ORIGINAL ARTICLE

# The Association Between Playing Video Games and Thumb/Wrist Pain Among Medical Students at the King Abdulaziz University

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Submission: 19 Aug. 2024
Accepted: 22 Dec. 2024

**Citation**
Altuwairqi A. The association between playing video games and thumb/wrist pain among medical students at the King Abdulaziz University. JKAU Med Sci 2024; 31(2): 13-19. DOI: 10.4197/Med.31-2.2.



## Abstract

De Quervain's disease is characterized by stennosing tenosynovitis in the first extensor wrist compartment. With the growing popularity of video gaming, the incidence of de Quervain's disease has continued to rise among teenagers and youths. There is a need to determine the correlation between gaming and de Quervain's disease. To assess the association between playing video games and thumb and wrist pain among medical students at King Abdulaziz University. This cross-sectional survey study was conducted among medical students at King Abdulaziz University between July 2020 and October 2020. Statistical analyses were performed using SPSS version 23. Most medical students (82%) played video games; among them, 36% and 59% reported using PlayStations and mobile phones, respectively. The mean ± SD pain severity was 1.63 ± 2.65, with 1.4% and 62.9% reported experiencing the most severe pain and no pain, respectively. Further, 12.9%, 15.1%, and 10.1% of the participants reported stretching their fingers before playing, having problems carrying things, and the pain affecting their daily activities, respectively. Most of our participants played video games mainly using mobile phones and PlayStations. However, a majority of them did not experience any pain; moreover, we observed an association of pain episodes and severity with the playing duration and devices used.

## Keywords

De Quervain's disease, Video games, Thumb pain, Wrist pain, Association, Medical students

## INTRODUCTION

Gaming has become an addiction in many young adults[1]. The World Health Organization (WHO) and the American Psychiatric Association (APA) have categorized gaming as a behavioral and mental health condition[2, 3]. Video games are defined as games played using an electronic system, including a digital phone, console, or computer. In Arab countries, video games are a popular leisure activity among adolescents and children[4]. Approximately 59%–73% of the youth have been shown to play video games on any given day[5, 6]. A study conducted in Abha among secondary school students reported a high prevalence of playing video games, with 80% and 75% of the students reporting that they played video games and owned a video game machine, respectively[4].

Gaming is associated with several diseases and complications. An Indian study on medical students reported an increase in gaming disorders, which led to anxiety, psychological disturbance, sleep, and mood disorders, and physical complaints such as headaches.[7] Another Saudi Arabian study reported an association of gaming addiction with stress among adolescents[1].

De Quervain's disease is characterized by stenosing tenosynovitis of the first dorsal wrist compartment. It is characterized by pain with gradual onset, which may be exacerbated by thumb abduction, grasping, and ulnar deviation of the wrist[8].[4] The etiology of De Quervain's disease is thought to be sustained or repetitive tension on the tendons of the first dorsal compartment. This tension causes a fibroblastic response, which in turn leads to swelling and thickening of the compartment. Moreover, an individual experiences discomfort while using the wrist and hand[8].

De Quervain's disease is the most common inflammatory wrist tendon lesion. Inflammatory wrist and hand tendon lesions have become increasingly common with the evolution of electronic systems[9]. A study conducted in Jeddah, Saudi Arabia, which included 338 university students reported a positive correlation of smartphone use with De Quervain's disease among medical and non-medical students[10]. This study aimed to assess the association of thumb and wrist pain with playing video games among medical students.

## METHODS

### PARTICIPANTS AND STUDY DESIGN

This cross-sectional survey study was conducted among medical students at King Abdulaziz University between July 2020 and October 2020.

We randomly included 140 medical students. This study was approved by the ethical committee of King Abdulaziz University (reference number 164-21).

### THE STUDY TOOL AND SCORING

The survey was sent to the students. The survey involved a two-step process. First, the students received a link to a video explaining how to perform Finkelstein's test. Moreover, information regarding its purpose was attached to the questionnaire to allow participants to perform the test on their own before answering the follow-up questions. The presence of pain during the test was considered a positive result.

Regardless of Finkelstein's test results, the participants answered a series of closed-ended questions to assess the frequency and duration of playing video games across different consoles (PlayStation, Xbox, Nintendo, PC, and smartphones), as well as whether there were pain episodes during or after playing.

The severity of pain was assessed on a scale of 0–10, where 10 reflected the most severe pain, with accompanying interference of daily activities, pain with moving objects, and episodes of nighttime awakening due to pain. The pain duration was categorized as < 10 minutes, 10–60 minutes, > 1 hour, or constant pain throughout the day. Pain-related experiences, including weakness, numbness, and improvement or worsening with finger movement, were also assessed.

Moreover, precautionary measures, including taking breaks while playing video games and stretching frequency, were assessed. Additionally, a well-established risk factor, which is the duration of playing, is also evaluated.

## STATISTICAL ANALYSIS

Data were collected and analyzed using SPSS version 23 (IBM SPSS, IBM Corp., Armonk, NY, USA). Data are expressed as numbers (%). Between-group comparisons were performed using the chi-square test. Statistical significance was set at $P < 0.05$.

## RESULTS

Most participants (82.0%) played video games. Regarding the daily duration of playing video games, most participants reported 1–3 hours (31.7%), followed by > 5 hours (18.7%), > 3–5 hours (15.8%), < 1 hours (12.9%), and depending on the free time (2.9%). Most participants played video games daily (36.7%), followed by 1–2 times a week (28.1%), 2–4 times a week (13.7%), and monthly (3.6%). Moreover, 12.9% and 15.1% stretched their fingers before playing and had problems with carrying things, respectively. Regarding taking breaks when playing, most participants answered sometimes (46.8%), followed by no (29.5%) and yes (23.7%), with significant differences among them ($P = 0.003$). Most participants did not experience pain episodes (70.5%), while 18.0%, 7.9%, 2.2%, and 1.4% had pain episodes for < 10 minutes, 10–60 minutes, > 60 minutes, and throughout the day, respectively, with significant differences among them ($P < 0.0001$). Pain affected daily activities in 89.9% of the participants, with 7.9% seeing doctors for this problem. Regarding nighttime awakenings induced by wrist/thumb pain, 11.5%, 3.6%, 2.2%, and 82.7% of the participants reported that they rarely, usually, always, and never woke up, respectively. Wrist pain was associated with finger numbness and hand weakness in 15.8% of the participants; moreover, it worsened and improved with finger movement in 12.2% of the participants. Further, 62.6%, 16.5%, 11.5%, and 9.4% of the participants reported no pain, pain during activities, constant pain, and episodic pain, respectively. The mean pain score was 1.63. Regarding the console used for video games, most participants used mobile (59.0%), followed by PlayStation (36.0%), PC (33.1%), Nintendo (18.7%), and Xbox (10.1%), with significant differences among them ($P < 0.0001$) (Table 1).

Mild, mild-to-moderate, moderate, moderate-to-severe, and severe pain were mostly reported by participants who played > 3–5 hours/day (40.0%), > 5 hours/day (37.5%), > 5 hours/day (66.7%), 1–3 hours/day (50.0%), and no playing (50.0%) (Table 2).

**Table 1. The association between playing video games and thumb/wrist pain: A cross-sectional study**

| Questions | Value | *P*- value |
|---|---|---|
| **Do you play video games?** | | 0.0001 |
| Yes | 114 (82.0%) | |
| No | 25 (18.0%) | |
| **For how long do you play video games per day** | | 0.0001 |
| None | 25 (18.0%) | |
| Less than an hour | 18 (12.9%) | |
| 1–3 hours | 44 (31.7%) | |
| 3–5 hours | 22 (15.8%) | |
| > 5 hours | 26 (18.7%) | |
| Others (depending on the free time) | 4 (2.9%) | |
| **How often do you play video games?** | | 0.0001 |
| Daily | 51 (36.7%) | |
| 1–2 times a week | 39 (28.1%) | |
| 2–4 times a week | 19 (13.7%) | |
| Monthly | 5 (3.6%) | |
| Never | 25 (18.0%) | |

| Questions | Value | *P*- value |
|---|---|---|
| **Do you stretch your fingers before you play?** | | 0.0001 |
| Yes | 18 (12.9%) | |
| No | 121 (87.1%) | |
| **Do you have problems carrying things?** | | 0.0001 |
| Yes | 21 (15.1%) | |
| No | 118 (84.9%) | |
| **Do you take rest breaks when playing?** | | 0.003 |
| Yes | 33 (23.7%) | |
| No | 41 (29.5%) | |
| Sometimes | 65 (46.8%) | |
| **How long, on average, does a pain episode last during the daytime (minutes)?** | | 0.0001 |
| < 10 min | 25 (18.0%) | |
| 10–60 min | 11 (7.9%) | |
| > 60 min | 3 (2.2%) | |
| Constant | 2 (1.4%) | |

**Table 1.** **The association between playing video games and thumb/wrist pain: A cross-sectional study.–Continued**

| Questions | Value | *P*- value |
|---|---|---|
| **Has this problem affected your daily activities?** | | 0.0001 |
| Yes | 14 (10.1%) | |
| No | 125 (89.9%) | |
| **Have you ever seen a doctor for this problem?** | | |
| Yes | 11 (7.9%) | |
| No | 128 (92.1%) | |
| **How often does your wrist/thumb pain wake you up?** | | 0.0001 |
| Always | 3 (2.2%) | |
| Usually | 5 (3.6%) | |
| Rarely | 16 (11.5%) | |
| Never | 115 (82.7%) | |
| **What is associated with your wrist pain?** | | 0.0001 |
| Finger numbness | 22 (15.8%) | |
| Worse with finger movement | 17 (12.2%) | |
| Better with finger movement | 17 (12.2%) | |
| Hand weakness | 22 (15.8%) | |
| **Describe the timing of your pain?** | | 0.0001 |
| Episodically | 13 (9.4%) | |
| Constant | 16 (11.5%) | |
| During activity | 23 (16.5%) | |
| No pain | 87 (62.6%) | |
| **What is the pain score out of 10?** | | |
| Mean+/-SD | 1.63 ± 2.65 (0.0-10.0) | |
| 0 | 87 (62.9%) | |
| 1 | 9 (6.5%) | |
| 2 | 6 (4.3%) | |
| 3 | 7 (5.0%) | |
| 4 | 9 (6.5%) | |
| 5 | 2 (1.4%) | |
| 6 | 7 (5.0%) | |
| 7 | 5 (3.6%) | |
| 8 | 3 (2.2%) | |
| 9 | 2 (1.4%) | |
| **What console do you use for video games?** | | |
| PlayStation | 89 (36.0%) | 0.001 |
| Xbox | 14 (10.1%) | 0.0001 |
| PC | 46 (33.1%) | 0.0001 |
| Nintendo | 26 (18.7%) | 0.0001 |
| Mobile phone | 82 (59.0%) | 0.034 |

**Table 2.** **Cross table between pain severity and length of playing video games per day**

| Pain Severity (pain score) | How long do you play video games per day? | | | | | |
|---|---|---|---|---|---|---|
| | None | < 1 hour | 1–3 hours | 3–5 hours | > 5 hours | Others |
| No pain (0) (n = 87) | 19 (21.8%) | 12 (13.8%) | 26 (29.9%) | 11 (12.6%) | 17 (19.5%) | 2 (2.3%) |
| Mild pain (1–2) (n = 15) | 1 (6.7%) | 2 (13.3%) | 4 (26.7%) | 6 (40.0%) | 2 (13.3%) | – |
| Mild to Moderate pain (3–4) (n = 16) | – | 3 (18.8%) | 4 (25.0%) | 3 (18.8%) | 6 (37.5%) | – |
| Moderate (5–6) (n = 9) | 2 (22.2%) | – | 6 (66.7%) | – | 1 (11.1%) | – |
| Moderate to severe (7–8) (n = 8) | 1 (12.5.0%) | 1 (12.5%) | 4 (50.0%) | 1 (12.5%) | – | 1 (12.5%) |
| Severe (9–10) (n = 4) | 2 (50.0%) | – | – | 1 (25.0%) | – | 1 (25.0%) |

*Data are expressed as numbers (%).*

Mild, mild-to-moderate, and moderate pain were mostly reported by participants who played daily (46.7%, 43.8%, and 55.6%, respectively). Moderate-to-severe and severe pain was mostly reported by participants who played > 2–4 times per week (50.0%) and never played (50.0%), respectively (Table 3).

Pain episodes lasting < 10 min, 10–60 min, and > 60 min were mostly observed in participants who played 1–3 h/day (28.0%, 36.4%, and 66.7%, respectively). Constant pain was mostly reported in participants who played < 1 h and 1–3 h/day (50.0% for both), while no pain episodes were reported by participants who played 1–3 hours (30.6%) (Table 4).

Mild pain was mostly reported in participants with constant pain (53.3%). Mild-to-moderate and moderate pain were mostly reported during activity (62.5% and 55.6%, respectively). Moderate-to-severe pain was mostly reported in participants with episodic and constant pain (37.5% for both), while severe pain was mostly reported in participants with constant pain (50.0%) (Table 5).

**Table 3. Cross table between pain severity and how many days they play video games per week**

| Pain Severity (pain score) | How often do you play video games per week? | | | | |
|---|---|---|---|---|---|
| | Daily | 1–2 times per week | 2–4 times per week | Monthly | Never |
| No pain (0) (n = 87) | 31 (35.6%) | 27 (31.0%) | 8 (9.2%) | 3 (3.4%) | 18 (20.7%) |
| Mild pain (1–2) (n = 15) | 7 (46.7%) | 3 (20.0%) | 4 (26.7%) | – | 1 (6.7%) |
| Mild to Moderate pain (3–4) (n = 16) | 7 (43.8%) | 6 (37.5%) | 2 (2.5%) 2 | 1 (6.2%) | – |
| Moderate (5–6) (n = 9) | 5 (55.6%) | 1 (11.1%) | 1 (11.1%) | – | 2 (22.2%) |
| Moderate to severe (7–8) (n = 8) | – | 2 (25.0%) | 4 (50.0%) | 1 (25.0%) | 1 (25.0%) |
| Severe (9–10) (n = 4) | 1 (25.0%) | 1 (25.0%) | – | – | 2 (50.0%) |

*Data are expressed as numbers (%).*

**Table 4. Cross table between the duration of the pain episode and the duration of playing video games per day**

| How long do the pain episodes last? | How long do you play video games per day? | | | | | |
|---|---|---|---|---|---|---|
| | None | < 1 hour | 1–3 hours | 3–5 hours | > 5 hours | Others |
| < 10 min (n = 25) | 2 (8.0%) | 4 (16.0%) | 7 (28.0%) | 5 (20.0%) | 6 (24.0%) | 1 (4.0%) |
| 10–60 min (n = 11) | 2 (18.2%) | – | 4 (36.4%) | 3 (27.3%) | 2 (18.2%) | – |
| > 60 min (n = 3) | 1(33.3%) | – | 2 (66.7%) | – | – | – |
| Constant (n = 2) | – | 1 (50.0%) | 1 (50.0%) | – | – | – |
| Never had episode (n = 98) | 21 (21.4%) | 13 (13.3%) | 30 (30.6%) | 14 (14.3%) | 18 (18.4%) | 2 (2.0%) |

*Data are expressed as numbers (%).*

**Table 5. Cross table between pain severity and timing of pain**

| Pain Severity (pain score) | Timing of Pain | | | |
|---|---|---|---|---|
| | Episodically | Constant | During activity | No pain |
| No pain (0) (n = 87 | – | – | – | (100.0%) 87 |
| Mild pain (1–2) (n = 15 | 2 (13.3%) | 8 (53.3%) | 5 (33.3%) | – |
| Mild-to-moderate pain (3–4) (n = 16) | 3 (18.8%) | 3 (18.8%) | 0 (62.5%) | – |
| Moderate (5–6) (n = 9) | 4 (44.4%) | – | 5 (55.6%) | – |
| Moderate to severe (7–8) (n = 8) | 3 (37.5%) | 3 (37.5%) | 2 (25.0%) | – |
| Severe (9–10) (n = 4) | 1 (25.0%) | 2 (50.0%) | 1 (25.0%) | – |

*Data are expressed as numbers (%).*

**Table 6. Cross table between pain severity and console used**

| Pain Severity (pain score) | Console Used for Video Games | | | | |
|---|---|---|---|---|---|
| | PlayStation | Xbox | PC | Nintendo | Mobile phone |
| No pain (0) (n = 87) | 51 (58.6%) | 8 (6.9%) | 30 (34.5%) | 16 (18.4%) | 44 (50.6%) |
| Mild pain (1–2) (n = 15) | 13 (86.7%) | 2 (13.3%) | 6 (40.0%) | 2 (13.3%) | 13 (86.7%) |
| Mild-to-moderate pain (3–4) (n = 16) | 13 (81.2%) | 3 (18.8%) | 9 (62.5%) | 4 (25.0%) | 15 (93.8%) |
| Moderate (5–6) (n = 9) | 6 (66.7%) | – | – | 3 (33.3%) | 6 (66.7%) |
| Moderate-to-severe (7–8) (n = 8) | 4 (50.0%) | 2 (25.0%) | 1 (12.5%) | 1 (12.5%) | 3 (37.5%) |
| Severe (9–10) (n = 4) | 2 (50.0%) | 1 (25.0%) | – | – | 1 (25.0%) |

*Data are expressed as numbers (%).*

No pain was mostly reported by participants with a PlayStation (58.6%). Mild pain was mostly reported in participants using a PlayStation and mobile phone (86.7% for both). Mild-to-moderate pain was mostly reported in participants using a mobile phone (93.8%). Moderate was mostly reported in participants using a PlayStation and mobile phone (66.7% for both). Moderate-to-severe and severe pain was mostly reported in participants using a PlayStation (50.0% for both) (Table 6).

## DISCUSSION

Our findings revealed a high prevalence of playing video games among medical students, with 82% of our participants reporting playing video games. Most students reported playing video games for 1–3 hours/daily. The most frequently used device for playing games was the mobile phone (59%), followed by the PlayStation (36%) and personal computer (33.1%).

A study conducted in Jeddah that enrolled 387 medical students showed that 66.4% of students had smartphone addiction[11], which was higher than that in our study. However, the previous study did not report whether the students used smartphones for gaming or other purposes.

We investigated the pain and its effect on students, with 2.2% and 82.7% of the students reporting that they always and never woke up, respectively, due to wrist and thumb pain. The mean score of pain severity was only 1.63; moreover, 62.9% and 1.4% reported no pain and the most severe pain, respectively. Regarding the pain impact, most patients denied any pain impact on their daily activities and did not visit a doctor for pain. The most common consequences of pain were finger numbness and weakness. Additionally, only a few students reported stretching their fingers before playing and having problems carrying things. Furthermore, we investigated factors that may affect pain severity.

In addition, we analyzed the association between the pattern of playing video games and pain severity. Playing for 1–3 and > 5 hours per day was associated with moderate-to-severe and mild-to-moderate pain, respectively. Notably, two students who reported no playing showed severe pain. Daily playing was associated with mild-to-moderate pain. Additionally, daily playing for 1–3 hours was significantly associated with pain episodes lasting from < 10 minutes to > 60 minutes. Further, the severity of pain was associated with no finger stretching before playing. Mobile phones and PlayStations were associated with the severity of pain.

A study reported that overusing the thumb for mobile texting is a risk factor for de Quervain's disease[12]. It implies that using mobile phones for a long duration could be associated with the development of de Quervain's disease. This is consistent with our findings that using mobile phones and PlayStations to play games for long durations was associated with pain development, duration, and severity. In our study, a small proportion of students reported experiencing pain, which could be attributed to a short duration spent playing video games or playing only during vacation. Further research is required to better understand the low pain prevalence among students playing video games.

A cross-sectional study of 833 adolescents reported similar findings. Specifically, high usage of computers (99%) and video games (58%) was found; however, the reported pain prevalence was only 39.4%. Additionally,

it should be noted that this previous study investigated musculoskeletal, rather than thumb or wrist pain[13].

A previous study that included 500 students reported that the incidence of de Quervain's disease was 49% among students who used mobile phones to play video games. Moreover, the risk of disease increased with a longer duration of playing, frequent playing, and changes in wrist position[9].

A study conducted in Jeddah reported that de Quervain's disease had a prevalence rate of 68.9% among 338 students. Moreover, it reported a positive correlation between the use of phones for gaming and de Quervain's disease[10]. Another study conducted on medical students in Jeddah reported a significant association between heavy smartphone use and thumb/wrist pain[11].

## CONCLUSION

Our findings revealed a high prevalence of playing video games among medical students, with mobile phones and PlayStations as the most common devices. There was a very low mean score of pain severity since most of the patients reported no pain. Pain severity was associated with playing daily for a long duration using mobile phones and PlayStations; moreover, the duration of pain episodes was associated with the playing duration.

## ACKNOWLEDGMENT

The author thanks King Abdulaziz University for their support in this research. I would also like to thank Abdulelah K. Bahabri for his active contribution to the data collection process..

## CONFLICT OF INTEREST

The author declared that there is no conflict of interest that is related to this study and this article.

## DISCLOSURE

The author did not receive any form of commercial support, including compensation or financial assistance, for this case report. Additionally, the author has no financial interest in any of the products, devices, or drugs mentioned in this article.

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