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Original Article

Prevalence of Poor Body Posture among Physiotherapists Using APECS

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ABSTRACT

Background: Poor posture among healthcare professionals, particularly physiotherapists, can adversely affect their ability to provide care and may lead to musculoskeletal disorders. Despite the physical demands of their profession, there is a lack of routine posture assessment and preventative measures to mitigate these risks.

Objective: This study aims to evaluate the prevalence of poor body posture among physiotherapists and to determine the efficacy of the APECS-AI Posture Evaluation and Correction System® (Apecs) mobile application as a tool for posture assessment.

Methods: A cross-sectional study was conducted over four months, with 309 clinical physiotherapists from various healthcare institutions in Lahore. Using a non-probability convenient sampling technique, participants were assessed with the APECS app for deviations in the frontal and sagittal planes. The app, serving as a cost-effective alternative to 3D-marker-based systems, was used to categorize postural deviations as normal, mild, or severe disturbances. Data analysis was performed using SPSS version 26.0.

Results: The findings revealed that 56% of the participants suffered from severe postural disturbances, while 32% had mild disturbances, and only 12% maintained a normal posture. The mean age was 26.17±2.21 years, with a distribution leaning towards novice practitioners, indicating a need for early intervention in posture management.

Conclusion: The high prevalence of poor posture among physiotherapists highlights an occupational health concern. The study supports the use of the APECS mobile app as an accessible and reliable tool for posture assessment, which could lead to improved clinical practices and better healthcare outcomes.

Keywords: Physiotherapy, Posture Assessment, Musculoskeletal Disorders, APECS, Healthcare Professionals, Occupational Health, Postural Deviation.

INTRODUCTION

The alignment and positioning of the body, colloquially known as posture, plays a crucial role in how individuals engage with their environment and perform daily activities, whether standing, sitting, or lying down (1, 2). It encompasses the relative arrangement of body parts and their coordination, which is largely influenced by body mechanics- the principles governing our movements in various activities, including sitting, standing, lifting, bending, and sleeping (3, 4). Body mechanics integrates four fundamental components: muscle groups, base of support, posture, and lifting techniques (5, 6). When body mechanics are suboptimal, it can lead to a cascade of negative outcomes, such as poor posture, joint pathologies, and disc herniation, thereby affecting activities of daily living (8, 9). The significance of understanding the impact of body mechanics on posture and, by extension, on daily activities cannot be overstated.

The World Health Organization (WHO) has identified musculoskeletal disorders as a leading cause of disability among individuals aged twenty to fifty years, attributing these conditions primarily to occupational factors, with neck pain and headaches being the

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most prevalent complaints worldwide (10, 11). Literature suggests that a staggering 90% of health practitioners are affected by musculoskeletal disorders, with about 50% of physiotherapists experiencing such issues within their first five years of practice (12, 13). Work-related musculoskeletal problems are recognized as a major source of ongoing pain and physical impairment, affecting millions globally, with their prevalence significantly correlated with factors like work experience, poor posture, prolonged static positions, and workplace stress (14, 15).

Physiotherapists, in particular, are highly susceptible to musculoskeletal disorders, with many reporting upper back pain as a common occupational hazard. This condition is often attributed to muscle stiffness or spasm in the upper back area (16). Studies have highlighted the high lifetime prevalence of work-related musculoskeletal issues among physiotherapists in various countries, including 68% in the United Kingdom, 91% in Australia, and 85% in Turkey, underscoring the global nature of this problem (17).

The physical demands of the physiotherapy profession require practitioners to maintain a high level of physical fitness and good posture. However, ergonomic standards are frequently overlooked in clinical settings, leading to the adoption of unhealthy postures and the manifestation of work-related musculoskeletal problems (18). The incidence of workplace injuries is particularly pronounced among newly graduated and younger physiotherapists, peaking during the initial five years of their professional careers (19).

In response to these challenges, the AI Posture Evaluation and Correction System (APECS) was developed as a tool for medical professionals and posture experts. APECS aims to evaluate and correct posture by analyzing the position of the head, neck, and shoulders, as well as measuring spinal posture through photographs or direct measurements on the subject's body using markers in a static standing posture (20). This innovative approach not only aids in the assessment of posture but also offers a valuable resource for educating physiotherapists on efficient body mechanics. By fostering awareness and understanding of proper body mechanics among physiotherapists, it is anticipated that the prevalence of poor posture and subsequent spine disorders can be significantly reduced, thereby enhancing the overall quality of life and professional longevity of these essential healthcare providers.

MATERIAL AND METHODS

Participants selected for this study were clinical manual physiotherapists who had a minimum of one year of professional experience, were aged between 23 and 33 years, and engaged in at least three hours of clinical practice per day. This cohort included both final year undergraduate and postgraduate students. Conversely, the study excluded physiotherapists primarily engaged in teaching, those with a diagnosis of arthritis, diabetes, any form of bone disease, or with less than six months of professional experience.

Data collection was facilitated through the use of the APECS Android application, a specialized tool designed to analyze and quantify postural deviations under various conditions. These conditions were categorized into three distinct levels: normal (no deviation), mild disturbance (deviation in one plane—either right/left or forward/backward), and severe disturbance (deviation in both planes—right/left and forward/backward). The APECS application provided a systematic and objective means to assess the posture of participants, offering insights into the prevalence and severity of postural deviations among the physiotherapist population.

Ethical considerations were paramount in the conduct of this research, adhering strictly to the principles outlined in the Declaration of Helsinki. Prior to data collection, informed consent was obtained from all participants, ensuring they were fully aware of the study's objectives, methods, and the potential use of the data collected. Confidentiality and anonymity were guaranteed to all participants, with measures taken to ensure that personal identifiers were removed from the data analysis process.

The analysis of collected data was performed using the Statistical Package for the Social Sciences (SPSS) version 26.0. This comprehensive analysis included the generation of frequency tables, bar charts, and histograms, allowing for a detailed examination of the prevalence and patterns of postural deviations among the study's participants. The use of SPSS facilitated a rigorous statistical evaluation of the data, ensuring the reliability and validity of the study's findings.

In summary, this study employed a meticulous and standardized approach to examine the impact of clinical practice on the posture of physiotherapists. Through the integration of a specific participant cohort, ethical adherence, and advanced data analysis techniques, the research aimed to provide valuable insights into the occupational hazards faced by physiotherapists and the potential implications for their long-term health and well-being.

RESULTS

In the assembled data, the gender distribution of the participating physiotherapists demonstrates a prominent skew towards one gender, with females comprising a substantial majority at 81.2% (251 participants), in contrast to the males at 18.8% (58 participants), as illustrated in Figure 1. This significant gender disparity highlights potential variances in occupational preferences or opportunities within the field.

The age distribution among the participants is displayed in Figure 2, which presents a histogram peaking in the mid-twenties. The mean age of the cohort is identified as 26.17 years, with a standard deviation of 2.21 years, indicating a relatively young professional

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group with a tight age range predominantly between 24 and 28 years. This concentration suggests that the physiotherapy profession is attracting early career professionals or that the study has captured a snapshot of a generational cohort within the field.

Figure 3 delineates the years of experience across the sample, showcasing a descending trend as the years of experience increase. A significant portion of the sample, 30% (95 participants), possesses one year of experience, denoting a large influx of novice practitioners into the profession. There is a noticeable decline as experience grows, with only 2.6% (8 participants) of the sample having either 6 or 8 years of experience, and a minimal 1.6% (5 participants) with 7 years of experience, potentially reflecting a high turnover rate or a shift in career paths as experience accumulates.

Table 1 Study Characteristics, Stress Level

Condition	Frequency	Percentage
Normal	37	12.0%
Mild disturbance	99	32.0%
Severe disturbance	173	56.0%
Total	309	100.0%

The aforementioned figures collectively paint a detailed picture of the demographic profile of the physiotherapist participants in this study, which is skewed towards younger, early-career female practitioners. These demographic characteristics may have implications for the profession, potentially influencing workplace dynamics, career development trajectories, and the future landscape of physiotherapy practice.

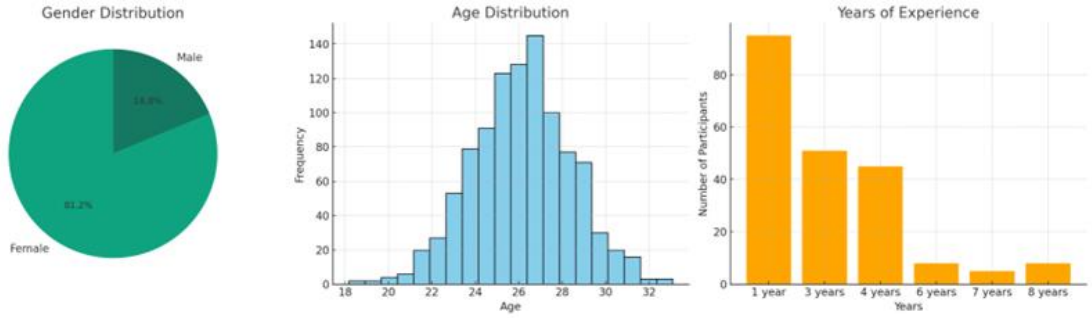

Figure 1 Gender, Age and Experience

The aforementioned figures collectively paint a detailed picture of the demographic profile of the physiotherapist participants in this study, which is skewed towards younger, early-career female practitioners. These demographic characteristics may have implications for the profession, potentially influencing workplace dynamics, career development trajectories, and the future landscape of physiotherapy practice.

DISCUSSION

The present investigation sought to delineate the prevalence of suboptimal body posture within the physiotherapist demographic. The derived data underscore a significant concern: a majority proportion, amounting to 56%, of the surveyed physiotherapists were found to exhibit poor posture. This is particularly disconcerting given the physical exigencies of their vocational roles.

In the pursuit of practical solutions, the study by Travato B. et al. (2022) warrants mention, wherein the Apecs-AI Posture Evaluation and Correction System® (Apecs) mobile application was examined for its efficacy in postural assessment. The app emerged as a cost-effective and consistent alternative, as corroborated by Intraclass Correlation Coefficient (ICC) tests, to the more elaborate 3D-marker-based systems traditionally in use (21). The accessibility and affordability of Apecs pave the way for its adoption as a supplementary tool in the routine evaluation of postural integrity, thereby enabling clinicians to enhance the standard of patient care delivered.

Complementing the findings of this study, R Albataneh et al. (2022) identified an elevated incidence of work-related musculoskeletal diseases (WMSDs) among Jordanian physiotherapists, attributing these to various occupational risk factors and emphasizing the necessity for self-protection strategies based on the International Classification of Functioning, Disability and Health (ICF) model (22). The current research aligns with these observations, having delineated a link between improper postural habits and the onset of musculoskeletal imbalances among physiotherapists.

Against this backdrop, clinicians are urged to adopt the APECS-AI Posture Evaluation and Correction System® (Apecs) in their diagnostic armamentarium. This measure not only holds promise for enhancing patient care but also serves as a preventative

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stratagem against the prevalence of WMSDs among physiotherapists. Moreover, there is a pressing need to augment awareness of self-protection modalities aimed at curbing the incidence of musculoskeletal ailments.

Prior literature on the postural assessment of healthcare professionals did not incorporate the APECS tool, rendering this research initiative particularly novel. Moreira R et al. (2020) highlighted the burgeoning interest in app-based postural assessment tools, leveraging the ubiquity of smartphones and their synergistic potential with image-capture technology (23). By integrating the APECS methodology into our research, we have garnered insightful data on the incidence and characteristics of poor body posture among physiotherapists.

Research conducted by J Jacquier et al. (2023) pinpointed awkward postures as a primary factor contributing to musculoskeletal disorders (MSDs) among healthcare workers, recommending posture amelioration to mitigate MSD risks. A comprehensive review of MSD prevalence across different continents elucidated discernible patterns among healthcare professionals (24). In contrast, the present study categorized postural adequacy into three distinct classes: normal, mild, and severe disturbances, thereby providing a nuanced understanding of postural deviations.

The ramifications of poor posture are profound, potentially impeding the professional efficacy of physiotherapists whose roles are pivotal in patient rehabilitation and recovery. The insights gleaned from this study have the potential to foster improved self-care among physiotherapists, culminating in better patient outcomes and enhanced practitioner wellbeing.

Notwithstanding these contributions, the study's scope was delimited by certain constraints. The exclusive focus on physiotherapists in Lahore may limit the generalizability of the findings, suggesting a need for broader geographic sampling in future research. Moreover, the reliance on self-reported data could introduce bias, thus, objective measures should be integrated to enhance data validity. As a recommendation, future studies should explore the long-term impact of posture correction interventions among physiotherapists, with an expanded participant base to bolster the external validity of the findings.

CONCLUSION

The study conclusively indicates a prevalent issue of poor posture among physiotherapists, with potentially deleterious effects on their professional practice and personal health. It underscores the imperative for incorporating cost-effective and accessible posture assessment tools like APECS into clinical settings. Addressing these postural inadequacies could significantly enhance the overall quality of healthcare delivery by physiotherapists, as it not only augments their ability to model optimal biomechanical strategies to their patients but also reduces their own risk of developing musculoskeletal disorders.

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