Research Article

Prevalence and impact of scapular muscle pain among video gamers in Rawalpindi and Islamabad: A cross-sectional study

Hina Javed*, Aima Raza Khan, Aiman Shaukat, Muhammad Zamar Munir, Fatima

Bashir Institute of Health Sciences, Simly Dam Road, Bhara Kahu, Islamabad

***Corresponding author's email:** hinajaved862@gmail.com

Abstract

Scapular muscle pain is common among individuals who engage in prolonged video gaming sessions. Poor posture, repetitive movements, and extended screen time contribute to musculoskeletal discomfort, particularly in the muscles surrounding the scapula. With the rise in Esports and video gaming as a primary source of entertainment, there is a growing need to understand the prevalence and impact of scapular muscle pain among gamers. This study aimed to identify the prevalence of scapular muscle pain among video gamers in Rawalpindi and Islamabad and to investigate the impact of this pain on gaming performance and quality of life. A cross-sectional descriptive study was conducted over six months in various gaming centers, communities, and universities in Rawalpindi and Islamabad. 100 male video gamers aged 15 to 40 were selected using non-probability convenience sampling. Pain and functional limitations were measured using the Numerical Pain Rating Scale (NPRS), Shoulder Pain and Disability Index (SPADI), and Scapular Assistance Test. Data were analyzed using SPSS version 26. Most participants (86%) were aged 15-25 years, with gaming hours ranging from 3-7 hours per day. Pain intensity assessment revealed that 59% of participants experienced moderate pain, while 8% reported severe pain. SPADI results indicated that 56% of gamers had very severe pain and disability. The Scapular Assistance Test showed that 68% of participants tested positive, indicating the presence of scapular muscle pain. Scapular muscle pain is prevalent among video gamers in Rawalpindi and Islamabad, particularly younger gamers who engage in prolonged gaming sessions. The study highlights the need for interventions to address poor posture and reduce the risk of musculoskeletal issues in this population.

Keywords: Scapular muscle pain, Video gamers, Posture, Musculoskeletal disorders, Esports, Rawalpindi, Islamabad.

Article History: **Received:** 17 Sep 24, **Revised:** 02 Oct 2024, **Accepted**: 08 Nov 2024, **Published:** 16 Dec 2024.

Introduction

Scapular muscle pain is pain or stiffness in the muscles surrounding the scapula, also known as the shoulder blade. The levator scapulae, serratus anterior, trapezius, and rhomboids are some of these muscles. Many factors including trauma, poor posture, overuse, and muscle tension can result in scapular muscle soreness [1]. In recent years, electronic sports (esports) have become popular for entertainment. It

is a pandemic situation or is believed that it has many millions of fans and spread with greater speed. Esports has more than 300 million fans with huge revenue generated internationally and is currently being sponsored by many institutes all over the world [2]. Esports athletes are those who spend a long period in front of computer screens and video gaming. The world of gaming has seen a seismic change recently, going from a pastime for leisure to a full-fledged business field known as Esports. The significance of maintaining good health, particularly in terms of posture, change in the biomechanics of the scapular musculature resulting in the scapular protractors and retractors adaptive lengthening and shortening has grown more well-known because of the hours that millions of gamers around the world spend bent into their screens [3]. The leisure of chair sitting while video gaming increases the prevalence of sedentary lifestyle due to extended screen time. While video gaming individuals spend a large portion of the day in a sitting position. However, their leisure chair activity potentially leads to adverse physiological and biomechanical effects over time [4]. Excessive playing time in video gaming causes negative consequences such as social isolation, poor academics, and the emergence of pathological video gaming. Pathological video gaming referred to as gaming disorders or gaming addictions that impact the physical and mental health of video gamers has become a critical issue in society [4 - 5]. Particularly, the period between adolescence and the younger population known as emerging adulthood is characterized by significant developmental changes. The increasing use of video games, which have become a common entertainment source, is one noticeable feature of emerging adulthood. Worries about the potential negative effects of excessive video gaming have given birth to the diagnosis of Video Gaming Disorder (VGD) [6 - 7]. During the pandemic covid-19, governments over the world implemented stick lockdowns and social distancing to control the spread of the virus. People faced high levels of stress, anxiety, and loneliness due to isolation. During the pandemic, the prevalence of video gaming has risen as people spend more time indoors and seek digital entertainment [8 - 9].

As discussed earlier, video gaming has become the primary source of entertainment for many individuals which is the risk factor for scapular muscle pain. Concerns about the potential negative effects of video gaming on health have developed along with the popularity of the medium. The incidence of soreness and discomfort in the scapular muscles among video gamers is one such issue [10]. Posture is essential in reducing these health hazards. Poor gaming posture, which includes slouching, hunching, and holding odd positions can cause persistent pain and discomfort. The scapular position is essential for normal glenohumeral joint functioning, and it assists maximum shoulder movements during gaming sessions [11 - 12]. The human Musculo-skeletal system is at risk of a variety of illnesses that cause pain and suffering, frequently impairing quality of life. Forward shoulder position during video gaming, which is indicated by the anterior displacement of the shoulder girdle, is one such prevalent problem. This misalignment may cause latent trigger points to form in the upper trapezius muscle, resulting in localized pain and limited shoulder movement. To reduce discomfort and restore ideal shoulder function, these trigger points must be managed effectively [13].

The prevalence of forward head position (FHP) among video gamers is one such issue. The protrusion of the head and neck forwards in proportion to the shoulders and spine is the hallmark of forward head posture. It is a typical problem seen in those who spend a lot of time using computers or engaging in other activities that require

prolonged forward-head orientation. FHP has been associated with several musculoskeletal and physiological issues in addition to affecting posture [14 - 15]. Scapular muscle pain is closely related to upper limb Cumulative Trauma Disorders (CTDs). Repetitive movements and poor ergonomics due to excessive video gaming are common causes of CTDs, which result in muscular imbalances that exert tension on the shoulder and scapula. These regions may be affected by painful diseases, such as impingement syndrome and rotator cuff tendinitis. Over time, the scapular region becomes more painful because of the persistent nature of CTD-causing activities [16]. Scapular muscle pain is also called "gamer's shoulder" and it is an important topic that needs to be discussed with immediate attention for many reasons.

The main objective of the study was to identify the prevalence of pain in the scapular muscles including supraspinatus, serratus anterior rhomboids, trapezius, and levator scapulae among video gamers and to investigate the impact of scapular muscle pain and functional limitations on gaming performance and quality of life among video gamers.

Method and Methodology

A Cross-sectional Descriptive study was conducted in Gaming centers, communities, and universities of Rawalpindi and Islamabad for 06 months by involving Active video gamers in Non-Probability Convenience Sampling. The sample size was 100 participants of video gamers, calculated by Solvin's formula (54).

$$n = \frac{N}{1+Ne2}$$

Where, n= sample size N= Expected population e= Margin of error which is +0.05

Pain & Functional limitations were measured by the Numerical Pain Rating Scale, Shoulder Pain and Disability Index (SPADI), and Scapular Assistance Test. Permission was taken from the Institutional Review Committee (IRC)/ Ethical Review Board (ERB) of Bashir Institute of Health Sciences, Islamabad. Informed consent was obtained from the participants. The questionnaire was distributed among participants selected based on exclusion and inclusion criteria. Participants aged 15 to 40 were included to focus on young adults actively involved in video gaming. They had to be in direct contact with the gaming screen for at least 3 to 7 hours a day. Only male participants were included in this study.

Participants outside the 15 to 40-year-old age range were excluded from the study. Female participants were excluded from the study. Participants with preexisting medical conditions or a history of musculoskeletal disorders that may significantly impact scapular muscle pain were excluded. The data was analyzed statistically using SPSS version 26.

Results and Discussion

Among 100 participants the age ranged from 15 to 40. With the age range 15-25 being the most frequent age i.e. 86% followed by the age range 26-35 i.e. 11% and the age range from 36-40 i.e. 3% respectively (Figure 1).

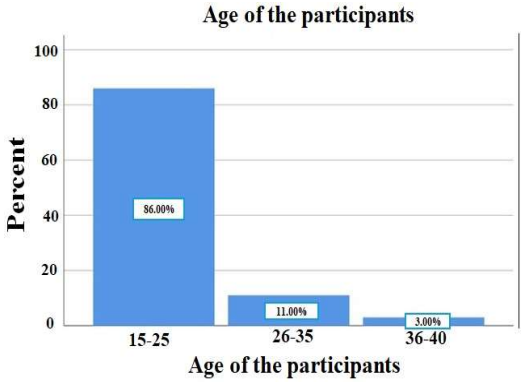

Figure 1: Frequency of participant age

Gaming hours range from 3-7 hours. The frequent gaming hours range from 3-5 (81%) and ranges from 6-7 hours (19%) (Figure 2).

Figure 2: Frequency of gaming hours

Pain Intensity was measured by a numerical pain rating scale. 14% (14) participants lie in no pain, 19% (19) in mild pain, 59% (59) in moderate pain, and 8% (8) lie in severe pain (Table 1, (Figure 3).

Table 1: Shows frequency of pain intensity.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no pain	14	14	14	14
	1-3 mild	19	19	19	33
	4-6 Moderate	59	59	59	92
	7-9 severe	8	8	8	100
	Total	100	100	100	

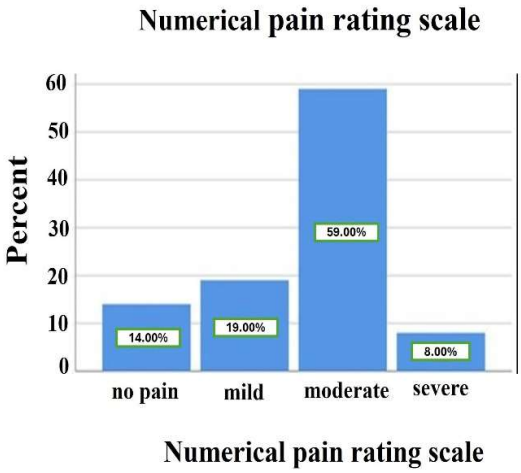

Figure 3: Pain rating scale

Shoulder Pain and Disability Index (SPADI) is a standard tool used for shoulder pain.

Table 2: Shoulder pain and disability index.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20 mild shoulder pain and disability	19	19	19	19
	21-40 moderate shoulder pain and disability.	13	13	13	32
	41-60 Severe shoulder pain and disability	12	12	12	44
	61-80 Very severe shoulder pain and disability	56	56	56	100
	Total	100	100	100	

The results showed that 19% (19) study participants lie in no pain and disability, 13% (13) lie in mild pain and disability, 13% (13) lies in moderate pain and disability, 12% (12) lies in severe pain and disability and 56% (56) lies in very severe pain and disability (Table 2, Figure 4).

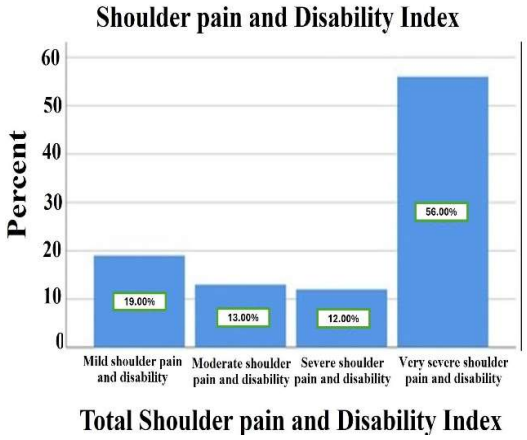

Figure 4: Shoulder pain and disability index

Table 3: Shoulder pain and disability index questions.

Questions	No pain and Disability	Mild pain and disability	Moderate pain and disability	Severe pain and disability
At its worst?	12	14	66	8
When lying on the involved side?	13	20	66	1
Reaching for something on a high shelf?	13	24	63	0
Touching the back of your neck?	17	61	22	0
Pushing with the involved arm?	15	15	67	3
Washing your hair?	20	66	14	0
Washing your back?	21	59	20	0
Putting on an undershirt or jumper?	20	66	14	0
Putting on a shirt that buttons down the front?	21	68	11	0
Putting on your pants?	21	68	11	0
Placing an object on a high shelf?	12	26	57	5
Carrying a heavy object of 10 pounds (4.5 kilograms)	12	18	67	3
Removing something from your back pocket?	20	67	13	0

The scapular assistance test is an assessment tool for Scapular muscle pain. The results showed that 68% (68) lie in the positive scapular assistance test and 32% (32) lie in the negative scapular assistance test.

Table 4: Scapular assistance test percentage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Positive	68	68	68	68
	Negative	32	32	32	100
	Total	100	100	100	

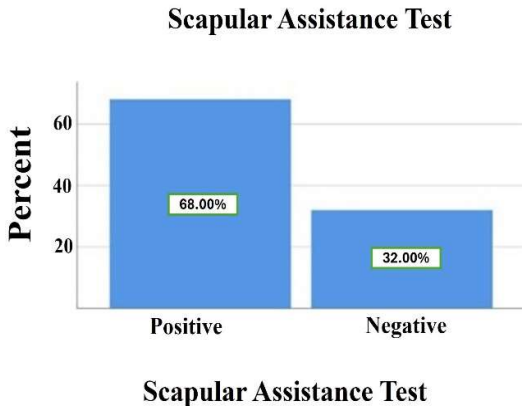

Figure 5: Scapular assistance test

Discussion

The result of the current study showed that scapular muscle pain is frequent in video gamers of Rawalpindi and Islamabad. Current results obtained through the Numerical pain rating scale, Shoulder Pain and Disability index, and Scapular assistance test that scapular muscle pain is present in video gamers. There is evidence found regarding scapular pain among video gamers due to abnormal posture, repetitive movements, and poor ergonomics dependent on patients, age, and prolonged gaming hours of video gamers. However, no such study has been found in Rawalpindi and Islamabad.

[17] investigated the epidemiology of scapular muscle pain among video gamers, while our study conducted in Rawalpindi and Islamabad revealed a prevalent occurrence of scapular muscle pain among gamers. Both studies utilized pain rating scales (NPRS, Numerical Pain Rating Scale) to assess pain levels, emphasizing a prevailing issue across diverse gaming habits. While Dr. Chaitanya's survey encompassed individuals playing video games for a shorter duration on a

PlayStation, our study focused on active gamers within specific age ranges and gaming duration in this region. This localized study offered unique insights into scapular muscle pain among gamers in Rawalpindi and Islamabad, addressing a gap in prior research in this context. In our study, we discovered that 59% of active video gamers in Rawalpindi and Islamabad experienced moderate discomfort, while 68% tested positive on the Scapular Assistance Test. This contrasted with Dr. Chaitanya's research, where 79% of participants in the targeted age group reported pain. Specifically, 29% experienced neck pain, 11% shoulder pain, and 23% upper back pain among video gamers who played for 5 hours or more. Our study focused on a specific age range and gaming duration in this region, while their study encompassed individuals playing for 3-7 hours per day on a PlayStation. Both studies stress the need to address ergonomic factors and promote healthier gaming practices to alleviate pain among gamers.

[18] explored musculoskeletal pain among school-aged children engaged in video gaming, specifically targeting neck and shoulder pain associated with computer gaming. In contrast, our study in Rawalpindi and Islamabad concentrated on scapular muscle pain among young adults engaged in prolonged gaming sessions. Both studies emphasized the significance of addressing ergonomic considerations and healthy gaming habits to mitigate musculoskeletal pain, tailored to different age groups and gaming duration. Despite focusing on distinct age groups and pain areas, both studies highlighted the impact of extended screen time on physical health. In our study focusing on active gamers in Rawalpindi and Islamabad, 59% experienced moderate discomfort, and 68% tested positive on the Scapular Assistance Test. Contrasting this with [19] research on school-aged children playing video games on a computer, where 30.1% of both boys and girls reported localized neck and shoulder pain. While our study highlights a higher prevalence of discomfort among active gamers in this specific region, their research, involving 524 children aged 10 to 14, used a Physical Activity Questionnaire for Children to gather data. Their methodology targeted school-aged children, revealing a significant percentage experiencing neck and shoulder pain, emphasizing the need for broader considerations in addressing discomfort related to gaming across different age groups.

[20] conducted a comprehensive meta-analysis on the effects of video games on the musculoskeletal system, encompassing a wide age range and highlighting negative impacts on various body parts. This contrasts with our localized study on scapular muscle pain among video gamers in Rawalpindi and Islamabad. Tholi's meta-analysis covered diverse musculoskeletal issues associated with excessive gaming, aligning with the findings of scapular muscle pain among active gamers in our study. However, the Rawalpindi and Islamabad study delved specifically into scapular muscle pain, offering detailed insights into a specific pain area among active video gamers in this particular geographic region. Both studies underscored the urgency of addressing the physical consequences of prolonged gaming and advocating for preventive measures within the gaming community. In the investigation led by [21] focusing on individuals aged 60 and older, their Meta-Analysis involving 62,987 participants across 16 studies highlighted adverse effects on the back (n=3), shoulder (n=4), and neck (n=4) due to extended gaming sessions exceeding three hours daily. In contrast, our study examined active gamers in Rawalpindi and Islamabad, where 59% reported experiencing moderate discomfort, and 68% tested positive on the Scapular Assistance Test [22, 23].

Conclusion

Our study highlights the prevalence of scapular muscle pain among active video gamers in Rawalpindi and Islamabad. With 59% experiencing moderate discomfort and 68% testing positive on the Scapular Assistance Test, it's evident that scapular muscle pain significantly impacts this gaming population. These findings emphasize the necessity for targeted interventions, ergonomic adjustments, and increased awareness among gamers to mitigate the adverse effects of prolonged gaming sessions on scapular health. Addressing this issue proactively can aid in reducing pain levels and improving overall well-being within the gaming community. Gaming platforms and health professionals must collaborate, fostering an environment that prioritizes scapular health and facilitates the adoption of preventive measures for sustainable gaming practices.

Limitations

One of the limitations is that a small sample size may be linked to an increased risk of error. Nonprobability convenience sampling, based on availability and accessibility, may introduce selection bias. This could impact the representativeness of the sample. Mobile phone video gamers were not included.

Recommendations

Our study primarily focused on scapular muscle pain prevalence among gamers in Rawalpindi and Islamabad. We suggest extending this investigation to encompass diverse regions within these cities to discern potential variations among gaming communities. Our research primarily analyzed the association between scapular muscle pain and gaming habits; future studies could incorporate psychosocial measures to understand the holistic impact on gamers' well-being. Exploring the long-term effects of scapular muscle pain among gamers would provide insights into pain and disability progression over extended gaming durations. Evaluating the effectiveness of interventions, such as ergonomic strategies or exercise programs, could offer valuable insights into alleviating scapular muscle discomfort. We recommend conducting a randomized trial on scapular muscle pain in gamers to determine effective intervention strategies and gain comprehensive insights for improved gaming health.

References

1. Franks RR, King D, Bodine W, Chisari E, Heller A, Jamal IV F, et al. AOASM position statement on esports, active video gaming, and the role of the sports medicine physician. Clinical Journal of Sports Medicine. 2022;32(3):221.
2. Worsley PR, Rebolledo D, Webb S, Caggiari S, Bader DL. Monitoring the biomechanical and physiological effects of postural changes during leisure chair sitting. Journal of tissue viability. 2018;27(1):16-22.
3. Donati MA, Guido CA, De Meo G, Spalice A, Sanson F, Beccari C, et al. Gaming among children and adolescents during the COVID-19 lockdown: The role of parents in time spent on video games and gaming disorder symptoms. International Journal of Environmental Research and Public Health. 2021;18(12):6642.
4. Pallavicini F, Pepe A, Mantovani F. The effects of playing video games on stress, anxiety, depression, loneliness, and gaming disorder during the early stages of the COVID-19 pandemic: PRISMA systematic review. Cyberpsychology, Behavior, and Social Networking. 2022;25(6):334-354.
5. Wani C, Vijayakumar M, Palekar TJ, Budhwani N, Patel C. Prevalence of Pain In Scapular Muscles In Video Gamers. Prevalence. 2021;10(1).
6. Raichlen DA, Pontzer H, Zderic TW, Harris JA, Mabulla AZ, Hamilton MT,

et al. Sitting, squatting, and the evolutionary biology of human inactivity. Proceedings of the National Academy of Sciences. 2020;117(13): 7115-7121.
7. Sağlam G, Telli H. The prevalence of scapular dyskinesia in patients with back, neck, and shoulder pain and the effect of this combination on pain and muscle shortness. Agri/Journal of the Turkish Society of Algology. 2022;34(2).
8. Baxi G, Jain A, Palekar T, Gohil D, Saini S, Basu S. Comparison of Immediate and Carry Over Effects of Kinesiotaping and Rigid Taping on Pain due to Latent Trigger Points of Upper Trapezius in Individuals with Forward Shoulder Posture: A Randomized Control Trial. Indian Journal of Physiotherapy & Occupational Therapy. 2019;13(3).
9. Ashok K, Purushothaman VK, Muniandy Y. Prevalence of forward head posture in electronic gamers and associated factors. International Journal of Aging Health and Movement. 2020;2(2):19-27.
10. Worlikar AN, Shah MR. Incidence of forward head posture and associated problems in desktop users. Int J Health Sci Res. 2019;9(2):96-100.
11. DiFrancisco-Donoghue J, Balentine J, Schmidt G, Zwibel H. Managing the health of the sport athlete: an integrated health management model. BMJ open sport & exercise medicine. 2019; 5(1):000467.
12. Luján CEM, Esteban C. Ergonomics and Videogames: Habits, Diseases and Health Perception of Gamers. eSports Yearbook 2015/2016: Books on Demand Germany; 2017. 95-105.
13. Panagiotopoulos AC, Crowther IM. Scapular dyskinesia, the forgotten culprit of shoulder pain and how to rehabilitate. SICOT-J. 2019;5.
14. Lange T, Struyf F, Schmitt J, Lützner J, Kopkow C. The reliability of physical examination tests for the clinical assessment of scapular dyskinesis in subjects with shoulder complaints: A systematic review. Physical Therapy in Sport. 2017; 26:64-89.
15. Gieg SD, Schaefer C, Smith MJ, Ma R, Heil SD, Kim HM. Utility of lateral scapular radiographs in initial evaluation of nontraumatic shoulder conditions. JSES Reviews, Reports, and Techniques. 2022;2(2):149-154.
16. Telli H, Sağlam G. Scapular dyskinesis and loss of cervical lordosis in myofascial pain syndrome and its effects on pain and posture disorders. Turkish Journal of Physical Medicine & Rehabilitation. 2023;69 (2): 2587-1250.
17. Chumari Mnl, Hasan Mrm, Adnan A, Umar Rzr, Samuel S, Sidek Aa, et al. Effect of prolonged sitting duration on the risk for musculoskeletal disorders among PC Gamers. Human Factors and Ergonomics Journal. 2019;4(1):66-74.
18. Kamal K, Dahiya N, Singh R, Saini S, Taxak S, Kapoor S. Comparative study of anatomical landmark-guided versus ultrasound-guided suprascapular nerve block in chronic shoulder pain. Saudi journal of anesthesia. 2018;12(1):22.
19. Emara AK, Ng MK, Cruickshank JA, Kampert MW, Piuzzi NS, Schaffer JL, et al. Gamer's health guide: optimizing performance, recognizing hazards, and promoting wellness in esports. Current sports medicine reports. 2020;19(12): 537-545.
20. Kim YH, Nauright J, Suveatwatanakul C. The rise of E-Sports and potential for Post-COVID continued growth. Sport in Society. 2020;23(11):1861-1871.
21. Lam W-K, Liu R-T, Chen B, Huang X-Z, Yi J, Wong DW-C. Health Risks and Musculoskeletal Problems of Elite Mobile Esports Players: A Cross-Sectional Descriptive Study. Sports Medicine-Open. 2022;8(1):65.
22. Mirza Z, Yousaf A, Siddiqui Z, et al. Incidental Diagnosis of Left Atrial Myxoma in a Patient Presenting with Right Shoulder and Inter-Scapular Back Pain: A Case Report. Cureus. 2023;

15(2):e34740.
23. Tholl C, Bickmann P, Wechsler K, Froböse I, Grieben C. Musculoskeletal disorders in video gamers–a systematic review. BMC musculoskeletal disorders. 2022;23(1):1-16.