1st Place Essay - What are the health challenges an esport player faces and how can they be addressed by stakeholders?

✓Student's choice

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Esports has grown aggressively in both a recreational and professional level, where millions of players are engaging daily in competitive gaming [1]. Universities are adding eSport teams and employing players at an exponential rate [2]. For example, the Chung-Ang University in South Korea accepts gamers student athletes [3]. A few esports competitions have a system that is comparable to physical sports, with professional players needing preparation and training to grow. I will be exploring the potential health challenges an esport player may face when engaging in extended sessions of virtual gaming and any prevention strategies that stakeholders can employ.

To succeed in such an industry, especially at a competitive level, players will be required to play for many hours a day. This involves remaining sedentary for extended periods of time, maintaining improper postures, and staring at light-emitting screens. WHO has recommendations and a guideline that provides details of all age groups on how much physical activity is needed for good health [4]. Given that most esports players have an average age of 24 and 27 years old for males and females respectively, the WHO guidelines indicate that this category of people should limit the amount of time spent remaining sedentary whilst engaging with at least 75-150 minutes of vigorous-intensity aerobic physical activity. Abstaining from such activities have led to studies surrounding the topic of reduced physical activities.

A study made to estimate the historical reductions in daily steps made by humans showed that the population present during the Palaeolithic period had, on average, a higher step count per day compared to US adults in 2010 [5,6]. Estimated daily step numbers have declined approximately 50% to 70% since the introduction of new technologies such as powered machinery or, in this case, video games. The amount of time spent playing video games has increased steadily and so has the prevalence of chronic conditions [7]. In a study which set out to determine if e-athletes moved enough, Kari (2012) found that 115 e-athletes trained approximately 5.28 hours every day around the year [8]. The implications of the finding can point towards futures where there is an increased risk in chronic health conditions such as obesity due to the increased sedentary lifestyle. According to researchers in The Journal of the American Osteopathic Association, players experienced health issues including blurred vision, neck and back pain from poor posture, metabolic dysregulation from prolonged sitting and high consumption of caffeine and sugar, and more debilitating psychological conditions such as depression and anxiety [9].

E-athletes are at a risk of developing cumulative trauma disorder (CTD), a physical injury that results from the cumulative effects of repetitive stressful movements or

postures [10]. Areas commonly involved are the hand, wrist, shoulder, and neck which can result in disorders such as carpal tunnel syndrome and neck tension syndrome. Although the study in question was conducted in 2002 and its sample was predominantly children between the ages of 12-18, the conditions still apply to the adults involved in today's esports. The study found that up to 30.8% of students reported discomfort of the neck, 37.7% had discomfort of the eyes, 29.7% had discomfort of the wrist, and 30.5% reported feeling fatigue [11]. In the study conducted by the Journal of the American Osteopathic Association, it was concluded that many e-athletes have compute vision syndrome, a condition characterised by blurry vision, lower back pain, and tension headache. Such a condition was found in 90% of individuals who used a computer for more than 3 hours a day. These short-term conditions affect e-athletes daily as they continue their extended sedentary sessions of gaming. Aside from the short-term implications, these can develop into chronic conditions that have long-term implications such as obesity and hypertension.

Aside from the physical conditions an e-athlete may endure, there also present the risks to mental health. One of these is developing an addiction to playing video games. Several studies have focused on correlating the relationship between addiction and problematic video gaming. The degree of video gaming has been linked to traits such as low self-esteem, anxiety, aggression, and symptoms of depression [12]. In one study, 7200 Korean adolescents who met the criteria for internet gaming disorder participated in an online survey to determine the correlation between IGD and depression, using the Internet Gaming Disorder scale (IGD-9) and the Patient Health Questionnaire-9 (PHQ-9). The results of this study showed that depression is a common co-morbid condition among patients with internet gaming disorder. It was found that males had a higher likelihood of engaging with video gaming, therefore increasing the likelihood of developing internet gaming disorder and, as a comorbidity, depression. 55.2% were found to have depression as a comorbidity [13]. In females, 44.8% belonged to the comorbid depression group. It should be noted that females are twice as likely to be diagnosed to depression than males, hence it can be inferred that females are more vulnerable to the symptoms of depression, especially when associated with IGD. These results suggest that there is an association between internet gaming disorder and symptoms of clinical depression.

Han et al [14] found that there were differences in brain structure and function between professional and nonprofessional e-athletes. It was observed the volumes of grey matter in the anterior cingulate gyrus was significantly larger in volume in professional e-athletes compared to nonprofessional e-athletes. This study suggests that such differences in grey matter volume can lead to different clinical characteristics between professionals and non-professionals. Such changes lead to conditions that affect an individual's ability to process emotion and even lead to poor decision-making and judgement. Increases in grey matter volume in the thalamus can lead to disruptions in the stimulus-reward pathway and altered conditioned responses.

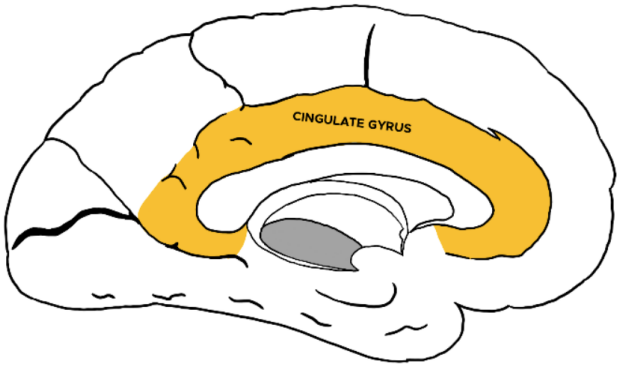

Figure 1 [35] - The cingulate cortex mediates aspects of attention, emotional regulation, and cognitive and emotional processes. Changes to such a region can lead to declines in cognitive performances and poor emotional control.

Finally, a third health challenge that should be addressed within the esports community is the risk of sleep deprivation. Sleep is a significant factor that influences the performance of an individual at accomplishing performance-heavy tasks. There has been little research done into the issue of sleep deprivation and its effects on eSport athletes. However, studies carried out into the effects of sleep deprivation on the body have led to conclusions being made for e-athletes and the consequences of sleep deprivation on their bodies.

The two cognitive processes that play a part in esports are attention and temporary memory. The average time taken for an eSport match to occur is approximately 40 minutes [15]. E-athletes are needed to maintain a degree of concentration and attention for long periods of time, thus requiring sustained attention and mental clarity. Sleep deprivation plays a part in hindering such skills and needs to be addressed. The use of caffeine has been associated with longer sleep latency and a decrease in sleep efficiency [16]. In a study conducted on rugby players, players ingested caffeine before a game and saliva samples were collected after. It was found that compared to the nights leading to the game, on the night of the game, players went to bed 3 hours later and had 1:30 hours less sleep. The increase in caffeine saliva concentrations correlated with the increase in sleep latency and decrease in sleep efficiency. This can lead to poor cognitive skills, poor executive functioning, and poor metacognition [17]. Other factors that can influence sleep quality include sleep disorders, travel, use of light-emitting devices, and the use of performance-enhancing substances [18]. In conclusion, sleep deprivation leads to a decline in selective and sustained attention, as well as working memory, affecting an e-athlete's ability to function efficiently.

E-athletes face many health conditions that can increase the risk of chronic conditions in the future. So, what can be done? One thing that stakeholders can do is push for changing the athlete's battle station during competitive games, for example, pushing the monitor away by 30 inches can help prevent computer vision syndrome, and modifying the lights in the room to an extent that stops the player from squinting. E-athletes should also be advised to perform exercises that reduce eye fatigue. A

programme could be promoted by stakeholders to teach players exercises, such as near-far focusing, palming, and the "20-20-20 rule" that involves looking 20 feet away for 20 seconds every 20 minutes [19]. Athletes should also limit blue light exposure before going to sleep. Sleep questionnaires, such as the Pittsburgh Sleep Quality Index, should be used to ensure players are getting adequate sleep to function efficiently as blue light is correlated with poorer sleep quality.20 Regarding the increased sedentary lifestyle, stakeholders could push for e-athletes to engage in less sedentary activities by pushing for achieving a specific step count per day, preferable between 7000 - 10,000 steps [21]. They could push for dietary counselling, encouraging a more healthier lifestyle. To combat the risks of gaming addiction, athletes could be screened and, if required, referred to health professionals for treatment. Assessments that could screen athletes include the 20-item Toronto Alexithymia Scale [22], Patient Health Questionnaire (PHQ-9) [23], and the Screen for Child Anxiety Related Disorders (SCARED) [24]. E-athletes, although do not experience nearly the same health challenges that traditional athletes face, do require nearly the same support both mentally and physically.

References

1. 2018, M. (2020) Rainbow Six: Siege Esports Hours on Twitch Quadrupled Compared to Last Year. Newzoo, Newzoo. Available at: https://newzoo.com/insights/articles/rainbow-six-siege-esportshours-on-twitch-quadrupled-compared-to-last-year/ (Accessed: 07 December 2020).

2. DiFrancisco-Donoghue, J. et al. (2019) "Managing the health of the eSport athlete: an integrated health management model", BMJ Open Sport & Exercise Medicine, 5(1), p. e000467. doi:10.1136/bmjsem-2018-000467.

3. South Korean University Now Accepts Gamers as Student Athletes (2020). Available at: https://gizmodo.com/south-korean-university-now-accepts-gamers-as-student-a-1547111361 (Accessed: 07 December 2020).

4. Physical activity (2020). Available at: https://www.who.int/news-room/factsheets/detail/physical-activity (Accessed: 07 December 2020).

5. Booth, F., Roberts, C. and Laye, M. (2012) "Lack of Exercise Is a Major Cause of Chronic Diseases", Comprehensive Physiology. doi: 10.1002/cphy.c110025.

6. BASSETT, D. et al. (2010) "Pedometer-Measured Physical Activity and Health Behaviors in U.S. Adults", Medicine & Science in Sports & Exercise, 42(10), pp. 1819-1825. doi:10.1249/mss.0b013e3181dc2e54.

7. (2020) Strivesponsorship.com. Available at: http://strivesponsorship.com/wpcontent/uploads/2017/08/nielsen-games-360-report-2017.pdf (Accessed: 07 December 2020).

8. (PDF) Do E-Athletes Move?: A Study on Training and Physical Exercise in Elite E-Sports (2020). Available at: https://www.researchgate.net/publication/313464582_Do_EAthletes_Move_A_Study_on_Training_and_Physical_Exercise_in_Elite_E-Sports (Accessed: 10 December 2020).

9. Zwibel, H. et al. (2019) "An Osteopathic Physician's Approach to the Esports Athlete", The Journal of the American Osteopathic Association, 119(11), p. 756. doi: 10.7556/jaoa.2019.125.

10. Peper, E., 2002. Cumulative Trauma Disorder Risk For Children Using Computer Products: Results Of A Pilot Investigation With A Student Convenience Sample. [online] ResearchGate. Available at: <https://www.researchgate.net/publication/10994370_Cumulative_Trauma_Disorder_Risk_for_Children_Using_Computer_Products_Results_of_a_Pilot_Investigation_with_a_Student_Convenience_Sample/link/5a6e85300f7e9bd4ca6d5317/download> [Accessed 07 December 2020].

11. (2020) Ncbi.nlm.nih.gov. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1497444/pdf/12477916.pdf (Accessed: 08 December 2020).

12. Kuss, D. and Griffiths, M. (2011) "Internet Gaming Addiction: A Systematic Review of Empirical Research", International Journal of Mental Health and Addiction, 10(2), pp. 278-296. doi: 10.1007/s11469-011-9318-5.

13. Wang, H., Cho, H. and Kim, D. (2018) "Prevalence and correlates of comorbid depression in a nonclinical online sample with DSM-5 internet gaming disorder", Journal of Affective Disorders, 226, pp. 1-5. doi: 10.1016/j.jad.2017.08.005.

14. Han, D., Lyoo, I. and Renshaw, P. (2012) "Differential regional gray matter volumes in patients with on-line game addiction and professional gamers", Journal of Psychiatric Research, 46(4), pp. 507-515. doi: 10.1016/j.jpsychires.2012.01.004.

15. Schubert, M., Drachen, A. and Mahlmann, T. (2016) "Esports Analytics Through Encounter Detection", MIT Sloan, p. Available at: https://portal.research.lu.se/portal/en/publications/esports-analytics-through-encounterdetection(37670941-2b22-4b72-84fc-7022700057df).html (Accessed: 08 December 2020).

16. "Caffeine use in a Super Rugby game and its relationship to post-game sleep" (2020), p. Available at: https://www.tandfonline.com/doi/full/10.1080/17461391.2018.1433238 (Accessed: 10 December 2020).

17. Friedman, N. and Miyake, A. (2017) "Unity and diversity of executive functions: Individual differences as a window on cognitive structure", Cortex, 86, pp. 186-204. doi: 10.1016/j.cortex.2016.04.023.

18. "Prevalence of sleep disorders and sleep problems in an elite super rugby union team" (2020), p. Available at: https://www.tandfonline.com/doi/full/10.1080/02640414.2018.1537092 (Accessed: 10 December 2020).

19. (2020) Ijcmr.com. Available at: http://www.ijcmr.com/uploads/7/7/4/6/77464738/_effect_of_pranayama_and_eye_exercises_on_visual_acuity_of_medical_students_a_case_control_study__.pdf (Accessed: 08 December 2020).

20. Publishing, H. (2020) Blue light has a dark side - Harvard Health, Harvard Health. Available at: https://www.health.harvard.edu/staying-healthy/blue-light-has-a-dark-side (Accessed: 07 December 2020).

21. (2020) Health.gov. Available at: https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf#page=55 (Accessed: 08 December 2020).

22. Loas, G. et al. (2017) "The measurement of alexithymia in children and adolescents: Psychometric properties of the Alexithymia Questionnaire for Children and the twenty-item Toronto Alexithymia Scale in different non-clinical and clinical samples of children and adolescents", PLOS ONE, 12(5), p. e0177982. doi: 10.1371/journal.pone.0177982.

23. PHQ-9 Depression Test Questionnaire (2020). Available at: https://patient.info/doctor/patienthealth-questionnaire-phq-9 (Accessed: 08 December 2020).

24. Beidas, R. et al. (2015) "Free, Brief, and Validated: Standardized Instruments for Low-Resource Mental Health Settings", Cognitive and Behavioral Practice, 22(1), pp. 5-19. doi: 10.1016/j.cbpra.2014.02.002.

25. Roberts, S., Teo, W. and Warmington, S. (2018) "Effects of training and competition on the sleep of elite athletes: a systematic review and meta-analysis", British Journal of Sports Medicine, 53(8), pp. 513-522. doi: 10.1136/bjsports-2018-099322.

26. Bonnar, D. et al. (2019) "Sleep and performance in Eathletes: for the win!", Sleep Health, 5(6), pp. 647-650. doi: 10.1016/j.sleh.2019.06.007.

27. von der Heiden, J. et al. (2019) "The Association Between Video Gaming and Psychological Functioning", Frontiers in Psychology, 10. doi: 10.3389/fpsyg.2019.01731.

28. Esports Athletes At-Risk for Serious Injuries, Health Issues - Doctors That DO. Doctors of Osteopathic Medicine (2019). Available at: https://doctorsthatdo.osteopathic.org/esportsathletes-at-risk-for-serious-health-issues (Accessed: 07 December 2020).

29. O'Keefe, J. et al. (2010) "Achieving Hunter-gatherer Fitness in the 21st Century: Back to the Future", The American Journal of Medicine, 123(12), pp. 1082-1086. doi: 10.1016/j.amjmed.2010.04.026.

30. Rudolf, K. et al. (2020) "Demographics and Health Behavior of Video Game and eSports Players in Germany: The eSports Study 2019", International Journal of Environmental Research and Public Health, 17(6), p. 1870. doi: 10.3390/ijerph17061870.

31. Pereira, A. et al. (2019) "Virtual sports deserve real sports medical attention", BMJ Open Sport & Exercise Medicine, 5(1), p. e000606. doi: 10.1136/bmjsem-2019-000606.

32. Columb, D., Griffiths, M. and O'Gara, C. (2019) "Online gaming and gaming disorder: more than just a trivial pursuit", Irish Journal of Psychological Medicine, pp. 1-7. doi: 10.1017/ipm.2019.31.

33. Sousa, A. et al. (2020) "Physiological and Cognitive Functions Following a Discrete Session of Competitive Esports Gaming", Frontiers in Psychology, 11. doi: 10.3389/fpsyg.2020.01030.

34. Chung, T. et al. (2019) "Will esports result in a higher prevalence of problematic gaming? A review of the global situation", Journal of Behavioral Addictions, 8(3), pp. 384-394. doi: 10.1556/2006.8.2019.46.

35. Cingulate cortex (2013). Available at: https://upload.wikimedia.org/wikipedia/commons/d/dc/Gray727_cingulate_gyrus.png (Accessed: 11 December 2020).