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Prevalence of Thumb Pain Among Physiotherapists of Lahore

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ABSTRACT

Background: *Work-related musculoskeletal disorders are highly prevalent among physiotherapists, particularly those performing repetitive manual therapy techniques that impose sustained compressive forces on the thumb, which functions as a pseudo weight-bearing joint. Despite substantial international evidence, epidemiological data on work-related thumb pain among physiotherapists in Pakistan remain limited.* ***Objective:*** *To determine the prevalence, severity, and occupational exposure association of current work-related thumb pain among physiotherapists engaged in manual therapy in Lahore, Pakistan.* ***Methods:*** *A descriptive cross-sectional study was conducted over six months in six tertiary care hospitals and rehabilitation centers in Lahore. A total of 146 physiotherapists with ≥2 years of clinical experience and active manual therapy involvement were recruited using convenience sampling. Data were collected through a structured, validated questionnaire and the Numeric Pain Rating Scale (NPRS). Prevalence was calculated with 95% confidence intervals (CI), and associations between manual therapy exposure and thumb pain were analyzed using chi-square tests and odds ratios (OR).* ***Results:*** *The prevalence of current work-related thumb pain was 76.0% (95% CI: 68.3%–82.6%). Moderate pain was most common (54.1%), followed by severe pain (20.7%). Dominant-thumb involvement was reported in 70.3% of symptomatic participants ($p < 0.001$). Physiotherapists performing manual therapy for 61–100% of working time had significantly higher odds of thumb pain (OR = 3.44; 95% CI: 1.18–10.05; $p = 0.018$).* ***Conclusion:*** *Work-related thumb pain is highly prevalent among physiotherapists in Lahore and demonstrates a significant dose–response relationship with manual therapy workload, highlighting the need for targeted ergonomic and preventive strategies.*

Keywords: *Work-related musculoskeletal disorders; Thumb pain; Physiotherapists; Manual therapy; Occupational exposure; Numeric Pain Rating Scale*

INTRODUCTION

Work-related musculoskeletal disorders (WRMSDs) are a major occupational health concern among healthcare professionals, particularly those engaged in physically demanding clinical tasks. WRMSDs encompass a spectrum of inflammatory and degenerative conditions affecting muscles, tendons, ligaments, joints, and peripheral nerves that are either caused or aggravated by occupational exposure (1,2). Among rehabilitation professionals, physiotherapists represent a group at elevated risk because their clinical practice frequently requires repetitive manual techniques, sustained postures, and the application of high compressive forces through the upper extremities (3). Despite their expertise in musculoskeletal health, physiotherapists consistently report substantial rates of work-related pain, particularly involving the spine and upper limbs, underscoring a paradox within the profession (3,5).

Within the upper extremity, the thumb plays a uniquely critical biomechanical role during manual therapy. Techniques such as joint mobilization, soft tissue manipulation, trigger point release, and spinal mobilization often require force transmission through the thumb in positions of flexion, abduction, and axial loading. In these contexts, the thumb may function as a pseudo weight-bearing joint, repeatedly subjected to compressive and shear forces that exceed physiological thresholds over time (4,6). The carpometacarpal and metacarpophalangeal joints, in particular, are vulnerable to cumulative microtrauma when

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exposed to repetitive, high-load manual interventions, potentially leading to tendinopathy, ligamentous strain, joint instability, and chronic pain (4). Biomechanical analyses and occupational surveys have identified manual therapy frequency, force intensity, and sustained thumb positioning as contributory risk factors for work-related thumb disorders (WRTDs) (6).

Epidemiological evidence from high-income countries demonstrates that thumb-related disorders are common among physiotherapists who routinely perform manual therapy. Observational studies have reported lifetime prevalence rates of thumb problems ranging from approximately 62% to 83% among manual therapists, with substantial proportions also reporting current or recent symptoms (7,8). For example, an Australian study documented a lifetime prevalence of 65% and a current prevalence of 41% for thumb problems among physiotherapists, with manual techniques such as trigger point therapy identified as significant contributors (7). Similarly, South African data indicate a lifetime prevalence of 65.3% for work-related thumb disorders among physiotherapists managing musculoskeletal conditions (1). In addition, broader surveys of WRMSDs in physical therapists confirm that upper limb complaints, including those involving the wrist and thumb, constitute a considerable share of occupational morbidity (5). Importantly, thumb pain has been associated with modification of clinical techniques, reduced work capacity, and, in some cases, premature career transitions, highlighting its functional and professional implications (9).

Although international literature substantiates the occupational burden of thumb pain in physiotherapy practice, there remains limited population-specific data from low- and middle-income countries. Clinical practice environments, patient volumes, ergonomic infrastructure, and workforce distribution may differ substantially from those in Western healthcare systems, potentially influencing both exposure intensity and risk profiles (1). In Pakistan, physiotherapy services in tertiary care hospitals and rehabilitation centers often involve high patient throughput and extensive reliance on hands-on manual techniques. However, systematic epidemiological data quantifying the prevalence and severity of work-related thumb pain among Pakistani physiotherapists are scarce. The absence of locally generated data constrains evidence-based occupational health planning, ergonomic training initiatives, and preventive policy development within the national context.

From a PICO-oriented perspective, the present investigation focuses on physiotherapists actively engaged in manual therapy (Population), exposed to repetitive and forceful thumb loading during routine clinical practice (Exposure), without a non-exposed comparator group due to its descriptive design (Comparison), and aims to quantify the prevalence and severity of work-related thumb pain (Outcome). Clarifying this burden within a defined urban tertiary-care setting is essential to contextualize international findings, identify the magnitude of occupational risk locally, and inform targeted preventive strategies. Furthermore, precise estimation of current thumb pain prevalence and its severity distribution provides foundational epidemiological data necessary for subsequent analytical or longitudinal research exploring causal determinants and risk modification.

Given the documented biomechanical vulnerability of the thumb, the high manual workload characteristic of physiotherapy practice, and the paucity of local epidemiological evidence, there is a clear need to quantify the magnitude of this occupational health issue in Lahore. Therefore, the objective of this study is to determine the prevalence and severity of work-related thumb pain among physiotherapists performing manual therapy in tertiary care and rehabilitation settings in Lahore, Pakistan. The study seeks to answer the research question:

What is the prevalence and intensity distribution of work-related thumb pain among physiotherapists engaged in manual therapy in Lahore?

MATERIALS AND METHODS

This study was conducted as a descriptive cross-sectional observational investigation designed to estimate the prevalence and severity of work-related thumb pain among physiotherapists engaged in manual therapy. A cross-sectional design was selected because it permits precise estimation of point prevalence and symptom distribution within a defined occupational population at a specific time, which is methodologically appropriate for epidemiological burden assessment (10). The study was carried out over a six-month period from January to June 2023 in six tertiary care hospitals and specialized rehabilitation centers in Lahore, Pakistan, including Ghurki Trust Teaching Hospital, Pakistan Society for the Rehabilitation of the Disabled, Jinnah Hospital Lahore, Mayo Hospital Lahore, Children's Hospital Lahore, and Lahore General Hospital. These institutions were selected because they represent high-volume clinical settings in which manual therapy techniques are routinely practiced, thereby ensuring adequate occupational exposure within the target population.

The source population comprised licensed physiotherapists working in musculoskeletal, orthopedic, neurology, and rehabilitation departments within the selected institutions. Eligible participants were required to have a minimum of two years of continuous clinical experience and to be actively performing manual therapy techniques as part of routine patient management. Manual therapy exposure was operationally defined as hands-on therapeutic techniques involving joint mobilization, manipulation, soft tissue mobilization, trigger point release, or sustained thumb-applied pressure. Physiotherapists with a history of traumatic thumb injury unrelated to occupational exposure, congenital structural deformities of the hand, inflammatory arthropathies, or systemic neurological or rheumatologic disorders affecting hand function were excluded to minimize non-occupational confounding influences on thumb pain. A non-probability convenience sampling approach was used due to the absence of a centralized registry stratified by manual therapy exposure and to facilitate recruitment within busy clinical environments. All eligible physiotherapists present during the data collection period were invited to participate. Recruitment was conducted through departmental coordination, and written informed consent was obtained after explanation of study objectives, procedures, confidentiality safeguards, and voluntary participation rights.

Data were collected using a structured, self-administered questionnaire developed based on previously published occupational musculoskeletal surveys in physiotherapy populations (5,7). The questionnaire underwent content validation by three senior academic physiotherapists with expertise in musculoskeletal practice and occupational health. A pilot test was conducted on 15 physiotherapists outside the study sample to ensure clarity, relevance, and comprehensibility; minor wording modifications were implemented prior to formal data collection. The instrument captured demographic characteristics (age, gender), professional variables (years of experience, clinical specialty, dominant hand), and occupational exposure parameters, including the proportion of working time spent performing manual therapy categorized as 1–30%, 31–60%, or 61–100%. The primary outcome variable was current work-related thumb pain, operationally defined as self-reported pain in either thumb attributed by the participant to clinical practice and present at the time of assessment. Pain intensity was measured using the 11-point Numeric Pain Rating Scale (NPRS), ranging from 0 (no pain) to 10 (worst imaginable pain), a tool with established reliability and validity in musculoskeletal populations (12). Pain severity categories were defined a priori as mild (NPRS 1–3), moderate (4–6), severe (7–9), and worst possible pain

(10), consistent with commonly accepted clinical cutoffs (12). Secondary variables included laterality of pain (dominant thumb, non-dominant thumb, bilateral, none).

Participants completed the questionnaire and NPRS during working hours in a quiet setting within their respective departments to minimize environmental influence and reporting bias. To reduce information bias, standardized written instructions were provided, and no supervisory personnel were present during completion to mitigate social desirability effects. Data completeness was checked immediately upon submission, and participants were requested to clarify missing responses where applicable to reduce item-level nonresponse.

Potential sources of bias were addressed at multiple stages. Selection bias was minimized by inviting all eligible physiotherapists available during the study period across multiple tertiary institutions. Restriction criteria were applied to exclude pre-existing systemic conditions affecting thumb function, thereby reducing confounding from non-occupational causes. Information bias was mitigated through use of a validated pain assessment scale (12) and standardized data collection procedures. Although the descriptive design did not permit causal inference, occupational exposure was operationalized uniformly across participants to enhance internal consistency.

The required sample size was calculated using the World Health Organization sample size determination formula for prevalence studies, $n = Z^2P(1–P)/d^2$, where Z corresponds to the standard normal deviate at a 95% confidence level (1.96), P represents anticipated prevalence, and d denotes margin of error. An expected prevalence of 41% for current thumb problems among physiotherapists was derived from previously published literature (7), and precision was set at 8%, yielding a minimum sample size of 146 participants (10). The final sample met this requirement.

Data were coded and entered into IBM SPSS Statistics version 23.0 for analysis. Double data entry verification was performed on a random 15% subsample to ensure accuracy. Descriptive statistics were calculated for all variables. Continuous variables were summarized using means and standard deviations or medians and interquartile ranges as appropriate based on distribution assessment. Categorical variables were presented as frequencies and percentages. The primary outcome, prevalence of current work-related thumb pain, was calculated as a proportion with corresponding 95% confidence intervals using the binomial exact method. Pain severity distribution was analyzed among participants reporting pain. Subgroup exploratory analyses were conducted to examine prevalence differences across gender and manual therapy exposure categories using chi-square tests. Missing data were minimal (<5%) and were handled using complete-case analysis. Given the descriptive objective, no multivariable regression modeling was undertaken.

Ethical approval was obtained from the Ethical Review Committee of Lahore College of Physical Therapy and Ghurki Trust Teaching Hospital prior to commencement of the study. Administrative permissions were secured from all participating institutions. All procedures adhered to principles outlined in the Declaration of Helsinki. Participant confidentiality was maintained by anonymizing questionnaires and assigning numeric identification codes. Data were stored in password-protected electronic files accessible only to the research team. To ensure reproducibility, standardized data collection instruments, predefined operational definitions, and a documented statistical analysis plan were used, enabling replication in similar clinical contexts.

RESULTS

A total of 146 physiotherapists were included in the final analysis. As shown in Table 1, males constituted 61.6% (n = 90) of the sample, while females accounted for 38.4% (n = 56). In terms of professional experience, 35.6% (n = 52) had 2–3 years of experience, 43.2% (n = 63) had 4–6 years, and 21.2% (n = 31) had more than 6 years of practice. Regarding occupational exposure, the majority of participants (61.0%, n = 89) reported spending 31–60% of their working time performing manual therapy, whereas 20.5% (n = 30) spent 61–100% of their time in manual therapy, and 18.5% (n = 27) reported lower exposure (1–30%). These data indicate that over four-fifths of the cohort (81.5%) were engaged in manual therapy for more than 30% of their clinical workload.

The overall prevalence of current work-related thumb pain was 76.0% (111/146), with a 95% confidence interval of 68.3%–82.6%, indicating that approximately three out of every four physiotherapists reported active symptoms at the time of assessment. When stratified by gender (Table 2), 78.9% of males (71/90) and 71.4% of females (40/56) reported thumb pain. Although the crude odds ratio suggested 1.39 times higher odds of pain among males compared to females (OR = 1.39; 95% CI: 0.63–3.07), this association was not statistically significant (p = 0.284), and the confidence interval included unity, indicating no meaningful gender-based difference in risk within this sample.

A statistically significant association was observed between the proportion of time spent performing manual therapy and the presence of thumb pain (p = 0.018). Among physiotherapists performing manual therapy for only 1–30% of their working time, 59.3% (16/27) reported pain. This proportion increased to 78.7% (70/89) among those performing manual therapy for 31–60% of their time and further to 83.3% (25/30) among those in the highest exposure category (61–100%). Compared with the reference group (1–30%), physiotherapists in the 31–60% category had 2.53 times higher odds of reporting thumb pain (OR = 2.53; 95% CI: 0.99–6.45), while those in the 61–100% category had 3.44 times higher odds (OR = 3.44; 95% CI: 1.18–10.05). The upper exposure group demonstrated a statistically significant increase in odds, as reflected by the confidence interval excluding 1.0. These findings demonstrate a dose–response pattern, with higher occupational exposure corresponding to increased prevalence of thumb pain.

Among the 111 physiotherapists reporting thumb pain, severity distribution is detailed in Table 3. Moderate pain (NPRS 4–6) was the most prevalent category, affecting 54.1% (n = 60) of symptomatic participants. Mild pain (NPRS 1–3) was reported by 24.3% (n = 27), while 20.7% (n = 23) experienced severe pain (NPRS 7–9). Only 0.9% (n = 1) reported worst possible pain (NPRS 10). Collectively, 21.6% of symptomatic participants (24/111) reported pain in the severe-to-worst range (NPRS ≥7), indicating that approximately one in five affected physiotherapists experienced clinically significant high-intensity symptoms.

Laterality patterns among affected participants (Table 4) revealed a marked predominance of dominant-thumb involvement. Of the 111 symptomatic physiotherapists, 70.3% (n = 78) reported pain localized to the dominant thumb only, whereas 28.8% (n = 32) reported bilateral involvement. Only 0.9% (n = 1) reported isolated non-dominant thumb pain. The distribution across laterality categories was statistically significant (p < 0.001), indicating a non-random pattern strongly favoring dominant-hand involvement. These findings suggest that repetitive force transmission through the dominant thumb during manual therapy likely contributes substantially to symptom development.

Overall, the tabulated results demonstrate a high burden of current work-related thumb pain (76.0%), a clear exposure–response gradient with increasing manual therapy workload,

predominance of moderate pain intensity (54.1%), and significant dominance-related laterality (70.3% dominant-thumb only involvement), collectively reflecting a substantial occupational musculoskeletal impact within this physiotherapy cohort.

Table 1. Demographic and Occupational Characteristics of Participants (N = 146)

Variable	Category	n	%
Gender	Male	90	61.6
	Female	56	38.4
Years of Experience	2–3 years	52	35.6
	4–6 years	63	43.2
	>6 years	31	21.2
Time Spent in Manual Therapy	1–30%	27	18.5
	31–60%	89	61.0
	61–100%	30	20.5

The overall prevalence of current work-related thumb pain and its distribution across demographic and occupational exposure variables are presented in Table 2. A statistically significant association was observed between the proportion of time spent performing manual therapy and the presence of thumb pain (p = 0.018). Physiotherapists performing manual therapy for 61–100% of their working time demonstrated significantly higher odds of reporting thumb pain compared to those performing manual therapy for 1–30% of their time (OR = 3.44; 95% CI: 1.18–10.05). No statistically significant association was found between gender and thumb pain (p = 0.284).

Table 2. Prevalence of Current Work-Related Thumb Pain According to Participant Characteristics

Variable	Category	Thumb Pain n (%)	No Pain n (%)	Odds Ratio (95% CI)	p-value
Gender	Male (n=90)	71 (78.9)	19 (21.1)	1.39 (0.63–3.07)	0.284
	Female (n=56)	40 (71.4)	16 (28.6)	Reference	
Manual Therapy Time	1–30% (n=27)	16 (59.3)	11 (40.7)	Reference	0.018*
	31–60% (n=89)	70 (78.7)	19 (21.3)	2.53 (0.99–6.45)	
	61–100% (n=30)	25 (83.3)	5 (16.7)	3.44 (1.18–10.05)	

*Chi-square test for trend.

Pain severity among participants reporting thumb pain (n = 111) is summarized in Table 3. Moderate pain was the most frequently reported category (54.1%), followed by mild (24.0%), severe (21.2%), and worst possible pain (0.9%).

Table 3. Distribution of Thumb Pain Severity Among Participants with Pain (n = 111)

Pain Severity (NPRS)	n	%
Mild (1–3)	**27**	**24.3**
Moderate (4–6)	**60**	**54.1**
Severe (7–9)	**23**	**20.7**
Worst (10)	**1**	**0.9**

The laterality of thumb pain is shown in Table 4. Dominant-thumb involvement was significantly more common than non-dominant-only involvement ($p < 0.001$). Bilateral pain was reported by 28.8% of those with symptoms.

Table 4. Laterality of Thumb Pain Among Affected Participants (n = 111)

Laterality	n	%	p-value*
Dominant thumb only	**78**	**70.3**	**<0.001**
Non-dominant thumb only	**1**	**0.9**	
Bilateral	**32**	**28.8**	

*Chi-square goodness-of-fit test comparing distribution across categories.

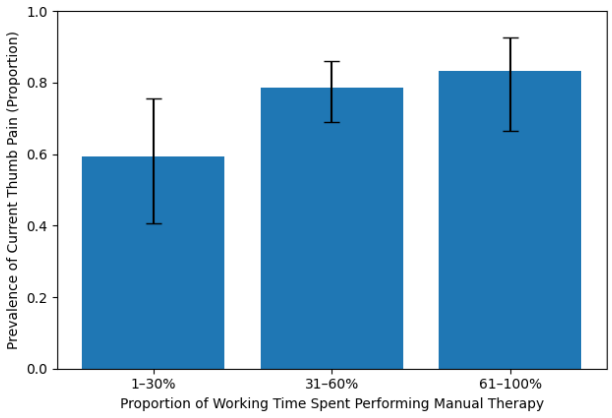

Figure 1 Dose–Response Relationship Between Manual Therapy Exposure and Current Work-Related Thumb Pain (Prevalence with 95% Confidence Intervals)

The figure demonstrates a clear exposure–response gradient between manual therapy workload and the prevalence of current work-related thumb pain. Physiotherapists performing manual therapy for 1–30% of their working time exhibited a prevalence of 59.3% (16/27; 95% CI: 40.7%–75.5%), which increased to 78.7% (70/89; 95% CI: 69.1%–86.0%) among those in the 31–60% exposure category. The highest exposure group (61–100%) showed a prevalence of 83.3% (25/30; 95% CI: 66.4%–92.7%). The ascending pattern across categories, combined with narrowing confidence intervals in the intermediate group due to larger sample size, supports a clinically meaningful dose–response relationship. Notably, the absolute risk difference between the lowest and highest exposure groups was 24.0 percentage points, reinforcing the occupational significance of cumulative manual therapy load as a determinant of thumb pain prevalence.

DISCUSSION

The present study demonstrates a high prevalence of current work-related thumb pain (76.0%; 95% CI: 68.3%–82.6%) among physiotherapists engaged in manual therapy in tertiary care settings in Lahore. Approximately three out of every four clinicians reported active symptoms, and more than half of affected participants experienced moderate pain intensity (54.1%), with an additional 21.6% reporting severe-to-worst pain (NPRS ≥7). These findings indicate not only a substantial occupational burden but also clinically meaningful symptom severity that may influence functional performance. From an epidemiological perspective, the precision of the prevalence estimate, supported by confidence interval reporting, strengthens the reliability of the burden assessment within this defined population.

The observed prevalence aligns with international literature documenting a high frequency of thumb-related disorders among physiotherapists who routinely perform manual therapy. Previous studies have reported lifetime prevalence rates ranging from 62% to 83%, with current prevalence estimates around 41% in Australian cohorts (7,8). While direct comparison must be interpreted cautiously due to differences in symptom timeframe definitions (lifetime versus current), the magnitude of prevalence in the present study suggests that thumb pain constitutes a comparable occupational concern within the Pakistani clinical context. The consistency of findings across geographically distinct settings supports the external validity of the underlying biomechanical hypothesis that repetitive thumb loading during manual therapy predisposes clinicians to cumulative microtrauma (4,6).

A particularly important finding in this study is the statistically significant dose–response relationship between manual therapy exposure and thumb pain prevalence ($p = 0.018$). Physiotherapists performing manual therapy for 61–100% of their working time demonstrated 3.44-fold higher odds of reporting thumb pain (95% CI: 1.18–10.05) compared with those performing manual therapy for only 1–30% of their time. This gradient pattern is clinically and epidemiologically meaningful, as dose–response relationships strengthen causal inference in observational research (10). Although the cross-sectional design precludes definitive causal conclusions, the ascending prevalence across exposure strata, combined with biological plausibility and consistency with prior occupational studies, supports a likely contributory role of cumulative mechanical load (6,13). These findings reinforce earlier reports identifying manual technique frequency and sustained thumb compression as significant risk factors for work-related thumb disorders (6,13).

Dominant-thumb involvement was markedly predominant, with 70.3% of symptomatic participants reporting pain confined to the dominant thumb and only 0.9% reporting isolated non-dominant involvement. This asymmetrical distribution ($p < 0.001$) is consistent with the functional biomechanics of manual therapy, in which force transmission and precision control are typically concentrated in the dominant hand. Prior research has similarly documented greater vulnerability of the dominant upper extremity in manual therapy clinicians (1,8). The predominance of unilateral dominant involvement further supports the occupational specificity of the symptoms, as generalized systemic conditions would be expected to produce more symmetrical patterns.

Pain severity distribution also warrants consideration. While moderate pain constituted the largest proportion (54.1%), more than one-fifth of affected clinicians experienced severe pain, which may have implications for work efficiency, technique modification, and long-term joint health. Previous investigations have reported that thumb pain may prompt physiotherapists to alter manual techniques, reduce clinical workload, or avoid certain high-force procedures (9). Although functional outcomes were not directly assessed in the present study, the proportion of participants reporting moderate-to-severe symptoms suggests potential subclinical impact on service delivery and practitioner well-being. Future studies incorporating functional scales or productivity measures would help quantify this dimension more precisely.

No statistically significant association was observed between gender and thumb pain ($p = 0.284$), indicating that exposure intensity rather than sex-based biological differences may play a more prominent role in this cohort. While some occupational musculoskeletal studies have reported sex-related variations in symptom reporting, findings in physiotherapy populations have been inconsistent (5). The absence of a gender effect in the present study may reflect comparable clinical workloads between male and female physiotherapists within tertiary care settings. Nevertheless, larger stratified analyses would be valuable to further

examine potential interaction effects between gender, hand dominance, and workload intensity.

Several methodological strengths enhance the interpretability of these findings. The study employed predefined operational definitions for exposure and outcome variables, utilized a validated pain assessment instrument (12), and reported prevalence with confidence intervals, thereby improving statistical transparency. The inclusion of multiple tertiary institutions increases contextual representativeness within urban Lahore. However, certain limitations must be acknowledged. The cross-sectional design restricts causal inference and does not permit temporal assessment of exposure preceding symptom onset. The use of convenience sampling may introduce selection bias, although recruitment across multiple institutions mitigates single-center effects. Self-reported pain measures may be subject to recall or reporting bias; however, standardized administration procedures were implemented to reduce information bias. Additionally, the study did not include objective clinical examination or imaging to confirm structural pathology, and potential ergonomic variables such as hand technique modification or assistive device use were not quantified.

From an occupational health perspective, the findings underscore the need for preventive interventions targeting cumulative thumb loading. Ergonomic education, joint-protection strategies, structured rest intervals, and strengthening protocols for intrinsic and extrinsic thumb musculature may reduce mechanical stress and mitigate symptom progression (4,6). Institutional policies promoting workload rotation and technique variation could also help distribute biomechanical demands more evenly across upper limb structures. Given the demonstrated exposure–response gradient, targeted risk reduction strategies for clinicians with high manual therapy workloads appear particularly justified.

In summary, the present study provides robust local epidemiological evidence that current work-related thumb pain is highly prevalent among physiotherapists performing manual therapy in Lahore, with a significant dose–response association between workload intensity and symptom occurrence, and a marked predominance of dominant-thumb involvement. These findings align with international literature while addressing a previously underexplored population context. Future longitudinal studies incorporating ergonomic assessments and functional outcome measures are warranted to further elucidate causal pathways and to evaluate the effectiveness of preventive strategies in reducing occupational thumb morbidity.

CONCLUSION

This study demonstrates that current work-related thumb pain is highly prevalent among physiotherapists performing manual therapy in tertiary care settings in Lahore, affecting 76.0% of practitioners, with more than half experiencing moderate pain and over one-fifth reporting severe intensity symptoms. A statistically significant dose–response relationship was observed between the proportion of working time spent performing manual therapy and the likelihood of thumb pain, with clinicians in the highest exposure category exhibiting more than threefold increased odds compared to those with lower exposure. Dominant-thumb involvement was markedly predominant, reinforcing the occupational biomechanical basis of the condition. These findings establish thumb pain as a substantial occupational health concern within this professional group and underscore the need for structured ergonomic training, workload regulation, and preventive musculoskeletal strategies to preserve clinician well-being and sustain long-term clinical performance...

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DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: ID; Design: MNT; Data Collection: ID; Analysis: MNT; Drafting: ID, MNT

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