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HEALTH AND REHABILITATION

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KNOWLEDGE AND ATTITUDES OF PHYSICAL THERAPISTS AND MEDICAL OFFICERS REGARDING THE APPLICATION OF ARTIFICIAL INTELLIGENCE IN HEALTH CARE AND REHABILITATION: A CROSS-SECTIONAL STUDY

Original Research

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Acknowledgement: The authors sincerely thank all participants for their valuable contributions to this study.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: Artificial intelligence (AI) has emerged as a transformative force in healthcare, including the field of rehabilitation, where it supports clinical decision-making, enhances diagnostic precision, and automates therapeutic processes. As AI technologies such as machine learning and robotics gain traction in medical settings, understanding the perceptions and readiness of healthcare professionals is crucial. This study aims to assess the knowledge and attitudes of physical therapists (PTs) and medical officers (MOs) toward the integration of AI into rehabilitation practice.

Objective: To evaluate the knowledge, attitudes, and readiness of physical therapists and medical officers toward artificial intelligence in rehabilitation, and to determine their willingness to adopt AI technologies in clinical practice.

Methods: A descriptive cross-sectional study was conducted using a self-administered, web-based survey distributed via Google Forms. A total of 308 participants, including licensed physical therapists and medical officers across various clinical and academic settings, were recruited through convenience sampling. The survey consisted of 20 structured questions covering demographics, knowledge, attitudes, and ethical considerations regarding AI. Data were analyzed using SPSS, with descriptive and inferential statistics applied to assess associations between variables.

Results: The mean age of participants was 30.04 ± 4.77 years (range: 23–47). Of the 308 respondents, 176 (57.1%) were female and 132 (42.9%) were male. A majority, 215 (69.9%), reported moderate knowledge of AI, while 32 (10.4%) indicated no awareness. Participants with less than 10 years of experience (193; 62.7%) were significantly more inclined to believe AI would impact their clinical roles. Moreover, 145 (47.1%) strongly supported integrating AI into medical practice, and 221 (71.9%) favored including AI education in curricula.

Conclusion: The study reveals a generally positive attitude and moderate knowledge about AI among physical therapists and medical officers. These findings highlight the need to enhance AI education and training, particularly for experienced practitioners and those in academic roles, to facilitate the effective integration of AI into rehabilitation practice.

Keywords: Artificial Intelligence, Attitude of Health Personnel, Clinical Practice, Medical Officers, Physical Therapists, Rehabilitation, Surveys and Questionnaires.

INTRODUCTION

Artificial intelligence (AI) has emerged as a transformative force within healthcare, offering innovative approaches to managing and interpreting complex medical data. Its applications span a wide spectrum, categorized into virtual and physical domains. The virtual branch encompasses advanced informatics techniques such as deep learning, which are integral to the analysis of electronic health records, diagnostic support, and decision-making processes (1). Conversely, the physical aspect of AI involves the use of robotic systems in clinical environments, including assistive devices in elderly care and precision-enhancing tools in surgical procedures (2). With the rapid evolution of AI, there are growing concerns regarding its impact on employment, as projections suggest that AI and robotics could replace a substantial proportion of the current workforce by 2025, given their increasing proficiency in both manual and cognitive tasks (3). As AI technologies continue to penetrate clinical practice, their implications extend to medical education and the professional readiness of healthcare providers. It has become essential for medical officers and physical therapists to familiarize themselves with core AI methodologies, such as supervised machine learning and deep learning. Supervised learning involves training algorithms on labeled data to predict outcomes, while deep learning models mimic the structure and function of the human brain through artificial neural networks (4). These techniques are central to predictive modeling, a tool that enables clinicians to forecast clinical outcomes, thereby facilitating timely and personalized interventions (5). The effectiveness of such systems, however, is contingent upon the availability of high-quality and sufficiently large datasets.

For physical therapists (PTs) and medical officers, this technological shift necessitates a reevaluation of traditional clinical roles. As AI becomes increasingly capable of performing diagnostic, monitoring, and decision-making tasks, healthcare professionals must adapt by developing competencies in digital health tools and data interpretation (6). Their perceptions, attitudes, and preparedness to engage with AI will significantly influence its integration into routine practice (7). Studies indicate that fostering confidence and comfort with AI technologies can enhance their utility and acceptance in clinical settings (8). Beyond clinical utility, AI also holds potential for systemic impact, including efficiency gains and improved patient outcomes, but it simultaneously presents ethical, legal, and societal challenges that warrant careful consideration (9). Importantly, PTs and medical officers are not merely passive recipients of AI innovations—they play a crucial role in guiding the development and ethical application of these technologies. Their clinical expertise is vital in ensuring that AI systems are patient-centered and responsive to the physical, emotional, and cognitive needs of individuals under care. Nonetheless, obstacles such as data privacy concerns, opaque algorithmic processes, and inadequate regulatory frameworks remain significant barriers to seamless AI integration (10). These challenges underscore the need for a balanced approach that safeguards patient welfare while embracing innovation. In this context, the present study seeks to explore the perceptions, readiness, and comfort levels of physical therapists and medical officers regarding the integration of AI into healthcare. The objective is to rationalize the essential role of healthcare professionals in co-evolving with intelligent technologies and to identify key areas where support and education are needed to ensure responsible and effective adoption.

METHODS

This cross-sectional study was designed to explore the knowledge, perceptions, and attitudes of physical therapists and medical officers regarding the application of artificial intelligence (AI) in healthcare and rehabilitation settings. Prior to data collection, ethical approval was obtained from the Ethical Review Committee of Lahore College of Physical Therapy. All participants received detailed information about the objectives and procedures of the study and provided informed consent voluntarily. Confidentiality and anonymity were strictly upheld through secure data handling procedures, though specific details regarding data encryption or storage protocols were not provided. Participants included male and female physical therapists and medical officers actively involved in clinical or academic practice. A broad inclusion criterion was applied to encompass diverse educational backgrounds and varying levels of professional experience. Individuals who declined to participate or did not complete the survey were excluded from the analysis. The sampling strategy employed was non-probability convenience sampling, allowing for the voluntary inclusion of respondents accessible through digital platforms.

The sample size was set at 308 participants, referencing estimates from prior research (5). However, the specific formula or statistical rationale used to determine this number was not disclosed, which may affect the generalizability and statistical power of the findings.

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Data were collected using a structured, self-administered questionnaire distributed electronically through platforms such as WhatsApp, Facebook, and email (11). The questionnaire comprised 20 items categorized into four sections: demographic details, knowledge of AI in healthcare and rehabilitation, perceptions of AI's benefits and impacts, and attitudes toward ethical concerns and AI-related research (12). Despite being well-structured, there was no mention of pretesting, validation, or reliability assessment of the questionnaire prior to use, which raises concerns regarding the tool's measurement accuracy and internal consistency. Responses were coded and analyzed using IBM SPSS software, though the version was not specified. Descriptive statistics were applied, with continuous variables summarized as means and standard deviations, and categorical variables reported as frequencies and percentages. This approach allowed for a clear representation of participant responses, yet the omission of inferential statistical tests may limit the depth of analysis. Furthermore, the lack of detail regarding data security, storage duration, and anonymity safeguards represents a limitation in fully aligning with standard ethical research practices. Overall, while the methodology provided foundational insights into participant perspectives, future studies would benefit from clearly defined sample size calculation methods, validated data collection instruments, and explicit ethical data management protocols to enhance reproducibility and methodological rigor.

RESULTS

The study comprised a total of 308 participants, including both physical therapists and medical officers. The mean age of respondents was 30.04 years, with a standard deviation of 4.77 years, and an age range spanning from 23 to 47 years, indicating a diverse participant pool in terms of age. In terms of gender distribution, 42.9% (n=132) of participants were male and 57.1% (n=176) were female. Employment sector data revealed that 36.4% (n=112) of respondents were employed in clinical settings, 29.9% (n=90) worked in both clinical and academic sectors, 26.3% (n=81) were engaged in academic roles only, and 8.1% (n=25) were currently unemployed. Educational qualifications indicated that 66.2% (n=204) had postgraduate degrees, while 33.8% (n=104) had undergraduate degrees. Regarding professional experience, 62.7% (n=193) had less than 10 years of experience, whereas 37.3% (n=115) had 10 years or more. Participants' perceptions of artificial intelligence (AI) in healthcare revealed varied opinions. When asked whether AI improves patient outcomes, 52.6% (n=162) strongly agreed, 18.8% (n=58) agreed, and 18.5% (n=57) were neutral, while 8.1% (n=25) disagreed and 1.9% (n=6) strongly disagreed. Regarding the belief that AI can replace manual treatments, 33.8% (n=104) strongly agreed, 15.1% (n=49) agreed, 12.7% (n=39) were neutral, 26.3% (n=81) disagreed, and 11.4% (n=35) strongly disagreed. In terms of integrating AI into medical practice, 47.1% (n=145) strongly agreed, 17.5% (n=54) agreed, and 23.1% (n=71) remained neutral, while 10.4% (n=32) disagreed and 1.9% (n=6) strongly disagreed.

Concerns surrounding AI's reliability and accuracy were also prevalent, with 16.4% (n=50) strongly agreeing and 52.0% (n=160) agreeing. Meanwhile, 24.7% (n=76) were neutral, and 6.9% (n=21) disagreed. None of the participants strongly disagreed with this concern. Regarding fears of job displacement and reduced opportunities due to AI, 17.3% (n=53) strongly agreed, 38.3% (n=117) agreed, and 15.6% (n=47) were neutral. On the other hand, 18.9% (n=58) disagreed and 10.0% (n=31) strongly disagreed with this concern. Inferential statistical analysis using the Chi-square test was conducted to explore associations between demographic variables and participants' attitudes toward the integration of artificial intelligence (AI) into medical practice. A statistically significant association was found between gender and support for AI integration ($\chi^2 = 9.214$, $p = 0.0024$), with male participants showing slightly greater agreement than females. Similarly, educational qualification was significantly associated with AI integration support ($\chi^2 = 4.654$, $p = 0.031$), indicating that participants with postgraduate degrees were more likely to favor the adoption of AI technologies. Furthermore, years of professional experience also showed a statistically significant association with attitudes toward AI ($\chi^2 = 6.537$, $p = 0.011$), with those having less than 10 years of experience demonstrating greater openness to integration. These findings suggest that younger, higher-educated professionals may be more receptive to AI in healthcare, highlighting the importance of tailored training and awareness strategies to foster inclusive adoption across all groups.

Table 1: Descriptive Statistics of Participants' Age

Variable	Statistic	Value
Age	Mean	30.04
	Standard deviation	4.77
	Minimum	23
	Maximum	47

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Table 2: Demographic and Professional Characteristics of Study Participants

Variable	Frequency (n)	Percentage
Gender Distribution		
Male	132	42.9%
Female	176	57.1%
Employment Sector		
Clinical	112	36.4%
Both Clinical and Academic	90	29.9%
Academic	81	26.3%
Unemployed	25	8.1%
Educational Qualification		
Undergraduate	104	33.8%
Postgraduate	204	66.2%
Professional Experience		
Less than 10 years	193	62.7%
10 years or more	115	37.3%

Table 3: Participants' Perceptions and Attitudes Toward Artificial Intelligence in Healthcare and Rehabilitation

Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Improves patient outcomes	162(52.6%)	58(18.8%)	57(18.5%)	25(8.1%)	6(1.9%)
Replaces manual treatment	104(33.8%)	49(15.1%)	39(12.7%)	81(26.3%)	35(11.4%)
Integrate artificial into medical practice	145(47.1%)	54(17.5%)	71(23.1%)	32(10.4%)	6(1.9%)
Concerns about the reliability and accuracy of artificial intelligence technology	50(16.4%)	160(52%)	76(24.7%)	21(6.9%)	0(0%)
Fear of job displacement and reduced job opportunities for physical therapists and medical officers due to artificial intelligence.	53(17.3%)	117(38.3%)	47(15.6%)	58(18.9%)	31(10%)

Table 4: Inferential Statistics Results

	Chi-square	p-value	Significant
Gender	11.715	0.0006	TRUE
Education	0.006	0.9387	FALSE
Experience	0.293	0.5882	FALSE

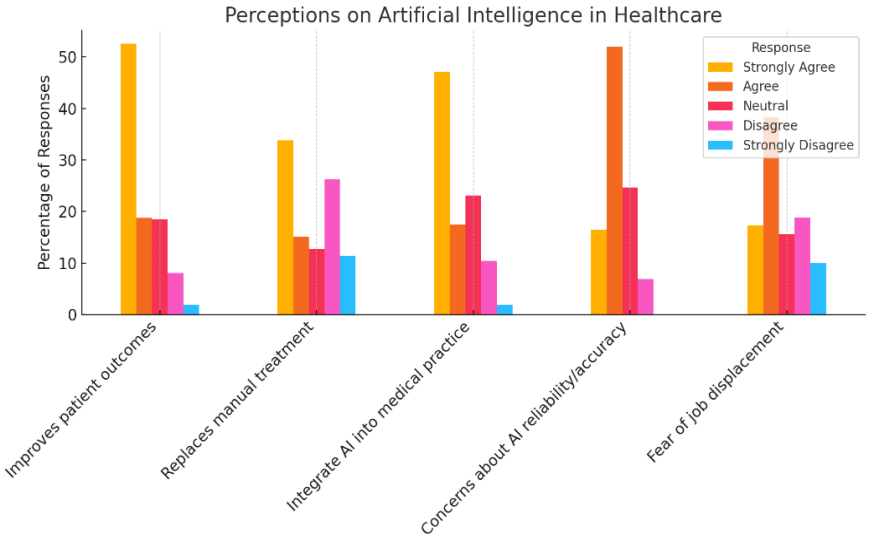

Figure 2 Perceptions on Artificial Intelligence in Healthcare

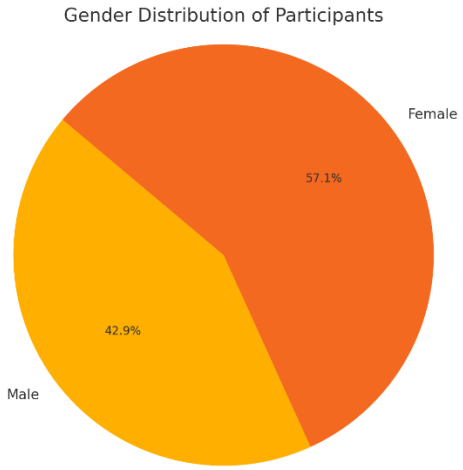

Figure 1 Gender Distribution of Participants

DISCUSSION

The findings of this study provide valuable insights into the knowledge, perceptions, and attitudes of physical therapists and medical officers regarding the integration of artificial intelligence (AI) into healthcare and rehabilitation. With a mean age of 30.04 years among the 308 participants, the study population represented a relatively young and professionally active cohort. A notable 69.9% of respondents reported some level of familiarity with AI, aligning with prior studies conducted in Saudi Arabia and Australia, which similarly indicated a widespread awareness of AI technologies among healthcare professionals (13). This consistent awareness across geographical regions underscores a global trend toward the digitization of healthcare systems and the growing presence of AI-driven tools in clinical environments. Gender differences emerged in the levels of knowledge and attitudes toward AI, with female participants demonstrating slightly higher familiarity and a more positive outlook. This observation may be attributed to increased engagement with digital technologies or continuing education programs among female healthcare professionals, although further research is warranted to explore the underlying reasons. In line with previous findings from Australian settings, participants with less than 10 years of experience appeared more receptive to AI integration compared to those with longer tenures (14). This generational divide may reflect greater technological adaptability among younger professionals, while more experienced individuals may exhibit caution due to their established clinical routines or limited exposure to AI training (15).

Interestingly, the study also revealed variations based on employment sector. Participants working in non-academic or combined clinical-academic settings expressed a greater readiness to adopt AI technologies compared to those in strictly academic roles. This divergence may reflect differences in exposure to real-time technological applications or priorities in day-to-day responsibilities. While limited literature has explored this dimension, the current findings suggest that practice environment may influence perceptions of AI, thereby highlighting an area in need of further exploration (16). Moreover, the strong support (71.9%) for incorporating AI education into healthcare curricula signals a collective recognition of its relevance in modern clinical practice (17,18). Integrating AI modules within academic programs could enhance digital literacy among future professionals and facilitate smoother transitions from education to technology-supported practice. Despite these meaningful observations, several limitations must be acknowledged. The use of a self-administered electronic survey introduces the possibility of response bias, as participants may have provided socially desirable answers or interpreted questions differently. Additionally, the reliance on digital distribution channels may have excluded professionals with limited internet access or those less inclined to participate in online research, thus limiting the representativeness of the sample (19). The absence of supervised response environments may have further affected the reliability of certain responses. Moreover, although the study captured general attitudes and knowledge levels, it did not evaluate actual competencies or the practical readiness of participants to implement AI tools in clinical settings—an area that warrants further investigation.

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Nonetheless, the study's strengths lie in its diverse participant pool, comprehensive scope covering multiple dimensions of AI perception, and the inclusion of inferential statistical analysis to identify significant demographic associations. These findings contribute to the evolving discourse on digital transformation in healthcare, particularly in low-to-middle-income countries where such studies remain limited. Moving forward, future research should aim to validate assessment tools, incorporate longitudinal designs, and investigate institutional and policy-level factors that influence AI integration. Emphasizing experiential training, evaluating real-world implementation outcomes, and involving educators in the AI dialogue may further bridge the gap between theoretical awareness and practical application in healthcare and rehabilitation. While the results support a generally positive attitude toward AI, the transition from conceptual support to real-world adoption remains a complex process. Successful implementation will depend on structured training, regulatory clarity, and collaborative efforts across educational, clinical, and technological domains (20).

CONCLUSION

This study concludes that artificial intelligence is increasingly recognized by physical therapists and medical officers as a valuable tool for enhancing clinical efficiency and supporting healthcare delivery. The findings underscore the significance of fostering professional readiness through targeted education and training, ensuring that healthcare providers are equipped to integrate AI responsibly and effectively. By identifying key trends in knowledge, perceptions, and attitudes, the study contributes to a deeper understanding of how AI can be successfully embedded into routine practice, ultimately promoting more responsive, informed, and patient-centered care in evolving medical environments.

Author Contribution

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Asad Azam	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Mir Shakeel Ahmad	Methodology, Investigation, Data Curation, Writing - Review & Editing
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Mah Noor Nadeem	Software, Validation, Writing - Original Draft
Khadija Irfan	Formal Analysis, Writing - Review & Editing
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