Prevalence of Thumb Pain Among Weavers of Multan

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LINK MEDICAL INTERFACE

Ayesha Waris[1], Muhammad Arif[2], Bishama Shafaat[3]

Correspondence
Bishama Shafaat
bishamashafaatdpt@gmail.com
Affiliations
1 Combined Military Hospital (CMH), Multan, Pakistan
2 Government College University Faisalabad, Layyah Campus, Layyah, Pakistan
3 University of Lahore, Lahore, Pakistan

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ABSTRACT

Background: Thumb pain is a common occupational health issue among weavers, often resulting from repetitive movements and prolonged working hours. This condition impacts productivity and quality of life, highlighting the need for focused research.

Objective: To determine the prevalence of thumb pain among weavers in Multan and identify associated factors.

Methods: A cross-sectional study was conducted in two weaving hubs of Multan: Ansar Colony and Shareefpura. A total of 217 weavers (171 females, 46 males) aged 20-40 years with at least one year of experience participated. Data were collected using a self-structured questionnaire, the Visual Analog Scale (VAS) for pain intensity, and the Finkelstein test for tendon inflammation. SPSS version 27 was used for statistical analysis, and significance was set at $p<0.05$.

Results: The prevalence of thumb pain was 55.3% (n=120). Positive Finkelstein test results were observed in 46.5% (n=101). Pain distribution included 35.9% (n=78) with right thumb pain, 11.5% (n=25) with left thumb pain, and 7.8% (n=17) with bilateral pain. Moderate pain (VAS 4-7) was reported by 35.02% (n=76) of participants, with a significant association between prolonged working hours and pain intensity ($p<0.05$).

Conclusion: Thumb pain prevalence among weavers is high, particularly among females and those working long hours, necessitating ergonomic interventions and healthcare strategies.

INTRODUCTION

The thumb joint is a biconcave saddle joint formed by the metacarpal of the thumb and the trapezium bone. This trapezium-metacarpal joint is inherently unstable, but its strong surrounding structures provide it with a wide range of motion and stability (1). The thumb joint enables movement in all axes and planes (2). It consists of three basic joints: the interphalangeal joint, the metacarpophalangeal joint, and the carpometacarpal joint. The interphalangeal joint is located at the fingertip, just before the nail bed, with stability provided by the radial and ulnar collateral ligaments during pinching movements (3). The metacarpophalangeal joint, situated between the metacarpals and phalanges, plays a crucial role in bending, extending, and power gripping. Its stability during pinching activities is also provided by the ulnar collateral ligament (4). Lastly, the carpometacarpal joint, formed between the metacarpals and carpals, facilitates movements such as flexion, extension, abduction, adduction, circumduction, and opposition, with muscles like the abductor pollicis longus and adductor longus assisting in abduction and adduction (5).

The thumb receives its blood supply primarily from digital arteries, including the radial and ulnar arteries, which originate from the princeps pollicis artery. The dorsal arteries, although variable in number, arise from the first dorsal metacarpal artery (6). Due to its frequent use, the thumb joint is highly susceptible to pain and injury caused by compressive loads, overuse, muscle weakness or hypertrophy, infrequent rest, and prolonged work hours (7). If left untreated, thumb pain may progress to chronic conditions (8).

Environmental and genetic factors contribute to thumb pain. The World Health Organization (WHO) classifies work-related disorders as conditions triggered by repetitive movements or overuse, with or without underlying causes (9). Such disorders adversely affect society by reducing labor force participation, lowering health status, and increasing absenteeism (10). Although physical therapists are aware of the risks of repetitive motions, the nature of their work demands increases their susceptibility to musculoskeletal disorders. Techniques such as trigger or tender point release, massage therapy, acupuncture, chiropractic adjustments, and mobilization and manipulation techniques place stress on the distal thumb (11, 12).

Prolonged smartphone use has also been implicated in thumb pain, especially among adolescents and office workers. The repetitive and unnatural positioning of the thumb during prolonged phone use strains soft tissues and joints, potentially leading to pain, loss of function, and reduced range of motion (13). Adolescents who engage excessively in gaming or texting are particularly vulnerable to thumb pain and carpometacarpal joint subluxation (14).

Osteoarthritis (OA) is another significant cause of thumb pain, particularly in older adults and females. OA,

characterized by the degeneration of joint structures, affects various joints, including the thumb's carpometacarpal joint, which is frequently involved (15). Risk factors such as radial subluxation, high body mass index, and Ehlers-Danlos syndrome further contribute to OA (16). Treatment for thumb OA includes non-surgical options like splinting and physiotherapy or surgical approaches like carpometacarpal joint arthrodesis (17). If left untreated, OA may lead to osteophyte formation, restricting joint movement and causing deformities (18).

Weavers, who engage in repetitive hand movements for prolonged hours without breaks, are at high risk of thumb pain due to the resulting strain and inflammation of connective tissues (19). Addressing the health needs of this occupational group is critical for sustaining their craft and productivity. Interventions such as rest intervals, splinting, and appropriate medical treatments can help manage pain and inflammation (20). This study aims to investigate the prevalence of thumb pain among weavers in Multan and provide insights to inform preventive and therapeutic strategies.

MATERIALS AND METHODS

This study employed a cross-sectional observational analytical design to investigate the prevalence of thumb pain among weavers in Multan. Data were collected from two primary weaving areas, Ansar Colony and Shareefpura, where a total of 217 weavers participated in the study. The sample was selected using a non-probability convenient sampling technique, focusing on individuals aged between 20 and 40 years with at least one year of weaving experience. Exclusion criteria included weavers with pre-existing musculoskeletal, neurological, or systemic disorders, as well as those with recent injuries, pregnant females, and individuals diagnosed with gamekeeper's thumb (1).

The data collection tools consisted of a self-structured questionnaire, the Visual Analog Scale (VAS), and the Finkelstein test. The questionnaire was designed to gather demographic and occupational information, while the VAS was utilized to measure pain intensity on a scale from 0 to 10, where 0 indicated no pain and 10 represented the worst imaginable pain. The Finkelstein test was performed to detect inflammation in the tendons of the thumb (2).

Ethical considerations were upheld throughout the study, adhering to the principles outlined in the Declaration of Helsinki. Verbal and written informed consent was obtained from all participants before their inclusion in the study, and confidentiality of the data was maintained (3).

The data were analyzed using SPSS version 27. Descriptive statistics were calculated to summarize the demographic characteristics, pain prevalence, and occupational details of the participants. The relationship between working hours and pain intensity was assessed using inferential statistical tests, with a significance level set at $p<0.05$ (4). These methods provided a comprehensive understanding of the prevalence and associated factors of thumb pain among the weavers in the selected areas of Multan.

RESULTS

The study enrolled 217 participants, with a majority being female (79.2%, n=171) and the remaining male (20.8%, n=46), as shown in Table 1. The average age of participants was 28.25 ± 4.56 years. Most participants worked either full-time (53.5%, n=116) or part-time (36.4%, n=79), while a smaller proportion were casual or seasonal workers (10.1%, n=22). Regarding daily working hours, the highest proportion of participants worked 10-12 hours (29.0%, n=63), followed by 4-6 hours (28.1%, n=61), 6-8 hours (24.4%, n=53), and 8-10 hours (18.4%, n=40) (Table 1).

The prevalence of thumb pain was 55.3% (n=120), indicating a significant occupational health burden among weavers. Positive results for the Finkelstein test, which identifies tendon inflammation, were observed in 46.5% (n=101) of participants (Table 2). Pain distribution revealed that 35.9% (n=78) experienced right thumb pain, 11.5% (n=25) experienced left thumb pain, and 7.8% (n=17) reported bilateral pain, while 44.7% (n=97) reported no pain. Pain intensity, measured using the Visual Analog Scale (VAS), revealed that 35.02% (n=76) experienced moderate pain (VAS score 4-7), while 7.37% (n=16) reported mild pain (VAS score 1-3), and 4.15% (n=9) reported severe pain (VAS score 8-10) (Table 2).

Table 1: Characteristics of Study Participants

Characteristics	Categories	Frequency (n=217)
Age (Mean ± SD)		28.25 ± 4.56 years
Gender	Female	171 (79.2%)
	Male	46 (20.8%)
Working Hours	4-6 hours	61 (28.1%)
	6-8 hours	53 (24.4%)
	8-10 hours	40 (18.4%)
	10-12 hours	63 (29.0%)
Employment Type	Full-time	116 (53.5%)
	Part-time	79 (36.4%)
	Casual/Seasonal	22 (10.1%)

The results underscore the high prevalence of thumb pain among weavers, particularly among females, full-time workers, and those working longer hours. These findings are consistent across both tabulated data (Table 1 and Table 2) and visual representation (Figure 1), providing a clear and detailed understanding of the occupational health challenges faced by this population.

Figure 1 presents a radial bar chart summarizing key findings from the study, illustrating the distribution of demographic and occupational characteristics, thumb pain prevalence, and pain intensity.

Table 2: Prevalence of Thumb Pain and Test Results

Variable	Categories	Frequency (n=217)
Reported Thumb Pain	Yes	120 (55.3%)
	No	97 (44.7%)
Finkelstein Test	Positive	101 (46.5%)
	Negative	116 (53.5%)
Pain Distribution	Right Thumb	78 (35.9%)
	Left Thumb	25 (11.5%)
	Both Thumbs	17 (7.8%)
	No Pain	97 (44.7%)

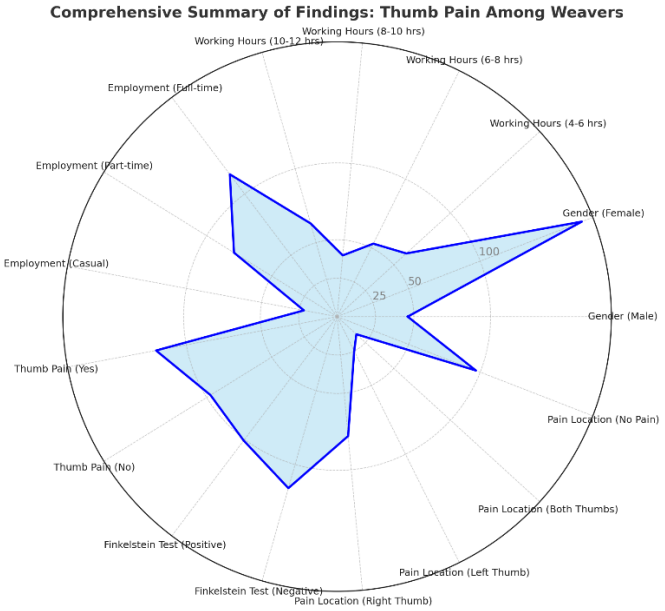

Figure 1 Thumb Pain among Weavers

The graph highlights the dominance of female participants, the prevalence of thumb pain among full-time workers and those with extended working hours (10-12 hours daily), and the significant association between prolonged working hours and pain intensity. The visual representation provides an intuitive overview, emphasizing the occupational burden of thumb pain among weavers in Multan.

DISCUSSION

The study revealed a significant prevalence of thumb pain among weavers in Multan, underscoring the occupational burden associated with repetitive manual tasks. Among the participants, more than half reported experiencing thumb pain, with the right thumb being the most affected. This finding aligns with previous studies that highlighted the susceptibility of the thumb joint to overuse injuries due to its anatomical structure and frequent involvement in repetitive tasks (1, 2). The Finkelstein test results further supported these observations, with nearly half of the participants showing positive outcomes indicative of tendon inflammation. This pattern has been consistently reported in other occupational studies, where prolonged and repetitive thumb use was associated with musculoskeletal strain and inflammation (3).

Female weavers demonstrated a higher prevalence of thumb pain compared to their male counterparts, reflecting findings from prior research that indicated gender differences in susceptibility to musculoskeletal disorders (4). These differences may stem from variations in hand anatomy, hormonal influences, or occupational roles that demand repetitive precision tasks more commonly assigned to females in this context (5). The association between long working hours and higher pain intensity was statistically significant, corroborating earlier studies that identified prolonged work durations as a critical risk factor for work-related musculoskeletal disorders (6).

The study's strengths included the use of validated assessment tools, such as the Visual Analog Scale and the Finkelstein test, which provided objective measures of pain and inflammation. Additionally, the focus on a specific occupational group allowed for a targeted analysis of thumb pain prevalence and contributing factors. However, there were notable limitations, including the restricted geographical scope of data collection, which was confined to two areas in Multan. This limited generalizability of the findings to other weaving communities. Furthermore, the study did not account for ergonomic factors such as workstation setup or weaving techniques, which could significantly influence pain prevalence and severity. The unequal gender distribution among participants also posed challenges in achieving balanced comparisons.

Recommendations for future research include expanding the study to encompass a larger and more diverse sample across different regions to enhance generalizability. Incorporating ergonomic assessments and evaluating the impact of workplace interventions, such as periodic rest breaks and ergonomic tool designs, could provide actionable insights for reducing thumb pain among weavers. Future studies should also consider longitudinal designs to explore the progression of thumb pain and its long-term impact on occupational performance and quality of life.

CONCLUSION

This study contributed valuable data on the occupational health challenges faced by weavers, emphasizing the need for preventive strategies and healthcare interventions tailored to this vulnerable population. Addressing these issues is critical not only for improving individual health

outcomes but also for preserving the economic viability of the weaving industry, which relies heavily on skilled manual labor. The findings highlighted the importance of integrating occupational health measures into workplace policies to mitigate the risk of thumb pain and related musculoskeletal disorders.

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