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PREVALENCE OF HAND OR WRIST-RELATED PAIN AND ITS FUNCTIONAL LIMITATION AMONG HEALTHCARE PRACTITIONERS

Original Research

Izza Ayub[1]*, Noor Habiba[1], Fatima Majeed[1]
[1]Department of Rehabilitation Sciences, The University of Faisalabad, Pakistan.
Corresponding Author: Izza Ayub, Department of Rehabilitation Sciences, The University of Faisalabad, Pakistan. drizzaayub@gmail.com

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ABSTRACT

Background: Work-related hand and wrist injuries are among the most common occupational traumas, particularly affecting healthcare practitioners due to prolonged manual tasks and repetitive movements. These injuries significantly impact the practitioners' functional abilities and overall productivity. Addressing this issue is critical not only to enhance the health and well-being of healthcare workers but also to maintain high standards of patient care. This study aimed to evaluate the prevalence of hand and wrist pain and its associated functional limitations among healthcare practitioners.

Objective: To assess the prevalence and impact of hand and wrist pain on functional limitations among healthcare practitioners in diverse healthcare settings.

Methods: A cross-sectional study was conducted between March 2024 and July 2024, involving 70 healthcare practitioners aged 21 to 35 years from Madinah Teaching Hospital, Faisalabad International Hospital, Civil Hospital, Sahil Hospital, and Prime Care Hospital. Approval was obtained from the Ethical Institutional Review Board (Ref: TUF/IRB/329/24). Participants were selected using purposive sampling, including those with at least one year of clinical experience and a minimum of four working hours per day. Data were collected using validated tools: Pain Rated Wrist/Hand Evaluation (PRWHE), Numeric Pain Rating Scale (NPRS), and Michigan Hand Outcome Questionnaire (MHOQ). Exclusion criteria included unhealed fractures, arthritis, neurological disorders, neoplasms, diagnosed diabetes mellitus, smoking or drug abuse >2 years, and systemic conditions affecting musculoskeletal function.

Results: The PRWHE, NPRS, and MHOQ showed mean values of 31.57 (SD 18.75), 3.64 (SD 1.75), and 66.25 (SD 12.29), respectively. Functional domains of MHOQ recorded percentages for Function (59.42%), Activities of Daily Living (70.06%), Work (58.28%), Pain (36.35%), Aesthetics/Appearance (83.75%), and Satisfaction (61.85%). Urologists demonstrated the highest pain levels (PRWHE: 41.64; NPRS: 4.57) and lowest functional outcomes (MHOQ: Function: 50.71%). Surgeons exhibited the highest overall hand functionality (MHOQ: 69.16%), while nurses and dentists reported significant limitations in pain and work-related capabilities.

Conclusion: The study identified a considerable prevalence of hand and wrist pain and associated functional limitations among healthcare practitioners. These findings underscore the necessity of ergonomic interventions and workplace modifications to alleviate musculoskeletal strain and improve the well-being and productivity of healthcare workers.

Keywords: Ergonomics, Functional Limitations, Hand Pain, Healthcare Workers, Musculoskeletal Disorders, Repetitive Strain Injuries, Workplace Health.

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INTRODUCTION

Healthcare practitioners encompass a diverse range of professionals, including surgeons, dentists, nurses, and physiotherapists, among others. These individuals play a crucial role in preventing, diagnosing, and treating patient ailments while striving to enhance health outcomes and improve the overall patient experience (1). In their daily practice, healthcare practitioners engage in a variety of physically demanding tasks, such as transferring, repositioning, and attending to patients. These activities often involve repetitive movements, sustained postures, and significant physical exertion, which can contribute to symptoms affecting the musculoskeletal system (3).

The occupational environment of healthcare professionals is frequently characterized by long working hours, high workloads, shift duties, and insufficient financial remuneration, all of which may exacerbate musculoskeletal strain (4). Specific physiological and ergonomic factors inherent in the profession, such as repetitive motion patterns, prolonged use of vibrating equipment, and high patient turnover, increase the risk of developing musculoskeletal disorders (3). For instance, surgeons often face unique physical demands in the operating theater, where intense focus, time constraints, and the use of ergonomically suboptimal instruments can contribute to muscle strain and injury. Surgical tools, such as scissors with limited arc ranges, often prioritize functionality over ergonomic design, leading to discomfort and restricted thumb mobility during extended use (5).

Evidence-based studies have also highlighted individual risk factors, including age, sex, body mass index (BMI), and the type of healthcare setting, as contributors to the development of hand or wrist-related disorders (6). Occupational and personal ergonomic practices further influence the likelihood of sustaining these injuries (7). Notably, workplace injuries involving the hand are among the most frequently reported occupational traumas, and they have far-reaching consequences on practitioners' health and productivity (6). Such injuries can diminish job performance, reduce income due to absenteeism, and in severe cases, prematurely end careers (9). This underscores the critical need to address workplace ergonomics and mitigate risks associated with musculoskeletal strain in healthcare settings.

Although the importance of human factors and ergonomics in healthcare is increasingly recognized, their integration and professionalization within the industry remain in their early stages (10). Addressing these gaps is imperative to enhance the quality of care and safeguard the well-being of healthcare practitioners. Therefore, the present study seeks to assess the prevalence of hand or wrist pain and its associated functional limitations among healthcare practitioners, providing valuable insights into the occupational challenges faced by these professionals (11).

METHODS

A cross-sectional study was conducted with ethical approval obtained from the Institutional Review Board (Ref: TUF/IRB/329/24). The study was carried out at Madinah Teaching Hospital, Faisalabad International Hospital, Civil Hospital, Sahil Hospital, and Prime Care Hospital over a period from March 2024 to July 2024. The sample consisted of 70 healthcare practitioners, selected using a purposive sampling technique to ensure participants met specific inclusion criteria.

Eligible participants included both male and female healthcare practitioners aged between 21 and 35 years, with a minimum of one year of clinical experience and engaged in manual handwork for at least four hours per day. Informed consent was a prerequisite for participation. Exclusion criteria included practitioners with unhealed fractures in the hand, wrist, shoulder, or elbow, as well as those with a history of arthritis, hand or wrist neoplasms, arm/hand/finger replantation or dislocation, or neurological disorders such as Dupuytren's contracture, tenosynovitis, ganglion cysts, carpal/radial/ulnar nerve issues, or peripheral neuropathy. Participants with diagnosed diabetes mellitus, cancer, or a history of smoking or substance abuse exceeding two years were also excluded to ensure homogeneity in assessing hand and wrist conditions.

Data collection was conducted using three standardized tools: the Pain Rated Wrist/Hand Evaluation (PRWHE), the Numeric Pain Rating Scale (NPRS), and the Michigan Hand Outcome Questionnaire (MHOQ). The PRWHE included five demographic questions and 15 items assessing pain and functional difficulties in performing activities, each rated on a scale of 0 to 10. The NPRS, an 11-point scale ranging from 0 (no pain) to 10 (worst possible pain), was utilized to quantify pain intensity subjectively. The MHOQ, a validated

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instrument for evaluating hand-related health domains, measured symptoms, functional outcomes, aesthetics, and satisfaction related to hand function. This comprehensive set of tools ensured multidimensional assessment of hand and wrist conditions.

Statistical analysis was conducted using SPSS software to process and interpret the data. Demographic details revealed a participant pool comprising 31 males (44.3%) and 39 females (55.7%) with a mean age of 28.10 years (SD = 3.78). Descriptive statistics were calculated for each instrument, including the NPRS, PRWHE, and MHOQ, revealing mean scores of 3.64 (SD = 1.75), 31.57 (SD = 18.75), and 66.25 (SD = 12.29), respectively.

Further analysis identified profession-specific patterns. Urologists reported the highest mean pain levels on the NPRS (4.57) and PRWHE (41.64) and exhibited significant limitations in daily living activities and work functions. Gynecologists and dentists showed notable deficits in working abilities, with scores of 49.44% and 43.63%, respectively. Nurses reported higher pain levels (46.81%), while ophthalmologists were most satisfied with hand aesthetics (92.70%). Dentists, however, were the least satisfied with overall hand function, scoring 54.92%. These findings highlighted occupational variations in hand and wrist conditions, reflecting the interplay of job-specific demands and ergonomic factors.

RESULTS

The study comprised 70 participants, of whom 31 (44.3%) were male and 39 (55.7%) were female, with ages ranging from 21 to 35 years and a mean age of 28.10 years (SD = 3.78). The participants represented various healthcare professions, including physiotherapists (21.43%), surgeons (17.14%), gynecologists (12.86%), nurses (15.71%), urologists (8.57%), dentists (15.71%), and ophthalmologists (8.57%). This demographic distribution provided a broad representation of healthcare practitioners actively engaged in manual handwork.

Pain scores were assessed using the Numeric Pain Rating Scale (NPRS), with a mean (SD) score of 3.64 (1.75), indicating mild to moderate pain among participants. The Pain Rated Wrist/Hand Evaluation (PRWHE) recorded a mean (SD) score of 31.57 (18.75), reflecting functional challenges related to hand and wrist discomfort. The Michigan Hand Outcome Questionnaire (MHOQ) revealed an overall mean (SD) score of 66.25 (12.29), measuring satisfaction, functionality, and activities of daily living among healthcare practitioners. Profession-specific results indicated that urologists reported the highest mean PRWHE score (41.64) and the highest NPRS score (4.57), suggesting greater pain and functional limitations compared to other groups. Functionality and daily activity performance on the MHOQ were also lowest among urologists, with scores of 50.71% and 54.14%, respectively. Conversely, ophthalmologists were most satisfied with hand aesthetics, scoring 92.70%.

Nurses reported elevated pain levels (46.81%) on the MHOQ, while dentists and gynecologists displayed the least working ability, with scores of 43.63% and 49.44%, respectively. Dentists were the least satisfied overall with hand functionality, scoring 54.92%, in contrast to the more favorable satisfaction levels among surgeons and physiotherapists. The findings underscored significant variations in pain and functionality across professions, emphasizing the impact of occupational demands on musculoskeletal health and overall satisfaction.

Table 1 Demographic Information

Demographic Information			
Variable	Constructs		Frequency (Percentage)
Age	Minimum	21	-
	Maximum	35	
	Mean (SD)	28.10 (3.78)	
Gender	Male		31 (44.3%)
	Female		39 (55.7%)

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The demographic information of the study participants revealed an age range of 21 to 35 years, with a mean age of 28.10 years (SD = 3.78). The sample consisted of 31 males (44.3%) and 39 females (55.7%), reflecting a slightly higher representation of female healthcare practitioners in the study. This distribution ensures a comprehensive analysis across genders within the specified age range.

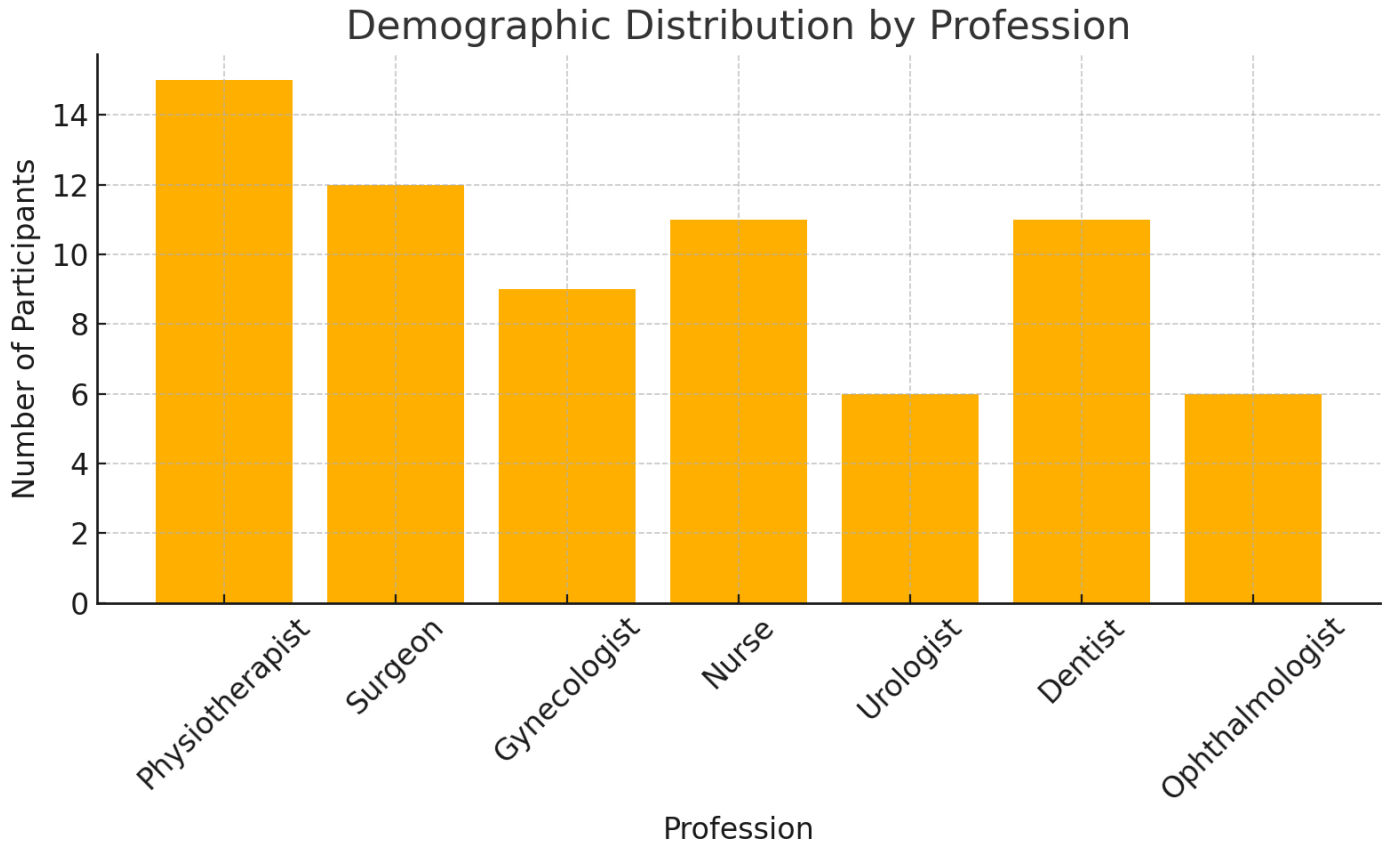


Figure 1 Demographic Distribution by Profession

The demographic distribution of participants by profession showed a diverse representation of healthcare practitioners, with physiotherapists forming the largest group at 15 participants (21.43%), followed by surgeons at 12 (17.14%). Nurses and dentists were equally represented, each with 11 participants (15.71%). Gynecologists comprised 9 participants (12.86%), while urologists and ophthalmologists had the lowest representation, each accounting for 6 participants (8.57%). This distribution highlights a balanced sample encompassing key healthcare professions engaged in manual and repetitive tasks.

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Table 2 Descriptive statistics of Numeric Pain Rating Scale, Pain Rated Wrist/Hand Evaluation, and Michigan Hand Outcome Questionnaire

	Minimum	Maximum	Mean ± Standard Deviation
Numeric Pain Rating Scale	1.00	9.00	3.64 ± 1.75
Pain Rated Wrist/Hand Evaluation score	8.00	82.00	31.57 ± 18.75
Michigan Hand Outcome Questionnaire score	40.69	90.44	66.25 ± 12.29

The descriptive statistics of the study revealed that the Numeric Pain Rating Scale (NPRS) scores ranged from 1.00 to 9.00, with a mean of 3.64 (SD = 1.75), indicating mild to moderate pain levels among participants. The Pain Rated Wrist/Hand Evaluation (PRWHE) scores varied from 8.00 to 82.00, with a mean of 31.57 (SD = 18.75), reflecting functional limitations due to pain. The Michigan Hand Outcome Questionnaire (MHOQ) scores ranged from 40.69 to 90.44, with a mean of 66.25 (SD = 12.29), providing a comprehensive measure of hand functionality, daily activities, and satisfaction.

Table 3: Descriptive Statistics of Outcome Measures According to Professional Categories

Descriptive Statistics of Outcome Measures According to Professional Categories								
Profession	Pain Rated Wrist/ Hand Evaluation	Numeric Pain Rating Scale	MICHIGAN HAND OUTCOME QUESTIONNAIRE (MHOQ)					
			Function	Daily Living Activities	Working	Pain Experience	Aesthetics/Appearance	Satisfaction
	Mean (S.D)	Mean (S.D)	Percentage					
Physiotherapists	26.82 (12.11)	3.60 (1.68)	58.92%	73.89%	64.64%	27.17%	88.39%	63.10%
Surgeons	18.20 (7.95)	3.00 (0.74)	67.91%	82.41%	69.16%	34.16%	88.54%	65.76%
Gynaecologist	40.44 (25.06)	4.11 (2.08)	58.33%	60.55%	49.44%	42.22%	75.69%	65.73%
Nurses	38.22 (21.96)	4.00 (2.23)	61.81%	69.72%	59.09%	46.81%	81.25%	61.73%
Urologists	41.64 (13.44)	4.57 (1.27)	50.71%	54.14%	60.71%	33.57%	76.78%	62.97%
Dentists	32.22 (19.97)	3.54 (2.02)	53.63%	67.50%	43.63%	35.45%	81.25%	54.92%
Ophthalmologists	30.91 (21.74)	3.16 (1.94)	61.66%	74.58%	57.50%	39.16%	92.70%	56.94%

The outcome measures by professional categories revealed varying levels of hand and wrist pain and functional limitations. Urologists exhibited the highest mean Pain Rated Wrist/Hand Evaluation (PRWHE) score of 41.64 (SD = 13.44) and the highest Numeric Pain

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Rating Scale (NPRS) score of 4.57 (SD = 1.27), indicating greater pain and functional challenges. Surgeons reported the highest overall functionality on the Michigan Hand Outcome Questionnaire (MHOQ), with a function score of 67.91% and daily living activities at 82.41%. Conversely, dentists and gynecologists demonstrated the lowest working scores, at 43.63% and 49.44%, respectively. Ophthalmologists were most satisfied with hand aesthetics, scoring 92.70%, while physiotherapists and surgeons also exhibited high satisfaction, at 88.39% and 88.54%, respectively. Nurses reported higher pain percentages (46.81%), indicating notable occupational strain. These findings highlight the diverse ergonomic and functional demands across professions.

DISCUSSION

The findings of this study highlight the prevalence of hand and wrist pain among healthcare practitioners, with urologists experiencing the highest levels of discomfort. Urologists reported a pain prevalence of 33.57%, comparable to a study conducted in Puerto Rico that indicated a prevalence of 32% (12). Functional limitations, as measured by the Michigan Hand Outcome Questionnaire (MHOQ), showed an overall hand functionality of 50.71% for urologists, underscoring the need for ergonomic interventions during procedures. Previous literature by Tjiam et al. identified insufficient knowledge about ergonomically modified workspaces among 40% of urologists, which directly impacts physical strain and functionality (13).

Gynecologists in this study demonstrated a wrist and hand pain prevalence of 42.22%, consistent with earlier findings reporting 60.9% prevalence among gynecological surgeons. The heightened vulnerability of female practitioners, attributed to smaller body frames and lower muscular mass, has been documented, with females showing a 2.9% higher risk than males (14). Nurses, who reported a 46.81% prevalence of hand and wrist pain, also exhibited 61.81% functionality on the MHOQ. These results align with a study in 2018 where 65.22% of nurses experienced significant impacts on daily work tasks and productivity (16). However, the discrepancy with studies such as one from Estonia, reporting only 17.2% prevalence, highlights geographical and methodological variations (15).

Dentists showed a hand pain prevalence of 35.45%, closely aligned with findings among Indian dentists, where the prevalence was 39% (17). Functional limitations, with 53.63% functionality on the MHOQ, reflect the physical strain from repetitive movements and poor ergonomic practices. Previous research supports ergonomic interventions such as micro-breaks and avoiding improper postures to mitigate such occupational risks (18). Similarly, ophthalmologists reported a pain prevalence of 39.16%, which exceeded Canadian data indicating an 18% prevalence (19). Despite 61.66% functionality on the MHOQ, a significant proportion required workplace adjustments. Studies from the United States emphasized stretching and posture modifications to enhance working capacity (20).

Physiotherapists in this study exhibited a lower prevalence of hand pain at 27.17%, significantly less than previous reports of 70% (21). Despite this, 58.92% functionality on the MHOQ suggests considerable limitations, with earlier studies highlighting exhaustion and persistent functional restrictions among physiotherapists (9). Surgeons reported a hand pain prevalence of 34.16%, contrasting sharply with earlier findings indicating a lower prevalence of 3.8% (22). The MHOQ reflected a higher functionality of 69.16%, yet forceful exertions and repetitive movements were associated with significant work-related discomforts in previous research (23).

This study's strengths include the use of validated tools and a diverse sample of healthcare professions, enabling comprehensive analysis across occupational groups. However, limitations such as the cross-sectional design preclude causal inferences, and the reliance on self-reported data may introduce recall bias. Future research incorporating longitudinal approaches and ergonomic assessments is necessary to validate findings and develop targeted interventions. The observed disparities across professions and regions emphasize the critical need for tailored ergonomic education and workplace modifications to mitigate hand and wrist-related pain and functional limitations in healthcare practitioners.

CONCLUSION

This study highlighted the significant prevalence of hand and wrist pain among healthcare practitioners and its impact on their functional capabilities. Addressing this issue is crucial, not only for safeguarding the well-being of healthcare professionals but also for ensuring the delivery of high-quality patient care. The findings underscore the importance of implementing ergonomic interventions, stress management strategies, and fostering further research to mitigate these challenges. By prioritizing these measures, healthcare organizations can enhance the health, efficiency, and productivity of their workforce, ultimately contributing to a more sustainable and effective healthcare system.

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AUTHOR CONTRIBUTIONS

Author	Contribution
Izza Ayub	Conception or design of the work Acquisition, Analysis, or Interpretation of data for the work Revising it critically for important intellectual content Final approval of the version to be published
Noor Habiba	Conception or design of the work Drafting the work Acquisition, Analysis, or Interpretation of data for the work
Fatima Majeed	Conception or design of the work Drafting the work Acquisition, Analysis, or Interpretation of data for the work

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