2nd Place Essay - What are the health challenges an esport player faces and how can they be addressed by stakeholders?

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INTRODUCTION

Electronic sports (esports) refer to the practice of playing video games as a competitive sport, typically at organised events that are streamed for spectators (Hamari & Sjöblom, 2017). In 2019, the global esports market generated $1.1 billion, reaching an audience of 453.8 million people (Newzoo, 2019). The rise of esports has legitimised competitive gaming as a profitable career option, contradicting the notion of gaming solely being a recreational activity (Bányai *et al.* 2020). However, playing at this competitive level can be physically and mentally demanding (Chung *et al.* 2019). eSport players, otherwise known as "eAthletes", are often required to practice their game for several hours per day in order to be apt for competition (Kari & Karhulahti, 2016). These long play sessions are characterised elongated periods of sitting, excessive screen exposure and repeated fine motor activities, making eAthletes prone to posture-related back/neck pain, eye fatigue and repetitive strain injuries (Chung *et al.* 2019; DiFrancisco-Donoghue *et al.* 2019; Sousa *et al.* 2020). Furthermore, there is evidence to suggest that the psychophysiological stress that eAthletes are exposed during competitions are comparable to that of traditional athletes (Rudolf *et al.* 2016). This stress, alongside the mental health complications associated with competition, are further health challenges that eAthletes must face (Himmelstein *et al.* 2017; Rice *et al.* 2016; Taylor, 2012). This essay will address the physical and mental health challenges of eAthletes and how these can be addressed by stakeholders.

THE PHYSICAL HEALTH CHALLENGES OF ESPORT PLAYERS

Sedentary Behaviour, Obesity and Cardiovascular Disease

Sedentary behaviour refers to acts of low metabolic activity such as sitting or lying down (Rezende *et al.* 2014). Although studies have shown that competitive gaming bouts constitute pronounced increases in sympathetic nervous system activation (leading to increased heart rate and blood pressure), eAthletes are still affected by the drawbacks of sitting for prolonged periods (Leis & Lautenbach, 2020; Valladão *et al.* 2020; Worsley *et al.* 2018). Sustained poor posture throughout long gaming sessions can cause neck and back pain in eAthletes (DiFrancisco-Donoghue *et al.* 2019). This is caused by the typical forward displacement of the head relative to the spine during gaming. Remaining in this position for too long stresses the cervicothoracic junction and lower paraspinal muscles, leading to axial pain in the cervical and lumbar spinal cord regions (Emara *et al.* 2020; Zwibel *et al.* 2019). eSport teams need to ensure that all their eAthletes have the tools to maintain proper desk ergonomics such as monitor stands to reduce head forward displacement and ergonomic chairs with pillows to support the lumbar/cervical spinal regions. Tournament organisers should also be held to this same standard when assembling their setups. Competitive games could also implement non-intrusive reminders every hour for the player to take a short active break. These reminders could promote eAthletes (and players alike) who are not already doing so to get up and do stretches after every hour of sitting, which would reduce muscle pain.

Those who partake in regular sedentary activity are at increased risk of obesity and cardiovascular disease, which can be fatal (Owen *et al.* 2010). However, this risk is mostly due to the physical inactivity of those with that lifestyle and is not a risk unique to eAthletes. There is conflicting literature on the physical activity of eAthletes. DiFrancisco-Donoghue *et al.* (2019) found that 40% of their 65 collegiate eAthletes did not partake in any physical exercise whereas Kari and Karhulahti (2016) found that the majority of their surveyed elite eAthletes exercised for at least one hour daily. Regardless, all eAthletes should exercise regularly for the physical and mental health benefits. eSport teams could hire personal trainers to do video consultations with their eAthletes, allowing them to receive advice on exercise and healthy dieting. These consultations could also be used to further promote active breaks during

gaming sessions, which would heavily reduce the risk of deep vein thrombosis and pulmonary embolism in eAthletes (Thachil, 2014).

Eye Fatigue and Sleep Deprivation

Computer vision syndrome, characterised by eye fatigue/strain and headaches, is common in eAthletes due to prolonged screen exposure and focus during competitive gaming bouts (Akinbinu & Mashalla, 2014). The pixels that generate images on a screen lack contrast compared to real-life objects, making them strain the eyes more. Furthermore, many competitive games involve frequent saccadic eye movements and continuous accommodation (focus), which reduce the blinking rate and contribute to oculomotor fatigue in eAthletes (Zwibel *et al.* 2019). To combat this, eSport teams should ensure that all their eAthletes are equipped with specialised eyewear that blocks blue light. Also, eSport teams and eSport developers should utilise their platforms (YouTube, Twitch, gaming events etc.) to educate eAthletes and gamers alike on safety precautions to minimise eye fatigue. This should include wearing blue light lenses when playing, encouraging hourly active breaks, and promoting the "20-20-20" rule of staring at something 20 feet away, for 20 seconds, every 20 minutes of play (Emara *et al.* 2020).

Prolonged light exposure from monitors when gaming can negatively impact the circadian rhythmicity of eAthletes. The master circadian clock within the suprachiasmatic nucleus (SCN) of the hypothalamus is entrained by light input received from a specialised subset of retinal ganglion cells, containing the photopigment melanopsin (Blume *et al.* 2019). The SCN regulates the secretion of the melatonin (the sleep hormone) from the pineal gland at night-time, which promotes sleepiness (Cajochen *et al.* 2003). Light exposure at night-time delays the circadian clock, suppressing the release of melatonin, thus delaying the onset of sleep. This desynchronisation of the circadian clock to the natural light rhythms can result in shortened sleep duration and reduced sleep quality (Blume *et al.* 2019; Wright *et al.* 2013). This sleep deprivation can be exacerbated by blue light, which stimulates melanopsin (and thus the SCN) more than other visible light wavelengths (Zwibel *et al.* 2019). To reduce the prevalence of insomnia in eAthletes, eSport teams should

ensure that all their athletes receive proper sleep hygiene counselling so that they understand the effects of light on their circadian rhythms. Blue light blocking lenses would also help reduce the effect of late-night screen exposure on sleep (Zwibel *et al.* 2019).

Repetitive Strain Injury

Repetitive strain injuries (RSIs) encapsulate any musculoskeletal or nervous tissue injuries caused by repetitive movements or sustained muscular contractions. The repetition of fine motor activities whilst gaming for long periods is a major cause of RSI in eAthletes (Booth-Malnack, 2019). RSIs are broadly caused by the deformation of connective tissue due to increased internal friction and intramuscular pressure (van Tulder *et al.* 2007). Carpel tunnel syndrome (CTS) is a common RSI in eAthletes that is caused by median nerve compression within the carpal tunnel of the wrist (Booth-Malnack, 2019). Developing CTS can be career-ending for eAthletes, especially those in the fighting game community. eAthletes should do hand/wrist stretches before playing and during their active breaks to reduce muscle pains. eSport teams should ensure that all their eAthletes are provided with wrist braces, fingerless compression gloves, and padded mouse mats to reduce pain in the wrist and hands. These accessories should also be sold more regularly at eSport events to promote their use even further. Additionally, eSport teams should have dedicated physiotherapists that work with their eAthletes in person and online to reduce the prevalence of RSIs.

THE MENTAL HEALTH CHALLENGES OF ESPORT PLAYERS

The mental health of eAthletes and traditional athletes is an underexplored topic within the scientific community. Regardless, there are multiple case studies of mental health being a prominent problem for eAthletes (Erzberger, 2018). eAthletes must deal with many stressors such as intra-team criticism, low confidence, goading from opponents and negative comments from social media. Alongside having to deal with competition stress, these stressors can contribute to anxiety and depression in eAthletes (Smith *et al.* 2019). The ability of eAthletes to cope with internal and external stressors is imperative to their competitive success. eSport teams should

provide psychological training for their elite eAthletes so that they can learn proper coping techniques for the pressures of competition and loss. And the fans of esports, debatably the most important stakeholder of them all, have a responsibility to create a non-toxic environment for eAthletes to compete within (Finch *et al.* 2020).

CONCLUSIONS

Overall, eAthletes are at risk of several physical and mental health complications if proper care is not taken. The physical health challenges include axial back pain, increased risk of obesity, eye strain, sleep deprivation and RSI. The mental health challenges are less well characterised but involve dealing with a myriad of internal and external stressors that can contribute to anxiety and depression. esports stakeholders can do more to aid the wellbeing of eAthletes by promoting hourly active breaks and the 20-20-20 rule, encouraging regular hand/wrist stretching, and investing in ergonomic technologies for gaming setups. Furthermore, eSport teams should strive to provide sleep hygiene counselling, physiotherapy, and psychological training for eAthletes.

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