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PREVALENCE OF LATERAL EPICONDYLITIS AMONG RESIDENTIAL PAINTERS IN PESHAWAR

Original Research

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ABSTRACT

Background: Lateral epicondylitis (LE), commonly known as tennis elbow, is an overuse injury caused by eccentric overload of the common extensor tendon, particularly at the origin of the extensor carpi radialis brevis (ECRB). It frequently affects individuals engaged in repetitive manual labor and is prevalent among both males and females, typically involving the dominant arm. Despite extensive research across various professions, little is known about its prevalence among residential painters, a group prone to repetitive upper limb movements. This study aims to determine the prevalence of lateral epicondylitis in residential painters in Peshawar.

Objective: To determine the prevalence of lateral epicondylitis among residential painters and assess its impact on daily activities using clinical and functional assessments.

Methods: A cross-sectional study was conducted in Peshawar, including 184 male residential painters aged 21–45 years. Participants were selected through non-probability convenient sampling, with a confidence interval of 95% and a margin of error of 5%, calculated using Raosoft software. Data collection involved a customized questionnaire capturing demographic and occupational information, the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire for pain and disability assessment, and the Cozen test for clinical diagnosis. Informed consent was obtained from all participants, and ethical approval was granted by the relevant institutional review board.

Results: The mean age of participants was 32.9 years (SD = 8.5), with the largest age groups being 21–25 (29.9%) and 41–45 (33.2%). A positive Cozen test result was observed in 54.3% of participants, indicating a high prevalence of lateral epicondylitis. PRTEE scores revealed that 38.1% experienced moderate pain, 34.2% severe pain, and 27.7% mild pain, with a mean score of 54.41. A significant positive correlation ($r = 0.672$, $p < 0.001$) was found between Cozen test results and PRTEE scores, confirming the consistency between clinical diagnosis and self-reported disability.

Conclusion: The findings reveal a high prevalence of lateral epicondylitis among residential painters, with both younger and older age groups affected. The strong correlation between Cozen test results and PRTEE scores highlights the condition's impact on daily activities and occupational performance. These results emphasize the need for preventive strategies, including ergonomic interventions and awareness programs.

Keywords: Cozen's test, Epicondylitis, Ergonomics, Extensor carpi radialis brevis, Occupational health, Pain measurement, Tennis elbow.

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INTRODUCTION

Lateral epicondylitis, commonly referred to as "tennis elbow," is a musculoskeletal condition characterized by pain on the lateral aspect of the elbow, often radiating toward the forearm. Initially associated with tennis players, this condition has increasingly been recognized among individuals engaged in repetitive wrist extension and gripping activities, including drivers, plumbers, woodworkers, and notably, painters (1). Despite its name, tennis elbow affects a broader demographic, with prevalence rates ranging from 1% to 3% in the general population, highlighting the need for further research to enhance treatment efficacy and reduce associated healthcare costs (2). Various international studies have reported prevalence rates between 2% and 14.5% among workers engaged in occupations involving repetitive strain (3). The condition affects men and women equally, with a higher occurrence typically observed in individuals in their 40s and 50s. Data also suggest that the dominant arm is more susceptible, and approximately 5% to 10% of patients undergoing surgical interventions experience complications or suboptimal outcomes (4). A range of risk factors has been associated with lateral epicondylitis, including underlying conditions such as rotator cuff pathology, De Quervain's disease, carpal tunnel syndrome, rheumatoid arthritis, and systemic factors like obesity, smoking, and corticosteroid use (5). Additionally, metabolic disorders, including dyslipidemia, hypertension, and hyperglycemia, have been implicated in tendinopathy development, underscoring a complex interplay between systemic health and localized musculoskeletal strain (5). Occupational risks are particularly significant for individuals involved in repetitive, forceful movements or those who maintain awkward postures for extended periods (3). While mechanical load factors are well-documented contributors, the psychological and emotional aspects of work environments remain underexplored and warrant further investigation (3).

The symptoms of lateral epicondylitis significantly impair daily functioning. Pain originating from the lateral elbow can extend to the forearm, diminishing grip strength and complicating seemingly simple tasks such as holding a cup or shaking hands (6). This decline in hand function not only impacts activities of daily living but also leads to decreased productivity in occupational and athletic contexts (6). Diagnosing lateral epicondylitis typically relies on a combination of physical examination and patient history. However, other conditions, such as radial tunnel syndrome, posterior interosseous nerve entrapment, and radiocapitellar arthrosis, may mimic or coexist with this condition, complicating the diagnostic process (7,8). Treatment strategies for lateral epicondylitis vary based on severity and chronicity. Initial management often involves rest and immobilization, while persistent cases may benefit from interventions such as soft tissue massage, nonsteroidal anti-inflammatory drug (NSAID) phonophoresis, and electrical stimulation (9,10). Innovative therapies, including platelet-rich plasma (PRP) injections and stem cell treatments, have shown promise in facilitating tendon healing by promoting tissue regeneration through the action of growth factors (9). Orthotic devices, such as counterforce braces and wrist splints, are frequently recommended to reduce strain on affected tendons (8). Despite advancements in treatment modalities, current evidence suggests that many commonly used interventions provide limited long-term benefits, necessitating a more evidence-based approach to management (11). Given the physical demands of occupations like painting—where repetitive upper limb movements and sustained postures are routine—residential painters may be particularly susceptible to developing lateral epicondylitis. While studies have explored this condition in various manual labor professions, there is a notable gap in research specifically focused on painters, particularly within the context of domestic settings (12). This study seeks to address this gap by investigating the prevalence of lateral epicondylitis among residential painters in Peshawar. Furthermore, it aims to identify occupation-related factors contributing to the development of the condition and to compare its occurrence with other professions that require similar physical activities, such as fine arts (13). The objective of this research is to provide insights into occupational health risks associated with residential painting and inform evidence-based interventions to mitigate these risks in vulnerable populations.

METHODS

A cross-sectional study was conducted in Peshawar to determine the prevalence of lateral epicondylitis among residential painters. The study utilized a customized questionnaire, the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire, and Cozen's test for data collection. A total of 184 participants, aged between 21 and 45 years, were recruited using a non-probability convenient sampling method. The sample size was determined using the Raosoft calculator, ensuring a confidence interval of 95% and a margin of error of 5%. Participants were included if they met specific inclusion criteria, such as being actively employed as residential painters and providing written or verbal consent to participate in the study. Exclusion criteria included individuals with a prior diagnosis of systemic

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musculoskeletal conditions or those with a history of upper limb surgery (14). Data collection was carried out using a structured questionnaire that gathered demographic information and work-related history, while the PRTEE questionnaire was employed to assess pain and functional limitations associated with lateral epicondylitis. The Cozen's test, also known as the resisted wrist extension test, was used to clinically diagnose lateral epicondylitis. During this test, participants were instructed to pronate their forearm, extend the elbow, and resist wrist extension against applied force. Pain over the lateral epicondyle during this maneuver was considered a positive result, indicative of lateral epicondylitis (15).

Informed consent was obtained from all participants, ensuring that confidentiality and anonymity were maintained throughout the research process. The study adhered to ethical guidelines concerning voluntary participation and the protection of personal data (16). Statistical analysis was performed to determine the prevalence of lateral epicondylitis among the participants. The results aimed to highlight occupational health concerns specific to residential painters, providing valuable insights for developing preventive measures. These measures could contribute to enhanced productivity, reduced absenteeism, and overall improvements in the quality of life for this occupational group. The study also intended to offer evidence-based recommendations for occupational health policies, workplace ergonomics, and targeted interventions to promote the well-being and job satisfaction of painters (17).

Ethical approval for this study was obtained from the relevant institutional review board, with approval reference number. Written informed consent was obtained from all participants to ensure ethical compliance and the protection of participants' rights, replacing the previously considered verbal consent for greater clarity and legal validity. Inclusion criteria involved actively employed residential painters aged 21–45 years with no prior history of systemic musculoskeletal disorders or upper limb surgery, while exclusion criteria involved individuals with pre-existing upper limb conditions unrelated to occupational exposure. Data analysis was performed using statistical tests, including chi-square tests for categorical variables and Pearson's correlation for assessing relationships between PRTEE scores and Cozen test results, ensuring a comprehensive evaluation of the associations between occupational factors and lateral epicondylitis prevalence.

RESULTS

The study evaluated 184 male residential painters aged between 21 and 45 years to determine the prevalence of lateral epicondylitis and its impact on daily activities. The mean age of participants was 32.9 years, with a standard deviation of 8.5. The highest proportion of participants (33.2%) fell within the 41–45 age group, followed by 29.9% in the 21–25 age group. The age distribution indicated a broad representation of working-age painters, with the oldest group showing a higher frequency of the condition. The Cozen test results revealed that 54.3% of participants tested positive for lateral epicondylitis, suggesting a notably high prevalence of the condition among residential painters. The highest number of positive Cozen test results was observed in the 41–45 age category, indicating that older painters were more susceptible to developing lateral epicondylitis. Conversely, the 21–25 age group had the highest number of negative test results, suggesting a lower prevalence of the condition among younger painters.

Pain severity and disability levels were assessed using the PRTEE scoring system. Approximately 27.7% of participants exhibited mild symptoms (scores 1–33), 38.1% showed moderate symptoms (scores 34–66), and 34.2% experienced severe symptoms (scores 67–100). These results highlighted a significant proportion of participants experiencing moderate to severe functional limitations and pain related to lateral epicondylitis. Analysis of predominant symptoms revealed that tenderness was the most frequently reported symptom, affecting 35.8% of participants, followed by pain in 20.7%, and limited movement in 12.5%. Notably, 31% of participants reported no symptoms, which could indicate either an early stage of the condition or the absence of clinical manifestation despite occupational risk.

Regarding the duration of painting work, 32% of participants reported working for three hours daily, 31% for five hours, and 37% for more than five hours. Longer working hours were associated with a higher prevalence of lateral epicondylitis, supporting the hypothesis that repetitive strain and prolonged exposure contribute to the condition's development. A strong and statistically significant positive correlation (Pearson correlation coefficient: 0.672, p-value < 0.001) was observed between PRTEE scores and Cozen test results. This finding suggests that participants who tested positive on the Cozen test also had higher PRTEE scores, indicating greater levels of pain and disability. The strength of this correlation highlights the reliability of using both tests in tandem for diagnosing and assessing the severity of lateral epicondylitis. Cross-tabulation between age categories and Cozen test results further demonstrated that older participants, particularly those aged 41–45, were more prone to developing lateral epicondylitis. This trend aligns with existing evidence suggesting that cumulative exposure to repetitive manual labor increases the risk of developing musculoskeletal disorders over time.

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Table 1: Age categories

Age	Frequency	Percent
21 to 25	55	29.9
26 to 30	30	16.3
31 to 35	28	15.2
36 to 40	10	5.4
41 to 45	61	33.2
Age Mean & SD	32.9	8.5

Table 2: PRTEE Scoring Frequency

PRTEE Scoring		Frequency	Percent
Mild Moderate Severe	1 to 33	51	27.7
	34 to 66	70	38.1
	67 to 100	63	34.2

Table 3: Predominant symptoms

Predominant Symptoms	Frequency	Percent
Pain	38	20.7
Tenderness	66	35.8
limited movement	23	12.5
None	57	31.0
Total	184	100.0

Table 4: Duration of Painting

Duration of Painting	Frequency	Percent
3 hours	59	32
5 hours	57	31
more than 5 hours	68	37
Total	184	100.0

Table 5: Correlation between PRTEE and Cozen test

Correlations Tests		PRTEE Scoring	Cozen test
PRTEEscoring	Pearson Correlation	1	.672**
	Sig. (2-tailed)		< 0.001
	N	184	184
cozen test	Pearson Correlation	.672**	1
	Sig. (2-tailed)	< 0.001	
	N	184	184

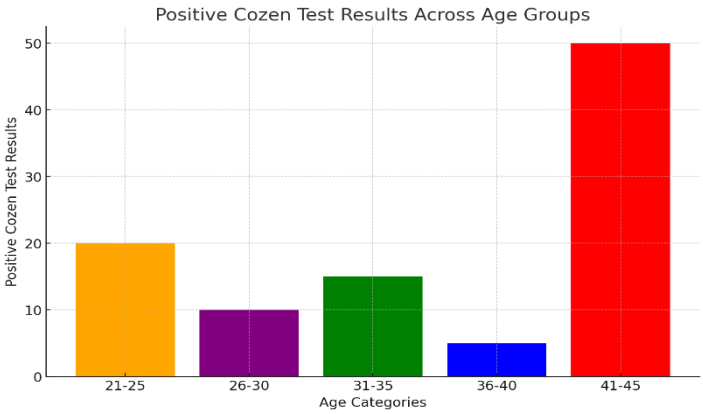

Figure 2 Positive Cozen Test Result Across Age Group

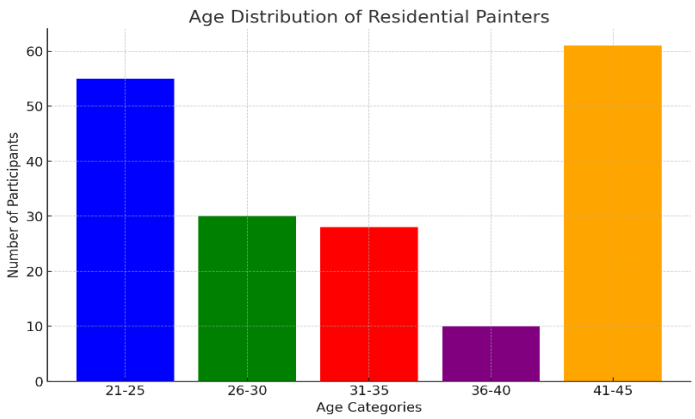

Figure 1 Age Distribution of Residential Painters

DISCUSSION

This study highlights the significant prevalence of lateral epicondylitis (LE) among residential painters, emphasizing the occupational hazards associated with repetitive upper limb movements and prolonged physical exertion. The results revealed that 54.3% of the participants tested positive for lateral epicondylitis through the Cozen test, a finding that underscores the high risk faced by this occupational group. The strong positive correlation observed between the Cozen test results and PRTEE scores (Pearson correlation coefficient: 0.672, p-value < 0.001) further validates the substantial impact of lateral epicondylitis on daily living activities and functional limitations among residential painters (18). The association between age and the prevalence of LE was particularly notable, with painters aged 41–45 years demonstrating the highest rate of positive Cozen test results. This finding aligns with previous research that identified older workers, especially those engaged in repetitive physical tasks, as being more susceptible to developing musculoskeletal disorders. This age-related increase in prevalence could be attributed to cumulative exposure to repetitive strain and age-related degenerative changes in tendinous tissues. Conversely, younger participants, particularly those aged 21–25, exhibited fewer positive Cozen test results, which could be linked to shorter occupational exposure and greater physiological resilience (19).

When compared with similar occupational studies, the prevalence rate observed in this study is higher than that reported in research conducted among art students, which found a 48.59% incidence of lateral epicondylitis. The higher prevalence among residential painters may be attributed to longer working hours, repetitive movements, and the physically demanding nature of residential painting compared to fine arts activities. This reinforces the hypothesis that both the intensity and duration of exposure play critical roles in the development of lateral epicondylitis (20). The observed correlation between the Cozen test and PRTEE scores supports the utility of combining both diagnostic tools for a comprehensive assessment of lateral epicondylitis. This approach enables a more accurate evaluation of the condition's impact on functional capacity, particularly in occupational settings involving repetitive upper limb strain. Similar trends were observed in studies examining other professions, such as chefs and manual laborers, where repetitive upper limb movements contributed significantly to the development of LE. These findings suggest that lateral epicondylitis is a widespread occupational health issue across various professions characterized by repetitive tasks (14,17).

The study’s strengths lie in its targeted focus on a high-risk occupational group, comprehensive assessment tools, and the inclusion of both clinical and functional measures to assess lateral epicondylitis. However, certain limitations must be acknowledged. The cross-sectional design restricts the ability to establish causality, and the reliance on a non-probability sampling method may limit the generalizability of the findings. Additionally, the exclusion of female participants and the absence of data on factors such as years of professional experience, ergonomic practices, or pre-existing musculoskeletal conditions could have influenced the results. Future studies should aim to incorporate a more diverse sample and employ longitudinal designs to establish causative relationships between occupational exposure and the development of lateral epicondylitis (8,12). Despite these limitations, the findings of this study underscore the importance of preventive strategies to mitigate the risk of lateral epicondylitis among residential painters. Workplace interventions, such as ergonomic training, proper rest breaks, and targeted exercise programs, may help reduce the incidence and severity of this condition. Special attention should be given to older workers, who appear to be at greater risk. Future research should explore the effectiveness of these interventions and further investigate the role of non-occupational factors that may contribute to the development of lateral epicondylitis in this population.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

CONCLUSION

This study highlights the significant prevalence of lateral epicondylitis among residential painters in Peshawar, particularly affecting those in the older age group. The strong association between clinical test results and symptom severity underscores the reliability of diagnostic tools like the Cozen test and PRTEE scores in assessing the condition. These findings emphasize the need for proactive preventive measures to address the occupational risks linked to repetitive tasks and sustained postures inherent in painting. Implementing ergonomic interventions, promoting regular breaks, and providing educational programs on safe work practices are essential strategies to reduce the risk and severity of lateral epicondylitis, ultimately improving the overall health and productivity of residential painters.

AUTHOR CONTRIBUTIONS

Author	Contribution
Saad Ur Rehman*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Nazish Raza*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Muhammad Danyal Gul Qureshi*	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Ahmad Zia*	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Akhtar Amin	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Muhammad Atif	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published

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