

A Cross Sectional Study On The Benefit And Health Issues Among Esport Players

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ABSTRACT

Background: ESport was known as professional or competitive video gaming. However, very little is documented about the health-related issues among eSport players. **Objective:** To study the common health issues among eSport players.

Methodology: This study is a cross-sectional study design with a purposive sampling method and sample size of 166. This research used validated questionnaires which consist of the Nordic Questionnaire, Epworth Sleepiness Scale, International Physical Activity (IPAQ), and Depression Anxiety Stress Scale (DASS-21).

Result: A total of 69 eSport players participate in this research. The prevalence of stress levels among eSport players was 26.1%, depression (43.5%), and anxiety (46.4%). The prevalence of mild to severe daytime sleepiness was 24.7% and prevalence for low/moderate physical activity was 39.1%. The most musculoskeletal pain complaint was hand/wrist pain (79.7%), followed by neck pain (76.8%) and the least was knee pain (11.6%). There was a significant association between stress and sleep pattern ($p < 0.05$). However, there was no association between stress, physical activity, and duration play and also no association between musculoskeletal pain sleep pattern, physical activity, and duration play ($p > 0.05$).

Conclusion: Esport players showed that there was an only association between sleep pattern and stress. Other associations might be influenced by other factors such as current working conditions and other environmental factors. We recommend that awareness programs should be done for eSport players to reduce the prevalence of computer-related health issues or injury due to the long-term sedentary nature of the sport and also strengthening the benefit obtained from eSport activity.

Keywords: Esport players, sleep pattern, stress level, musculoskeletal pain, physical activity

INTRODUCTION

According to British Medical Journal (BMJ), eSports is electronic gaming that can be professional or competitive video gaming. ESports is currently growing at a rapid pace worldwide. Professional players usually practiced 3 to 10 hours daily and usually had a sedentary lifestyle due to limited physical activity. The most recurrent complaint among players is eye fatigue (56%) followed by neck

and back pain (42%). There were also complaints of hand and wrist pain (3).

Due to this concerning matter, we decided to conduct a survey to study the health benefits and common health issues such as stress, vision, and ergonomic factors among players in Malaysia. By practicing a healthy and active lifestyle, it can prevent these issues among eSports players.

METHODOLOGY

Samples

In this study, the respondents were selected by using a purposive sampling method. The respondent targeted in this survey was eSport player in Malaysia. Respondents were only selected if they were aged 18 and above, must be born, living and staying in Malaysia, had constant gaming times and had no chronic or mental illnesses before the questionnaire was distributed. Questionnaires were distributed online to eSport players across Malaysia for one year times. Participation in the survey was voluntary as the criteria were fulfilled and each questionnaire was completed using the self-administered method. Through these procedures, a total of 69 respondents were collected and used for analysis.

Data Collection

This research was conducted to any eSport player in Malaysia. The questionnaires were distributed to the respondents by email or social media application and respondents were required to fill in within the period of data collection and the completed questionnaires were submitted via Google Form.

Statistical Analysis

The quantitative data collected through the questionnaires was analysed using the SPSS statistical software version 21. The data was analysed descriptively, and some statistical tests used to further tabulate appropriate findings from the study. The finding was presented in the table as well as a more appropriate diagram format. Findings are considered statistically significant if the p-value is less than 0.05 with a confidence interval of 95.

Research Instruments

In this study, we used five different instruments to collect the data from the respondents. In sociodemographic and characteristics of the e-sport players, we assess respondents' age, race, education level, income, and the characteristics of play such as duration play.

Depression Anxiety Stress Scale (DASS-21) was used to measure the stress level among the e-sports' players. The DASS-21 composed of 21 items self-report questionnaire designed to measure the range of symptoms of both Depression and Anxiety. In completing the DASS, responders were required to

measure the presence of a symptom over the previous week.

Each item was scored from 0 (did not apply to me at all over the last week) to 3 (applied to me very much or most of the time over the past week). The main function of the DASS was to measure the severity of the core symptoms of Depression, Anxiety, and Stress. The scale to which each item belongs is represented by the letters, D (Depression), A (Anxiety), and S (Stress). The sum of scores for each category for identified items will be multiplied by two because DASS 21 is a short-form version of the DASS (the Long Form has 42 items). Once the result is multiplied by 2, each score will be transferred to the DASS severity rating sheet to compare between the three scales and also giving percentile rankings and severity for each category.

Ergonomic issues among eSport players were assessed by Body Symptom Survey (BOSS). This survey will assess the location of the pain, level of severity (no/ mild discomfort, discomfort, pain but able to go to work and pain and unable to go to work), and the frequency (once a year, a few times a year, once a month, a few times a month, once a week, a few times a week and every day).

Sleep patterns among eSport players were determined by using Epworth Sleepiness Scale to assess the sleep pattern among responders. This questionnaire contains 8 sets of questions which each question requires them to rate their daytime sleepiness on a scale of zero (would never doze), one (slight chance of dozing), two (moderate chance of dozing or three (high chance of dozing). The total of scores were calculated and the final result was used to rate their daytime sleepiness.

International Physical Activity Questionnaire (IPAQ) was used to measure the respondents' estimated physical activity. Respondents' were required to answer seven sets of questions on their estimated physical activity within the last seven days. The final result was categorized into three categories which are low physical activity, moderate physical activity, or high physical activity

ETHICAL CLEARANCE

This study was approved by Research Ethics Review Committee, University of Cyberjaya No. UOC/CRERC/AL-ER(18/2020).

RESULT

Socio-demographic statistics

Table 1. Sociodemographic factors and characteristic of play among e-sports players

Sociodemographic data		Total, n = 69 (%)
Age	≤ 21	9 (13.0)
	>21	60 (87.0)

Gender	Male	59 (86.0)
	Female	10 (14.0)
Religion	Muslim	39 (56.5)
	Hindu	3 (4.3)
	Buddha	26 (37.7)
	Christian	1 (1.5)
Marital Status	Single	56 (81.2)
	Married	13 (18.8)

Highest Education Level	Primary	3 (4.3)
	Secondary	18 (26.1)
	Tertiary	48 (69.6)
Occupation	Student	27 (39.1)
	Government employees	2 (2.9)
	Private sector employee	16 (23.2)
	Self-employed	24 (34.8)
Income	≤ RM4600	57 (82.6)
	> RM4600	12 (17.4)
Duration of play(months)	≤ 60	42 (60.9)
	> 60	27 (39.1)
Duration of play(hours/day)	≤ 3	24 (34.8)
	>3	45 (65.2)

Duration of play(hours/week)	≤20	30 (43.5)
	21-40	28 (40.6)
	≥41	11 (15.9)
Type of e-sports tournament joined	Ladder/ranking	37 (53.6)
	National	26 (37.7)
	Global	6 (8.7)
Current smoking status	Yes	22 (31.9)
	No	44 (63.8)
	Ex-smoker	3 (4.3)

A total of 69 questionnaires were utilized, consisting of responses from 59 male (86.0%) and 10 female (14.0%). Participation was limited to adult age more than 21 (n=60, 87.0%), fitting the goal of the research study. Types of religion is divided into Muslim (n=39, 56.5%), followed by Buddha (n=26, 37.7%), Hindu (n=3, 4.3%) and Christian (n=1, 1.5%).

Most of the eSport players are single (n=56, 81.2%) while the rest are married (n=13,18.8%). For the most part the eSport players have tertiary education (n=48,69.6%), subsequently secondary education (n=18,26.1%) and primary education (n=3,4.3%). Predominately the eSport players are students (n=27,39.1%) along with self-employed (n=24,34.8%), private sector employees (n=16,23.3%) and government employees (n=2,2.9%). Substantially the average income of the eSport players are less than RM 4600 (n=57,82.6%) while the remaining have income more than RM 4600 (n=12,17.4%).

Generally, most of the eSport players spend less than 60 months playing (n=42,60.9%), while the rest took more than 60 months to play (n=27,39.1%). Besides, most eSport players usually take less than 3 hours in a day to play (n=24, 34.8%) while the rest take more than 3 hours in a day to play (n=45, 65.2%).

Moreover, the eSport players commonly plays less than 20 hours in a week (n=30 ,43.5%) while the remaining takes about 21-40 hours in a week to play (n=28 ,40.6%) and more than 41 hours in a week to play (n=11 ,15.9%). Furthermore, the types of eSport tournament joined is divided into ladder/ranking (n=37 ,53.6%) accompanied by national (n=26 ,37.7%) and lastly global (n=6 ,8.7%).

Finally, more often than not the eSport players are non-smokers (n=44 ,63.8%) while the rest being smokers (n=22 ,31.9%) and ex-smokers (n= 3 ,4.3%).

Prevalence of stress level among esports players.

Table 2. Prevalence of stress among e-sports players

Stress level	Frequency, n (%)
Normal	51 (74.0)
Stress	18 (26.0)

Most of the eSport players have no stress (n=51, 74.0%) while the remaining eSport players had stress (n=18, 26.0%).

Prevalence of musculoskeletal disease among eSport players

Table 3. Prevalence of ergonomic issues among e-sports players

Site	Frequency	
	Yes, n (%)	No, n (%)
Neck	53 (76.8)	16 (23.2)
Shoulder	43 (62.3)	26 (37.7)
Upper back	46 (66.7)	23 (33.3)
Lower back	52 (75.4)	17 (24.6)
Upper arm	28 (40.6)	41 (59.4)
Elbow	35 (50.7)	34 (49.3)
Lower Arm	31 (44.9)	38 (55.1)
Hand/ Wrist	55 (79.7)	14 (20.3)
Thigh	15 (21.7)	54 (78.3)

Knee	8 (11.6)	61 (88.4)
Lower leg	10 (14.5)	59 (85.5)
Ankle/ Foot	11 (15.9)	58 (84.1)

Majority of the eSport players accuse of hand/wrist pain(n=55,79.7%), followed by neck pain (n=53,76.8%), lower back pain (n=52,75.4%), upper back pain (n=46,66.7%), shoulder pain (n=43,62.3%), elbow pain (n=35,50.7%), lower arm pain (n=31,44.9%), upper arm pain (n=28,40.6%), thigh pain (n=15,21.7%), ankle/foot pain (n=11,15.9%), lower leg pain (n=10,14.5%) and the least was knee pain (n=8,11.6%).

Prevalence of daytime sleepiness among eSport players

Table 4. Prevalence of daytime sleepiness among e-sports players

Scale	Frequency, n (%)
Normal daytime sleepiness	52 (75.3)
Mild daytime sleepiness	4 (5.8)
Moderate daytime sleepiness	11 (15.9)
Severe daytime sleepiness	2 (3.0)

Greater number of eSport players have a normal level of daytime sleepiness (n=52,75.3%), followed by players that have daytime sleepiness (n=17,24.7%) which consist of mild daytime sleepiness (n=4,5.8%), moderate daytime sleepiness (n=11,15.9%), and severe daytime sleepiness (n=2,3.0%).

Prevalence of the physical activity among eSport players

Table 5. Prevalence of the physical activity among e-sports players

Physical Activity	Frequency, n (%)
Low/ Moderate	27 (39.1)
High	42 (60.9)

Generally eSport -players have high physical activity (n=42,60.9%) accompanied by low or moderate physical activity (n=27,39.1%).

Factors associated between stress and sleep pattern, physical activity, and duration play

Table 6. Association between stress and sleep pattern, physical activity and duration play

		Stress level		Total, n (%)	OR (CI)	P value
		Normal	Stress			
Sleep pattern	Normal	48 (92.3)	4 (7.7)	52	1	<0.001
	Abnormal	3 (17.6)	14 (82.4)	17	0.03(0.005,0.147)	
Physical Activity	Low/Moderate	25(92.6)	2 (7.4)	27	1	0.126
	High	26(61.9)	16(38.1)	42	4.85 (0.641,36.760)	
Duration play	Less than 3 hours	15(62.5)	9(37.5)	24	1	0.434
	More than 3 hours	36(80.0)	9(20.0)	45	2.06 (0.337,12.581)	

Principally the eSport players that have abnormal sleep patterns have a higher prevalence of getting stress (n=14,82.4%) compared to those that have normal sleep patterns (n=4,7.7%). There is a significant association between sleep pattern and stress ($p<0.05$) among the eSport players.

ESport players who are physically active are more liable to acquire stress (n=16,38.1%) compared to those that are not physically active (n=2,7.4%). However, there is no significant association between physical activity and stress ($p>0.05$) among the eSport players. Players that spend more than 3 hours per day playing video games have a lower prevalence of getting stress (n=9,20.0%) compared to those who play less than 3 hours(n=9,37.5%). However, there is no significant association between duration of play per day and stress ($p>0.05$).

Association between musculoskeletal disorder with sleep pattern, physical activity and duration play.

Table 7. Association between ergonomic issues and sleep pattern, physical activity and duration play

		Ergonomic Issues		Total, n (%)	OR (CI)	P value
		Yes	No			
Sleep pattern	Normal	46 (88.5)	6 (11.5)	52 (100)	1	0.052
	Abnormal	13 (76.5)	4 (23.5)	17 (100)	0.18 (0.032, 1.01)	

Physical Activity	Low/ Moderate	22 (81.5)	5 (18.5)	27 (100)	1	0.106
	High	37 (88.1)	5 (11.9)	42(100)	3.8 (0.75, 19.6)	
Duration play	Less than 3 hours	22 (91.7)	2 (8.3)	24 (100)	1	0.103
	More than 3 hours	37 (82.2)	8 (17.8)	45 (100)	0.23 (0.4, 1.34)	

Esport players that have abnormal sleeping patterns have a lower prevalence of getting musculoskeletal pain (n=13,76.5%) compared to those who have normal sleeping patterns (n=46,88.5%). However, there is no significant association between sleeping patterns and musculoskeletal pain ($p>0.05$) among the eSport players.

Esport players who have high physical activity have a higher prevalence of getting musculoskeletal pain (n=37,88.1%) compared to those who have low and moderate physical activity (n=22,81.5%). However, there is no significant association between physical activity and musculoskeletal pain ($p>0.05$) among the eSport players. Players with duration play of more than 3 hours per day have the highest prevalence of getting musculoskeletal pain (n=37,82.2%) compared to players with duration

play of fewer than 3 hours per day ($n=22, 91.7\%$). However, there is no association between duration play and musculoskeletal pain ($p>0.05$).

DISCUSSION

Sociodemographic of eSports players

The prevalence of eSport players among males (86.0%) is higher compared to females (14.0%). This corresponds to the study done in the USA which stated that most of the eSport gamers are males (95.12%) (4). This might be due to males adopting online games earlier in life (8). Most of the eSport players are above 21 years old (87.0%) which corresponds to the study made by the University of Carolina, United States (55.0%). A higher number of players aged more than 21 years old may be due to an increase in their motivation for more achievement in the games that they play (19). From a total of 69 of participants, 39.1% of them were students which does not correspond to the study made in Germany (27.4%). This study shows that most of the eSport players are working full time (32.6%) (18). This difference in result is most likely due to our questionnaire being distributed more to the university students instead of the working group.

ESports players with tertiary education are the highest (69.6%) compared to primary (4.3%) and secondary (26.1%). As stated in the study done in Germany, a higher number of eSport players with higher education levels (52.5%) compared to those with lower education levels (47.5%) (18). This indicates that eSport players were also academically educated instead of just spending their time playing video games. The prevalence of eSport players who spend more than 3 hours per day playing games is 65.2% which corresponds to the study done in the United States. ESports players tend to spend more time playing games to achieve higher scores and also to socialize more with other players in the game (19).

Stress level among eSport players

The prevalence of stress levels among eSport players is 26% which is lower compared to players that do not have stress symptoms (74%). This corresponds to research that has been conducted in German which studies the effect of video and computer games on recovery from stress. In this study, there is a strong positive relationship between the use of computer games to recover from stress or strain ($\beta = .60, p < .001$) (16). This shows that as the players play video or computer games, it can reduce their stress level. However, the result is contradictory with a study which study the correlation between game addiction and engagement with depression, stress, and anxiety. The result shows that there was a significant indirect effect of game addiction on stress levels. ($p<0.001$) (14).

Another research was done among adolescents in Saudi which study the association between game addiction and stress level among adolescents. The result shows that the prevalence of stress in this study was 75% while the prevalence of game addiction was 5%. There is a strongly significant association between game addiction with both moderate and high stress among the adolescents (moderate OR = 6.7, 95% CI = 2.9–15.5; high OR = 11.9, 95% CI = 4.7–30.1). This shows that if they are addicted to games, they have a higher possibility to develop stress compared to others (15).

Musculoskeletal disorders among eSport players.

The prevalence of musculoskeletal symptoms/ pain is 85.5%. This probably due to the long duration of play and improper posture during playing games. This corresponds to a study done to evaluate the discomfort level among the gamers. The result shows that the mean values of discomfort level of pre-and post-experimental are 0.37 [SD = 0.669] and 1.90 [SD = 1.155] respectively and the difference is 1.53 [SD = 1.196] (2). This shows that the prolonged gaming session does affect the discomfort level among the gamers. This is further supported by another study done in Swedish which aims to investigate the relationship between online gaming time and the additive effect of gaming musculoskeletal symptoms. The result shows that gaming was associated with musculoskeletal symptoms (OR 1.081, 95% CI 1.034–1.129, P = 0.001) (9).

In this research, the most site of the musculoskeletal complaint are hand/wrist pain(79.7%), followed by neck pain (76.8%), lower back pain (75.4%), upper back pain (66.7%), shoulder pain (62.3%), elbow pain (50.7%), lower arm pain (44.9%), upper arm pain (40.6%), thigh pain (21.7%), ankle/foot pain (15.9%), lower leg pain (14.5%) and the least was knee pain (11.6%). The result is similar to another study done among eSport players from Canada and the USA shows that the highest complaint was neck and back pain (42%), followed by wrist pain (36%) and hand pain (32%) (3).

Association between stress and sleep pattern among eSport players

In this study, players that have abnormal sleep patterns have a higher prevalence of getting stress (17.6%) compared to those that have normal sleep patterns (92.3%) with the presence of an association between sleep pattern and stress ($p < 0.05$). A study was done and showed that the proportion of anxiety and the depressive symptom was higher among the participants which have abnormal sleeping patterns such as reduction in night time sleep duration and increased daytime napping. The prevalence of depression (17.21%) and anxiety (12.58%) is highest among those respondents which were reduced in night time sleep (7). Another research also showed sufficient sleep hours able to reduce stress significantly. A total of 39% respondent who slept for less than five

hours had felt stress while the respondent who slept for six hours and above showed lesser stress (1). For example, only 23% of the respondents that slept at least eight hours had stress. This might be concluded that sufficient sleep hours and good sleeping quality able to reduce stress significantly.

Association between stress and physical activity among eSport players

Those who are physically active are more prone to getting stress (38.1%) compared to those that are not physically active (7.4%). However, there is no association between physical activity and stress ($p > 0.05$). Besides, the result was inconsistent with another study done and which the result for males with activity limitations, the OR for the perceived stress level for those who participated in walking exercise for 5 days or more compared to the non-participation group was 0.630 (95% CI, 0.472-0.841; $P < 0.05$) (11). The difference in result could be due to respondents not having a consistent walking exercise for 5 days and lead to a non-significant result.

Another similar study was done and indicate that particular leisure activity, collegiate sport, and individuals' experiences of stress because they participated in this type of leisure and the assumption is relevant in our study since our study consists of the student (10). They might actively be engaged in sports activities and because of sports activities, they were having lots of stress.

Association between stress and duration play among eSport players

Players that spend more than 3 hours per day playing video games have a lower prevalence of getting stress (37.5%) compared to those who play less than 3 hours (20.0%). However, this result was not significant since the P-value is > 0.005 . This result is contradicted by a study which found that video game addiction was significantly positively correlated with depression, anxiety, and stress, and time spent per week was positively associated with addiction (14).

Other studies also showed that video game addiction significantly predicted DAS, with depression showing the largest effect followed by stress and anxiety (13,6,5). This can conclude that long hours of playing video games per day can lead to addiction and cause stress problems but the result obtained in this study was different compared to the previous study. This might result in this study was influenced by other comorbid factors such as types of game playing, the intention of playing the game and duration of as e-sport player.

Association between musculoskeletal disorders and sleep pattern among eSport players

Based on this study, there is no association between sleeping patterns and musculoskeletal pain ($p > 0.05$). However, the results were contraindicated to another study done which shows a

prevalence of poor sleep quality of 28.2 % (CI 95 % 23.1-33.1) was identified to be associated with age and discomfort in the cervical region and scapular waist variables (17). This may be due to as you age your body produces lower levels of growth hormone, so you'll likely experience a decrease in slow-wave or deep sleep. When this happens you produce less melatonin, meaning you'll often experience more fragmented sleep and wake up more often during the night.

One possible explanation is that sleep disturbances disrupt the muscle relaxation and healing that normally occur during sleep. Additionally, it is well established that musculoskeletal pain can disrupt sleep, contributing to a vicious cycle of musculoskeletal pain disrupting sleep, and sleep problems contributing to musculoskeletal pain.

Association between musculoskeletal disorders and physical activity among eSport players

Those who have high physical activity have a higher prevalence of getting musculoskeletal pain (62.7%) compared to those who have low and moderate physical activity (37.3%). However, there is no association between physical activity and musculoskeletal pain ($p>0.05$). Besides, a study shows that in the group that documented MSK pain during the previous week (3722.4 ± 3667.3 MET-minutes), the mean weekly physical activity levels were not substantially lower than in the group without MSK pain (3641.3 ± 4563.1 MET-minutes) (mean gap 81.1 MET-minutes/week; 95 % CI -1266.9 to 1429.1, $p=0.906$) (12).

There was no difference in physical activity levels between athletes with and without MSK pain, meaning that physical activity levels were not influenced by MSK pain. This could be due to the fact the causes of musculoskeletal pain are varied. Muscle tissue can be damaged with the wear and tear of daily activities. It is most often caused by an injury to the bones, joints, muscles, tendons, ligaments, or nerves. This can be caused by jerking movements, car accidents, falls, fractures, sprains, dislocations, and direct blows to the muscle. Musculoskeletal pain can also be caused by overuse. Pain from overuse affects 33% of adults.

Association between musculoskeletal disorders and duration play among eSport players

Contingent on this study, players with duration play of more than 3 hours per day have the highest prevalence of getting musculoskeletal pain (82.2%) compared to players with duration play of fewer than 3 hours per day (8.3%). However, there is no association between duration play and musculoskeletal pain ($p>0.05$). Furthermore, another study shows that the average weekly eSports - related training volume was significantly lower in the group who reported MSK pain during the previous week (20.9 ± 15.1 hours) compared with the group with no MSK pain (26 ± 18.5 hours) (mean

difference -5.6 hours/week; 95% CI -10.6 to -0.7 , $p=0.027$) (12). They observed an important correlation between pain in MSK and training intensity linked to eSports.

Those with MSK pain had 6 hours fewer preparation a week for eSport. This means that involvement in eSport by athletes with MSK pain could be affected as their amount of weekly training was slightly lower relative to athletes without MSK pain. This could be because increase the duration of the training will strengthen the muscle because building strength is important for stabilizing the joints and preventing future injuries.

It helps you maintain proper posture and balance and reduces the risk of injuries that could lead to more musculoskeletal pain.

CONCLUSION

In a nutshell, most of the e-sport players are generally young males who have good health, financial and educational status. The prevalence of stress level among e-sport players was lower than the international findings but the prevalence of musculoskeletal pain among e-sport players was higher than the international findings which underpin the need to develop sport-specific management strategies.

Besides, there was a significant association between stress level and sleep patterns which was also proven that the proportion of anxiety and the depressive symptoms were the factors for unusual sleeping patterns such as the decrease in night-time sleep and increased daytime napping. However, there is no association between physical activity and duration of play with stress level. Moreover, there is no significant association between musculoskeletal pain with sleep pattern, physical activity, and duration of play.

The sector is still evolving in eSport wellness, thereby offering insufficient data to provide precise management techniques. A study was done and shows that how eSport players can maintain their fitness by collaborating with several health providers such as physiotherapists, physical trainers, and workout experts (3).

ACKNOWLEDGEMENTS

We would like to give our gratitude to all eSports players that help us and participate in our research.

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