
My therapist answers all my questions.	1%	6%	9.0%	64%	20%
My therapist advises me on ways to avoid future problems.	5%	5%	8%	53%	29%
My therapist gives me detailed instructions regarding my home program.	3%	5%	11%	21%	60%
Overall, I am completely satisfied with the services I receive from my therapist.	5%	3%	21%	11%	60%
I would return to this office for future services or care.	0.5%	2.5%	8.5%	62%	26.5%
	5.91%	10.37%	10.55%	38.13%	35.04%
Overall satisfaction	16.28		10.55%	73.71%	

SD: Strongly disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly agree

DISCUSSION

The current study aimed to find the patient satisfaction with physical therapy treatment in a sample of 320 participants using the Med-risk instrument. The Physical therapist deals with the patient, either by using his communication skills or by applying clinical skills. A balance between both skills leads towards an increase in the level of satisfaction of the patient. The services given to the patient from the time of admission to the discharge time all have an impact on the satisfaction level [4]. The result of our study shows identical results that the more the patient is satisfied with the services, like giving proper treatment and advice for the future and answering all questions, will lead towards more satisfaction. Higher expenses of the physiotherapy sessions also increase the expectations of the patients and their caregivers. If the expenses are kept high, treatment should also be up to the mark; otherwise, the patient satisfaction will decline. Continual treatment should be provided to patients with all the services to increase the patient response towards treatment and to increase the satisfaction [14]. The result of our study showed that patients who were treated with the reasonable treatment fee were greatly satisfied with the treatment, along with the proper treatment services and respectful behaviour of the therapist. Different questionnaires have been designed to find out the satisfaction level of the patient. Questionnaires contained different types of questions, including how the physical therapy was performed, did it provided benefit to the patient, how many times it was consumed to reduce the pain, etc. Out of all, only one questionnaire was selected, which was the most reliable [15]. Our study also included various questions regarding physical therapy services, which showed the satisfaction of the patients. Questions include how much the patient is satisfied with the

reasonable fee, physiotherapy services, advice by the therapist and behaviour of the therapist. Nadeem *et al.* reported a higher satisfaction level in patients getting treatment at private hospitals in Sialkot, and regarding the behaviour of the treating physiotherapist, the fact may be attributed to the inclusion of participants with at least matriculation and adult age groups. They have not included responses of parents of patients below 18 years and those above 40 years; the fact lies that most of the chronic and debilitating conditions affect persons of the older age group [16]. Our results differ in the sense that we included parents of children below 18 years, and participants from only OPD settings were included. Bukhari *et al.* found that patients getting physiotherapy services from government facilities in twin cities in Pakistan were satisfied [17], but the results cann't be generalized as there was no comparison group and a convenience small sample size was considered, while the current study included participants from both public and private hospitals with a comparatively larger sample. Patient satisfaction was higher in those who spent more time with their physiotherapist, in the public hospitals' OPD in Lahore [18]. The doctors' attitude, competency, performance, and openness are the characteristics of patient satisfaction in the healthcare setting. Doctor's market value and patient's perception of expectation, his demographic and personality, are all determinants of the patient's satisfaction. Patient compliance, clinical results, loyalty, and recommendations were the results of patient satisfaction [19]. A hospital's internal Third-Party Administrator (TPA) department is essential to provide patients with effortless services. It identifies the elements related to a hospital's internal TPA department that control a patient's overall hospital loyalty for obtaining future medical care through private health insurance. Two distinguishable categories, "Physical evidence" and "Professionalism," accounted for 57% of the variance in the total. These two distinguishable elements have had a major and favourable impact on sponsored patients' loyalty to the hospital [20].

CONCLUSIONS

A large majority of the participants were found to be satisfied with the physical therapy treatment they received. Furthermore, clinical skills are not the only factor which contributes to the satisfaction of the patient. There are various indicators of patients' satisfaction which, as a whole, satisfy the patient which including a reasonable fee, how the therapists explain the treatment to the patient, what guidelines and advice they provide for future and how respectfully they treated the patient. All these factors increase the overall satisfaction score of the patient.

REFERENCES

[1] Sulistyowati WT, Suryani L, Harokan A. analysis of Patient Satisfaction with Inpatient Services in Regional General Hospitals. Cendekia Medika: Jurnal Stikes Al-Maarif Baturaja.2024 Sep; 9(2): 255-64. doi: 10.52235/cendekiamedika.v9i2.382.

[2] Falck RS, Percival AG, Tai D, Davis JC. International Depiction of the Cost of Functional Independence Limitations Among Older Adults Living in the Community: A Systematic Review and Cost-of-Impairment Study. BioMed Central Geriatrics.2022 Oct; 22(1): 815. doi: 10.1186/s12877-022-03466-w.

[3] Ferreira DC, Vieira I, Pedro MI, Caldas P, Varela M. Patient Satisfaction with Healthcare Services and the Techniques Used for Its Assessment: A Systematic Literature Review and A Bibliometric Analysis. In Healthcare.2023 Feb; 11(5): 639. doi: 10.3390/healthcare11050639.

[4] Kalaja R. Determinants of Patient Satisfaction with Health Care: A Literature Review. European Journal of Natural Sciences and Medicine.2023;6(1):43-54. doi: 10.2478/ejnsm-2023-0005.

[5] Alharbi MF. Patients' Experience of Service Quality in Government and Private Hospitals in the Qassim Region, Kingdom of Saudi Arabia. Journal of Medicine and Life.2023 Nov;16(11):1622.doi:10.25122/jml-2023-0184.

[6] Alumran A, Almutawa H, Alzain Z, Althumairi A, Khalid N. Comparing Public and Private Hospitals' Service Quality. Journal of Public Health.2021 Aug; 29(4): 839-45. doi: 10.1007/s10389-019-01188-9.

[7] Shao Z and Bi S. Patient Satisfaction After Total Hip Arthroplasty: Influencing Factors.Frontiers in Surgery.2023Jan;9:1043508.doi:10.3389/fsurg.2022.1043508.

[8] Van Zyl C, Badenhorst M, Hanekom S, Heine M. Unravelling 'Low-Resource Settings': A Systematic Scoping Review with Qualitative Content Analysis. Biomed Journal Global Health.2021Jun;6(6).doi:10.1136/bmjgh-2021-005190.

[9] Olaleye OA, Hamzat TK, Akinrinsade MA. Satisfaction of Nigerian Stroke Survivors with Outpatient Physiotherapy Care. Physiotherapy Theory and Practice.2017 Jan; 33(1): 41-51. doi: 10.1080/0959 398 5.2016.1247931.

[10] Butt MN, Akhter FA, Kashif MU, Perveen W, Akhtar M, Riaz H et al. Determination of Factors Influencing Physical Therapy Treatment Compliance.Pakistan Journal of Medical and Health Sciences.2020;15(12): 3244-3246. doi: 0.53350/pjmhs2115123244.

[11] Gutiérrez-Sánchez D, Pérez-Cruzado D, Cuesta-Vargas AI. Instruments for Measuring Satisfaction with Physical Therapy Care: A Systematic Review. Physical Therapy.2020 Sep; 100(9): 1690-700. doi: 10. 1093/ptj/pzaa111.

[12] Babur MN, Junaid M, Ansari M, Zubair M. Patient's Satisfaction in Physical Therapy OPD of Al-nafees Hospital Islamabad. International Journal of Rehabilitation Sciences. 2017 Sep; 4(01): 25-9.

[13] Odumodu IJ, Olufunlayo TF, Ogunnowo BE, Kalu ME. Satisfaction with Services Among Attendees of Physiotherapy Outpatient Clinics in Tertiary Hospitals in Lagos State. Journal of Patient Experience. 2020 Aug; 7(4): 468-78. doi: 10.1177/2 374 373519847370.

[14] Khan R, Aftab A, Akram I, Nasar J, Farooq A, Janua UI. Patients's Satisfaction Regarding Physiotherapy Services in Urban Areas of Pakistan.The Rehabilitation Journal.2018 Jun; 2(01): 40-3. doi: 10.5 2567/trj.v2i01.34.

[15] Beattie P, Turner C, Dowda M, Michener L, Nelson R. The MedRisk Instrument for Measuring Patient Satisfaction with Physical Therapy Care: A Psychometric Analysis. Journal of Orthopedic and Sports Physical Therapy. 2005 Jan; 35(1): 24-32. doi: 10.2519/jospt.2005.35.1.24.

[16] Nadeem Z, Fatima S, Mahmood T, Yousaf Q, Salam A. Comparison of Patient Satisfaction Between Public and Private Physical Therapy Clinical Sectors of Sialkot. Annals of Punjab Medical College.2022Sep; 16(3): 184-8. d

[17] Bukhari R, Farooq MN, Ali M, Khan GA. Are Patients Satisfied with Physiotherapy Services? A Cross-Sectional Survey. Rawal Medical Journal. 2021 Aug; 46(3): 729-.

[18] Sarwar S, Murtaza F, Atta S, Shabbir A, Hussain IT. Satisfaction level of Physical therapy services among Hospitals of Lahore. Journal Riphah College of Rehabilitation Sciences.2021Dec;9(2).doi:10.53389 /JRCRS.2021090201.

[19] Ng JH and Luk BH. Patient Satisfaction: Concept Analysis in the Healthcare Context.Patient Education and Counseling.2019Apr;102(4):790-6.doi:10.10b16/j.pec.2018.11.013.

[20] Singh A, Ravi P, Lepcha K. Patient Satisfaction Factors with in House Third Party Administrator(TPA) Department of A Tertiary Care Hospital: A Cross Sectional Analysis. International Journal of Healthcare Management.2021Apr;14(2):603-9.doi: 10.1080/20479700.2019.1679519.