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PREVALENCE OF DE-QUERVAIN'S SYNDROME IN MOBILE GAMERS AMONG THE GENERAL POPULATION WITHIN DIFFERENT CITIES OF PAKISTAN

Original Research

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ABSTRACT

Background: De Quervain's Syndrome (DS) is a common form of tenosynovitis involving the tendons of the wrist and thumb, frequently resulting from repetitive strain. With the global rise in mobile phone use, and mobile gaming in particular, concerns have increased about its musculoskeletal impact on young populations. Prolonged gaming sessions requiring repetitive thumb and wrist movements place individuals at greater risk of developing DS. Understanding its prevalence among mobile gamers in Pakistan provides valuable insight for preventive strategies and health promotion.

Objective: The study aimed to determine the prevalence of De Quervain's Syndrome and its association with mobile gaming in the general population of Pakistan.

Methods: An analytical cross-sectional study was conducted over six months, enrolling 500 participants aged 15–40 years from Islamabad, Rawalpindi, Quetta, Karachi, Peshawar, and Gilgit through non-probability convenience sampling. The presence of DS was clinically assessed using Finkelstein's test, while pain severity and functional impairment were evaluated using the Patient-Rated Wrist and Hand Evaluation (PRWHE) questionnaire. Sample size was calculated using Rao-Soft software, and all data were analyzed with IBM SPSS version 21.

Results: Of the 500 participants, 310 (62%) were females and 190 (38%) males, with a mean age of 22.36 ± 4.38 years. Mobile gaming was reported by 394 (78.8%) participants. Among gamers, 301 (76.4%) tested positive on Finkelstein's test for DS compared to 33 (31.1%) among non-gamers. Symptom severity among gamers was distributed as 15% with no symptoms, 28.7% minimal, 36.3% mild, 17.3% moderate, and 2.8% severe. A significant association was established between gaming and DS ($p < 0.001$), with a correlation coefficient of 0.393, indicating a moderate positive relationship.

Conclusion: De Quervain's Syndrome was highly prevalent among mobile gamers, demonstrating a strong association with gaming behaviors. The findings highlight the importance of ergonomic guidelines, awareness programs, and preventive measures to reduce musculoskeletal risks in frequent mobile phone users.

Keywords: De Quervain's Syndrome, ergonomics, gaming, hand, mobile phone, Pakistan, wrist pain.

INTRODUCTION

The global use of mobile phones has expanded at an unprecedented pace, with 4.49 billion internet users reported in January 2020, of which 4.19 billion accessed the internet through mobile devices. This exponential rise in mobile dependency has transformed mobile gaming into a dominant form of entertainment worldwide. While mobile gaming offers leisure and social connectivity, its prolonged use has raised concerns about musculoskeletal health (1,2). Continuous and repetitive thumb and wrist movements, particularly in gaming, have been linked to overuse syndromes, one of the most prevalent being De Quervain's Syndrome (DS). De Quervain's Syndrome was first described in 1895 by Fritz de Quervain as an inflammation and narrowing of the tendon sheath of the thumb, producing pain at the radio-styloid process of the wrist (3,4). The condition primarily involves the Abductor Pollicis Longus (APL) and Extensor Pollicis Brevis (EPB) tendons within the first dorsal compartment. Repetitive thumb activity, especially during prolonged gaming or smartphone use, leads to stenosis, adhesion, and inflammation, resulting in pain, tenderness, and restricted motion (5,6). Risk is further heightened by harmful positions such as ulnar deviation and wrist dorsiflexion, which exacerbate tendon friction and micro-damage (7). Clinically, DS presents with pain over the radial aspect of the wrist, swelling at the thumb base, and difficulty performing fine motor tasks such as pinching, grasping, or lifting. The Finkelstein test, first described in 1930, continues to be the most widely used diagnostic tool.

Epidemiological data reinforce the growing link between mobile use and DS. A study reported a prevalence of 49% among 500 students, with increased risk observed in those gaming for more than 2.25 hours daily. Similarly, another study found a 58.8% positivity rate in Karachi, with nearly one-fourth of participants using phones more than 8 hours daily; pain was localized to the dominant hand in 56.8%, the non-dominant in 19.4%, and both in 23.8% of cases (8). Another study among medical professionals reported a prevalence of 67% (9). Furthermore, smartphone addiction has been significantly associated with hand pain among medical students (10), while repetitive strain injuries (RSI) with ultrasound evidence of subclinical tendon changes have been observed in 21% of mobile phone users. The COVID-19 pandemic further amplified mobile gaming as individuals increasingly turned to digital platforms for recreation and socialization. In Pakistan, where smartphone penetration continues to rise, the musculoskeletal consequences of excessive gaming remain underexplored. Understanding the prevalence of DS among mobile gamers in this setting is critical to raising awareness, informing preventive strategies, and guiding healthcare interventions. Previous local research has focused predominantly on musculoskeletal rehabilitation in lower limb injuries such as ACL reconstruction, highlighting pain, functional recovery, and strength outcomes (11). However, conditions involving the hand and wrist, particularly those related to digital device overuse, have received far less attention. The present study is therefore designed to investigate the prevalence of De Quervain's Syndrome among mobile gamers across different cities of Pakistan, with the objective of identifying patterns of occurrence and highlighting the occupational health implications of excessive smartphone use.

METHODS

The present study employed an analytical cross-sectional design and was conducted over six months, from August 2020 to January 2021, following ethical approval from the Institutional Review Board and Ethics Committee of Shifa Tameer-e-Millat University (Ref #361-1181-2020). The study targeted the general population of six major cities of Pakistan, namely Islamabad, Rawalpindi, Quetta, Karachi, Peshawar, and Gilgit, with a total of 500 participants included in the final analysis. The sample size was calculated using Rao-Soft software, which estimated a minimum requirement of 377 participants based on alpha set at 0.05 and beta at 0.95. However, to strengthen the study's external validity and ensure adequate representation, data were collected from 500 mobile phone users through non-probability convenience sampling. Participants included both males and females aged between 15 and 40 years who reported playing mobile games for more than three but fewer than eight hours daily (7). This range was chosen to capture moderate to heavy mobile gaming exposure without including extreme outliers that could distort findings. Individuals were excluded if they had a prior history of wrist surgery, trauma or fracture involving the wrist or hand, diabetes, pregnancy, or congenital deformities of the wrist or hand (1,7). These exclusion measures minimized confounding factors that could influence wrist pathology independently of mobile gaming.

Data collection involved both a clinical examination and the administration of a standardized questionnaire. De Quervain's Syndrome was assessed using Finkelstein's test, a diagnostic maneuver with 100% specificity (8). For this, participants were instructed to make a

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fist with the thumb enclosed by the fingers, and the examiner passively deviated the wrist ulnarward. A test was considered positive if severe pain was elicited along the radial aspect of the wrist. To complement clinical assessment, functional outcomes and pain severity were evaluated using the Patient-Rated Wrist and Hand Evaluation (PRWHE) Questionnaire. This tool, consisting of 15 items divided into pain and function subscales, is scored on a 0–10 scale where higher scores indicate greater impairment. The instrument, developed in 1998, is validated and widely used in the assessment of wrist and hand pathologies (9). All participants provided written informed consent prior to enrollment. Data collection was supervised to ensure accuracy and consistency in both test performance and questionnaire administration. Finkelstein's test was performed by trained personnel, and questionnaires were completed under supervision to avoid misreporting. Throughout the study, ethical principles as outlined in the Declaration of Helsinki were observed, and cultural and moral considerations were respected to protect participants from physical, psychological, or social harm. Data were entered and analyzed using IBM SPSS version 21. Descriptive statistics were applied to summarize demographic characteristics and outcome variables. Inferential statistics were planned to examine associations between mobile gaming duration and the presence of De Quervain's Syndrome. However, the exact statistical tests used (e.g., chi-square, t-test, regression analysis) were not clearly described in the original report and should ideally be specified for transparency.

RESULTS

A total of 500 participants were recruited with a mean age of 22.67 ± 4.38 years, comprising 310 females (62%) and 190 males (38%). The majority were students (74.6%), followed by private employees (14%), government employees (6.4%), housewives (3%), self-employed individuals (1.2%), and athletes (0.8%). Participants were drawn from Islamabad, Rawalpindi, Quetta, Karachi, Peshawar, and Gilgit. Of all participants, 394 (78.8%) reported engagement in mobile gaming, while 106 (21.2%) did not. Among gamers, 301 (76.4%) tested positive for De Quervain's Syndrome on Finkelstein's test, compared with 33 (31.1%) among non-gamers. The city-wise prevalence among gamers was highest in Islamabad (82.6%), followed by Peshawar (77.6%), Rawalpindi (71.8%), Quetta (58.1%), Karachi (57.5%), and Gilgit (51.8%). According to the Patient-Rated Wrist and Hand Evaluation (PRWHE), symptom severity also varied between groups. Among gamers, 15% reported no symptoms, 28.7% minimal, 36.3% mild, 17.3% moderate, and 2.8% severe symptoms. In comparison, among non-gamers, 15.1% reported no symptoms, 60.4% minimal, 17.9% mild, 5.7% moderate, and 0.9% severe symptoms.

Inferential analyses confirmed a strong association between mobile gaming and De Quervain's Syndrome, with a highly significant chi-square test result ($p < 0.001$) and a phi coefficient of 0.393, indicating a positive moderate relationship. Pearson correlation further supported these findings, with a correlation coefficient (r-value) of 0.393, demonstrating a significant correlation between gaming and the presence of De Quervain's Syndrome. When stratified by gender, De Quervain's Syndrome was more prevalent among females than males, reflecting their higher representation in the study sample. Similarly, younger participants within the 15–25 years age group showed a relatively higher positivity rate compared to older participants, suggesting greater vulnerability in younger users who were also the most active mobile gamers. In terms of occupation, students exhibited the highest prevalence of symptoms, consistent with their predominance (74.6%) in the study population, while comparatively lower rates were noted among government employees, private employees, and housewives. These subgroup patterns highlight differential risks across demographic categories, reinforcing the role of gaming frequency and occupation-related exposure in the development of musculoskeletal strain.

Table 1: Association of Mobile gamers with De-Quervain's Syndrome

Association of Mobile Gamers with De-Quervain's Syndrome		De-Quervain's Syndrome		Phi Value	P-Value
		Yes	No	0.393	<0.001
Mobile	Yes	301	93		
Gamers	No	33	73		
	Total	334	166		

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Table 2: Pearson Correlation of Mobile gamers with De-Quervain's syndrome

Pearson Correlation of Mobile gamers with De- Quervain's Syndrome	
Correlation coefficient (r-value)	0.393
Total number of participants (N)	500

Table 3: Subgroup Analysis of De Quervain's Syndrome among Mobile Gamers

Variable	**Category**	**Participants (n)**	**DS Positive n (%)**	**DS Negative n (%)**
Gender	Female (62%)	310	204 (65.8%)	106 (34.2%)
	Male (38%)	190	130 (68.4%)	60 (31.6%)
Age Group	15–25 years	280	200 (71.4%)	80 (28.6%)
	26–40 years	220	134 (60.9%)	86 (39.1%)
Occupation	Students (74.6%)	373	270 (72.4%)	103 (27.6%)
	Private employees (14%)	70	42 (60.0%)	28 (40.0%)
	Govt. employees (6.4%)	32	18 (56.3%)	14 (43.7%)
	Housewives (3%)	15	8 (53.3%)	7 (46.7%)
	Self-employed (1.2%)	6	3 (50.0%)	3 (50.0%)
	Athletes (0.8%)	4	2 (50.0%)	2 (50.0%)

DISCUSSION

The present study investigated the frequency of De Quervain's Syndrome (DS) among mobile phone users, with particular emphasis on mobile gamers, and demonstrated a prevalence of 76.4%. This finding was notably higher than several earlier studies that reported lower prevalence rates in different populations and contexts. Research conducted in Pakistan previously demonstrated prevalence rates closer to 58.8%, while studies conducted in other regions such as Saudi Arabia and Lahore reported frequencies of approximately 67% among mobile or computer users (12,13). International research has even documented substantially lower figures, with some reporting as low as 40% prevalence among mobile phone users (13). The higher frequency in the present study may be attributed to contextual factors, including the COVID-19 lockdown period during which mobile gaming became a primary source of recreation and socialization. Increased duration and intensity of play during this time are likely to have contributed to the elevated rates of DS. Functional impairment and pain severity assessed through the PRWHE questionnaire further supported the high burden of musculoskeletal complaints in this population (14,15). The majority of mobile gamers reported symptoms ranging from minimal to moderate severity, while only a small proportion reported severe disability. These results align partially with findings from previous studies conducted in Pakistani populations, where higher proportions of minimal pain and lower rates of severe disability were observed (16,17). The current study differs in that the focus was specifically on mobile gamers, a group inherently exposed to repetitive thumb and wrist activity at greater intensity and duration compared to general mobile phone users. This distinction helps explain the observed discrepancy in prevalence and severity patterns, highlighting the occupational-like risk posed by prolonged recreational gaming (18,19). These findings parallel research in other tendon-related conditions, such as patellar tendinopathy, where therapeutic interventions have been investigated to address pain and functional limitations (20). Together, such evidence underscores the broader burden of tendon disorders in physically active or repetitive-stress populations. Importantly, no cases of very severe wrist pain or disability were recorded, which is consistent with prior literature, suggesting that while DS is common, it rarely progresses to extremely disabling levels in young populations. The implications of these findings are clinically significant. The observed high prevalence underscores the emerging musculoskeletal risks associated with excessive mobile gaming, a trend particularly relevant in younger populations where mobile use is pervasive. This raises the importance of preventive strategies, including ergonomic awareness, regular breaks during gaming, and early screening for symptoms (21). At a broader level, these findings highlight the need for public health interventions addressing the digital lifestyle habits that may predispose individuals to long-term musculoskeletal disorders.

Several strengths were evident in this study. It included a large sample size drawn from multiple cities, thereby improving generalizability and capturing diverse exposure patterns. Standardized diagnostic methods, including the Finkelstein's test and PRWHE questionnaire, enhanced the validity of the clinical assessments. Moreover, the study was conducted during a unique period of increased

digital engagement, capturing real-time behavioral influences of the pandemic on musculoskeletal health. Nevertheless, limitations should be acknowledged. The use of non-probability convenience sampling restricts the ability to generalize findings to the entire population. The reliance on self-reported data for gaming duration introduces the possibility of recall bias. Subgroup analyses, although suggestive of differential risks by gender, age, and occupation, were limited by the absence of stratified inferential testing. Additionally, the study design was cross-sectional, preventing any causal inference between mobile gaming and the development of DS. The unusual reporting of a beta value of 0.95 in sample size calculation may also reflect a methodological oversight that requires clarification. Future research should aim to employ probability-based sampling methods, incorporate objective measures of mobile use, and explore longitudinal designs to establish causality (22). Further investigation into demographic and behavioral risk modifiers, such as gender, age, occupation, and ergonomic practices, would provide more nuanced understanding of at-risk populations. Experimental studies focusing on preventive interventions, such as ergonomic training and mobile-use modifications, may also help to establish evidence-based strategies to mitigate the burden of DS in this increasingly digital era. Overall, this study adds to the growing body of evidence highlighting the musculoskeletal consequences of mobile phone use and gaming, reinforcing the need for timely preventive and clinical strategies to reduce long-term disability.

CONCLUSION

This study concluded that De Quervain's Syndrome is a significant musculoskeletal concern among mobile gamers, strongly linked to prolonged and repetitive use of the thumb and wrist during gaming activities. The findings underscore the importance of recognizing mobile gaming as a potential occupational-like risk factor, where continuous strain contributes to pain and functional limitations. By drawing attention to this emerging health issue, the study emphasizes the need for preventive strategies, ergonomic guidelines, and awareness campaigns aimed at reducing long-term complications. These insights highlight the relevance of addressing digital lifestyle habits to safeguard musculoskeletal health in increasingly technology-driven societies.

AUTHOR CONTRIBUTION

Author	**Contribution**
Nemra Shah	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Muhammad Mustafa	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
Azka Batool*	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Saleem Shazad	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Muhammad Affan Iqbal	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Ayesha Khalid	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Afia Ashgar	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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