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Original Research

Prevalence of Carpal Tunnel Syndrome and De-Quervain Tenosynovitis among PUBG Players

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ABSTRACT

Background: Due to the increase in mobile gaming, the game PlayerUnknown's Battlegrounds (PUBG) is now one of the top choices worldwide. Because users need to use their hands again and again to play games on these devices, there is concern that they could develop muscle problems.
Aim(s): This study was designed to discover how many PUBG players have Carpal Tunnel Syndrome (CTS) and De Quervain Tenosynovitis (DQT) and to compare them with the players' gaming habits and demographic characteristics.
Material and methods: The cross-sectional study involved 382 university students aged 18 and 40. The tools used were the Boston Carpal Tunnel Questionnaire (BCTQ), Finkelstein test, Numeric Pain Rating Scale (NPRS), and Gaming Addiction Scale (GAS). Analysis was done using both descriptive and inferential statistics.
Result: DQT was found in almost half of the participants using Finkelstein's test. According to BCTQ, CTS was experienced by most as mild symptoms (67.3%), by some as moderate (18.6%), and only by a few as severe (1.6%). Around 42.1% of the study's subjects fit the definition of gaming addiction. More people with DQT are female and own mobile devices.

Conclusions: PUBG players are very likely to experience DQT, while their CTS symptoms are normally not severe. Proper awareness of ergonomics and how to play games might reduce issues with muscles and bones.

Keywords: *Carpal tunnel syndrome, De Quervain's tenosynovitis, PUBG, Gaming Addiction, Musculoskeletal disease*

INTRODUCTION

Over the past few decades, the internet's pervasive influence has touched every corner of the world, shaping the lives of individuals across the globe. While heralding a multitude of advantages and societal benefits, this digital revolution has also introduced new dynamics and considerations. Millions played mobile games during the COVID-19 pandemic, there has been concern about their possible harmful impacts.[1] Many gamers have become addicted to PlayerUnknown's Battlegrounds on their mobile phones, playing for hours with constant hand movements. Although the cognitive and enjoyable sides of such games are widely publicized, new findings suggest that playing them repeatedly can injure the upper body.[2,3]

People, especially those in the younger generation, are seeing an increase in discomfort related to straining their muscles and bones from digital devices.[4] Carpal Tunnel Syndrome (CTS) and De Quervain Tenosynovitis (DQT) are disorders that are often linked to carpal tunnel syndrome. The carpal tunnel syndrome is a condition where the median nerve is squeezed by the carpal tunnel, resulting in symptoms such as numbness, weakness in the hands, and paresthesia. In DQT, the first dorsal compartment near the wrist becomes inflamed, causing inflammation of the APL and EPB tendons and leading to both thumb pain along the radial styloid and reduced mobility.[5-7]

Mobile games such as PUBG increase your chances of developing both conditions due to constant swiping, tapping, bent wrists, and holding your device firmly for a period. Many reports link a rise in smartphone use with symptoms of CTS and DQT.[8,9] Still, studies concentrated mainly on CTS linked to using phones in general, but only a few have looked at CTS in PUBG players.[10] Likewise, Benites-Zapata et al. concluded that excessive smartphone use is significantly related to

having DQT symptoms.[11] The research conducted did not focus on gaming apps or movements specific to playing games.[12] Two recent papers suggest that excessive PUBG play may increase the risk of injury because moving the hands quickly and efficiently for hours may cause carpal tunnel syndrome.[13]

Even as mobile games become more popular, few scientific studies have measured the rate of CTS and DQT in people who actively play PUBG and linked these disorders to duration, frequency, or type of device. Additionally, gaming addiction and its effects on the musculoskeletal system have not been looked into much for young adults in college. Based on this analysis, it is proposed to use self-reported and clinical assessments to find out if PUBG players suffer from CTS and DQT at high and moderate rates, respectively.

MATERIAL AND METHODS

A cross-sectional approach and analysis were used in this study to check for Carpal Tunnel Syndrome (CTS) and De Quervain Tenosynovitis (DQT) among PUBG players and find a link between their muscle issues and game time. The study was conducted among students enrolled in Pakistani universities in Rawalpindi and Islamabad between May and September of 2022. People are involved in the data collection process by being chosen through a sampling method.

In total, 382 people from 18 to 40 years of age were selected at random from the campuses. People were included in the study if they met the following criteria: Played the game for at least 3 months. Not only can Handheld devices such as smartphones or tablets be used but also Provided an agreement before proceeding with the surgery. Those involved in the study were not included in the data if they had: A history of issues with the muscles, bones, or nervous system, or A recent operation on their wrist or hand. Such as rheumatoid arthritis (an example of a systemic inflammatory disease). Additionally, any past trauma or fracture in the upper extremities or They mainly use their phones for things other than games. The

project was reviewed and approved by the Ethical Review Committee at Shifa Tameer-e-Millat University. All people taking part were informed about the research goal and gave their written consent.

Assessment Tools and Diagnostic Criteria

Lemmens et al. created the Gaming Addiction Scale (GAS) from which gaming addiction was assessed using its 21 items.[14] It uses seven basic elements of addiction: how significant the addiction is, mood change, developing tolerance, withdrawal symptoms, causing conflicts, vulnerability to relapse, and other related issues. Any person scoring 3 or higher on four or more of these points was identified as having a gaming addiction. We have used the Finkelstein test to diagnose DQT, since it is a reliable and well-known procedure.[15]

The subject put their thumb in a tight fist, and the examiner tried to twist the wrist in an ulnar direction. If, during palpation, there was sharp pain over the radial styloid, the diagnosis of DQT was given. DQT was considered to be either positive or negative when estimating the prevalence.

BCTQ was used to learn about the effects and limitations caused by CTS.[16.] It is made up of: The Symptom Severity Scale Separate (SSS): You will evaluate the items on a scale of 1 to 5. While 8 items are scored using a 1 to 5-point scale for the Functional Status Scale. Other than that, there are four severity categories based on your total score (ranging from 11 to 55). Mild: 11–20; Moderate: 21–30; Severe: >30. There are 8 categories for functional limitation, and your total score can range from 8 to 40. Mild: 8–15; Moderate: 16–24; Severe: >24. According to this study, moderate or greater symptomatology was identified for participants who received a score of 21 or higher on either form of the SDS. Intensity of pain in the wrist, hand, or thumb was measured using the NPRS on a scale from 0 to 10. The researchers used 1–10 for their scale,

with a score of 1–3 being mild, 4–6 being moderate, and anything higher being severe.[17]

The respondents were supervised while they filled in the sociodemographic questionnaire and then completed the GAS on their own. Only trained physiotherapists administered the clinical tests (Finkelstein and BCTQ). The data were processed so that personal information was removed. All data were imported into IBM SPSS version 21. Many analyses were carried out during the process: The statistics should include how often each variable occurs, as percentages, average values, and standard deviations for each of them. Cross-tabulation is used to examine the amount of DQT and CTS received by members of different genders, age groups, groups of gaming frequency, devices used, and level of addiction. A Chi-square test is conducted to find links between different types of variables and DQT/CTS diagnosis. Other than that, the two-sample t-test helps to see if mean scores from BCTQ and GAS are significantly different from one another. Any p-value below 0.05 was deemed significant in the study.

RESULT

The study involved 382 players of PUBG. Most of those participating (56.5%) were female, and the average (mean) age was 21.53 years ± 0.50. Fifty percent of respondents were undergraduate students, followed by 39.79% high school graduates. Half of those I spoke to used smartphones for gaming, while another group chose PCs, consoles or tablets.

From what Table 1 reveals, the majority of PUBG players were young adults, and most of them preferred mobile phones to play on. Since handheld devices are used very often, thumb and wrist pain are common. This could be the main reason why De Quervain Tenosynovitis is so common among these users.

Based on Table 2, half the participants were found to have De Quervain Tenosynovitis

(DQT) using the Finkelstein test. On the other hand, those with CTS reported moderate or greater symptoms in 20.1% of cases, and only 13.1% of them had significant functional ill effects.

The results in Table 3 indicate that nearly half of the sample group had gaming addiction symptoms. In addition, 68.6% of participants said they had hand or thumb pain at some level. Flatulence after gaming occurs in similar areas as reported in studies on DQT and CTS, and suggests that gaming often causes upper limb discomfort.

Table 4 shows that several factors about participants are linked with the presence of musculoskeletal conditions. Significantly more people with DQT and CTS problems were found to be female, users of mobile phones, and addicted to gaming ($p < 0.05$). People who practiced for more than 3 hours each day were also found to be at greater risk, supporting the idea that playing strains the arms and shoulders.

The evidence found supports the conclusion that excessive mobile gaming by females may contribute to developing repetitive strain injuries. Based on these observations, it is clear that ergonomic action and associated rules can help support adolescent and young adult gamers.

Table 1. Descriptive Statistics of Sociodemographic Data

Variable(s)	Item(s)	Frequency	Percentage (%)
Gender	Male	166	43.5%
	Female	216	56.5%
Level of Education	High school or Equivalent	152	39.79%
	Undergraduate	191	50%
	Graduate or others	38	9.95%

	Mobile phones	191	50%
Gaming device	PC/Laptop	115	30.1%
	Gaming console	57	14.9%
	Tablet	19	5%

Table No. 2. Frequency of gaming habits among participants

Condition	Positive Cases(n)	Prevalence (%)
De-Quervain Tenosynovitis (Finkelstein Test)	202	52.9%
Carpal Tunnel Syndrome (Symptom Severity ≥21)	77	20.1%
Carpal Tunnel Syndrome (Functional Limitation ≥16)	50	13.1%

Table 3. Gaming Behaviour and Pain Profile

Variable	Category	Frequency (%)
Gaming Addiction Scale	Addicted	161(42.1%)
	Not Addicted	221(57.9%)
Gaming Frequency	Daily	24.3%
	Several times/week	26.7%
	1-2 times/week	33.4%
Pain Presence	Hand/Thumb Pain Reported	262(68.6%)
Pain Severity	Mild	34.3%
	Moderate	24.3%
	Severe	9.9%

Table 4. Association Between Sociodemographic and Gaming Variables with DQT and CTS

Variable	DQT Positive (%)	CTS Positive (%)	p-value
Gender (Female)	61.1%	24.5%	<0.01
Device Used (Mobile)	58.6%	21.3%	<0.05
Gaming Addiction (Yes)	65.8%	28.5%	<0.01
Gaming>3hrs/day	63.4%	27.6%	0.02
Daily Gaming Frequency	59.1%	23.8%	0.04

DISCUSSION

The study examined how often Carpal Tunnel Syndrome (CTS) and De Quervain Tenosynovitis (DQT) occur in PUBG players and how their gaming habits and demographics influence the outcome. Our hypothesis is proven right because the research showed that extended time gaming with a handheld increases the risk of upper limb problems, mainly leading to DQT.

The Finkelstein test was used to identify DQT for 52.9% of the participants. This corresponds with studies conducted by Pamungkas et al., who reported that mobile gaming in Indonesia leads to decreased Digital Intelligence in Students.[12] Most participants experienced mild to moderate pain, which is an expected symptom in such an early form of the disease.

However, CTS symptoms were found in fewer individuals, but were still not uncommon. Problems were found to be moderate or greater in 20.1% of people, and 13.1% experienced functional disabilities. Our findings are consistent with Karaçorlu et al., who found that using smartphones excessively can lead to occasional hand irritation.[10] No nerve conduction tests were included in our study; however, the severity of CTS symptoms was based on the BCTQ patient questionnaire.[17]

A greater number of females than males experienced DQT (61.1%) and CTS (24.5%). Likewise, prior studies demonstrate that women are more prone to repetitive strain injuries because they have smaller carpal tunnels and use more muscle during gripping tasks. [18,19]Individuals accessing the service on smartphones were found to have the highest DQT symptoms (58.6%) and CTS symptoms (21.3%).[20,21] These outcomes agree with what Benites-Zapata et al. and Sehar et al. found previously: that continuously holding a device and using it can cause muscle pain.[11,22]

In the sample, 42.1% were identified as having a gaming addiction, which was related to both

DQT and CTS ($p < 0.01$). On top of that, people who played PUBG for over 3 hours daily or every day had a higher risk of developing these illnesses. It agrees with the findings of Ma et al. on the dose-response theory, which says that stress increases with repeated exposure to typing.[13]

Limitations of the Study

Its main advantage is found in using both identified subjective tools (BCTQ, GAS) and clinical evaluations (Finkelstein). Furthermore, analyzing factors such as age and gender helps make the results clearer. At the same time, several limitations ought to be acknowledged. A CTS diagnosis was given to patients whose symptoms were reported, but electrodiagnostic tests had not been performed (EMG or NCS), nor were hand posture, device shape, and force applied to devices considered.

CONCLUSION

Among members of the study group, those who played PUBG often had moderate cases of CTS and DQT. It is clear from the results that using portable devices for gaming directly contributes to the onset of upper limb symptoms and pains. Playing for a long time and also being a woman appeared to increase the risk. Doing so is crucial to reduce illnesses that may develop due to gaming and technology use. Despite experiencing few limitations and only minor CTS, the frequent DQT incidents prove that mobile e-sports puts increased strain on athletes' bodies. If gamers are screened, basic ergonomics are used, and the online gaming industry is regulated, many long-term health issues from gaming could be prevented.

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