THE INFLUENCE OF PHYSICAL ACTIVITY ON THE HEALTH AND PLAYING QUALITY OF THE E-SPORTS PLAYERS

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Abstract:

E-sport has developed and became professionalized extremely quickly, but it is also becoming more demanding, so it is required from e-sport players to possess high technical and tactical knowledge and, also mental and physical readiness to cope with the demands of the e-sport scene. The aim of this paper is to study the impact of physical activity on the playing quality and the health of athletes. This primarily includes activities that affect the improvement of the physical and mental structure of each person, such as a healthy diet, regular exercise, an active lifestyle, the creation of transient art in nature, and quality time. With the help of modern technologies and devices (smartphone and smart watch), physical activity can be easily monitored, determined and studied by counting steps and hours of daily activity of e-sport athlete's, taking body composition in to the account. A smart device registers data on the e-sport athlete's wrist on the basis of which his general physical health is estimated. The smart device recognizes the moment when the user starts training, stores data recorded during physical and digital exercise, sleep, and other activities. Physical activity has an impact on the overall health status and playing quality of e-sports players, i.e. with the increase in the number of steps on daily basis, the total time of performing the tasks of the e-sport players, and the BMI decreases. E-sport players' performance is improved by integrating physical and artistic activity into the athlete's exercise program, and it has a positive effect on their health.

Keywords:

BMI, Number of steps, Smartphone, Smart watch, Video games.

INTRODUCTION

E-sport is becoming a significant part of the popular culture and represents a grand global industry with a rapid growth, as well as an important topic of research within the sport sciences [1]. The term e-sport is described as an organized competitive sport where one or more players compete in computer games.

The consensus over a clear-defined universally accepted definition of sport has not yet been attained among the researchers [2]. Taking into account the negative trends of reduced movement correlating with the rise of the digital technologies resulting in negative health consequences [3] [4] [5], the question of mental and physical health of the players in the e-sports domain arises.

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According to the results of the researches, it has been widely accepted that e-sports has negative effects on the physical health of the players, considering that the requirements of their sports are limited to the digital domain, resulting in a lack of holistic training structures. Monitoring and research of the lifestyles, daily habits and health status estimations are becoming easier to an increasing number of researchers owing to development of digital technologies.

Electro dermal activity (i.e., the electrical conductivity of the skin) carries important information about the brain's cognitive stress [6]. The new technology monitors sweat to infer brain stress and, when detected, sends a message through the smart watch. With the help of modern technologies and devices (smartphone and smart watch), physical activity is determined by counting steps, BMI, and hours of daily activity. A smart device registers data on the subject wrist on the basis of which his general physical health is estimated.

Literature concerning e-sports is quite rare despite the big popularity of the sport itself, especially considering the fact that available research is primarily focused on the health of the „problematic" (over)users of video games and negative consequences of the video games themselves, rather than on the health of professional e-sport players.

This paper aims at setting the foundation for further research of e-sport in our region, affirming the importance of physical activity with e-sport players and reminding that e-sport players aren't using the potential benefit of the physical exercise, as well serve for comparison in future researches.

The subject matter of this research is examining the influence of physical activity on the performance output and overall health status of e-sport players. Previous studies have identified similar factors that affect the general wellbeing and performance of traditional athletes, as well as fact that e-sport players have digital training without physical training, which results in a lack of holistic training structures.

This point is an especially important basis for research, generating a goal of this paper of determining the influence of physical activity on quality of performance and overall health of e-sport players.

2. METHODOLOGY

For the purpose of reviewing the research results of current studies on e-sports and physical activity, the PubMed and google academic electronic bases was searched. The following keywords for database search were used: "e-sport*," "esport*," "e sport*," "electronic sport*,"or "eSport*." Initially, over 39000 results were found, ranging from the year 1968 until the present day. Then search was performed only for titles and abstracts, which narrowed the search to 68 scores. After filtering duplicate and the irrelevant scores, which wouldn't fit under the subject of relations between e-sports and physical activity only 20 most relevant researches was chosen to be subject of this review. Having in mind the exploratory nature of this paper, we believe that this choice is justified.

3. RESULTS AND DISCUSSION

Players that practice on average from 3 to 10 hours per day report eye fatigue (56 %), neck and back pain(42 %), joint pain(36 %) and arm pain (32 %) as well as 40 % of e-sport players doesn't incorporate physical exercise in their daily routine [7] despite the researcher's suggestions that their body composition and physical activities level can be improved with adequate programs [8] . This results in negative changes of these players related to physical inactivity and increased weight gain. The only way to increase energy expenditure is physical activity and moderate intensity exercise that burns the fatty tissue and preserves other tissues, resulting in prevention of the aforementioned issues. Physical activity implies any movements conducted by skeletal muscles that generate energy expenditure greater than energy expenditure during idle state [9].

Behaviour of the e-sport players is akin to office work behaviour, programmer or an artist, carrying the similar profile of health risks, which spawns a logical conclusion that e-sport players are also more prone to cardiovascular and mental ailments, psychological problems connected to stress, weight gain, back problems, tendon injuries caused by repetitive movements and positions, all of which can present a career-ending cause. E-sport players are also not physically active enough because of the in-game time spent being sedentary, and physical exercise after prolonged sedentary periods doesn't compensate for the damage caused by sitting for extensive time periods, meaning they ought to have active breaks in between the matches, making screen time breaks [10].

Also, concerning the problems such as various addictions, violence desensitization, rapid weight gain, musculo-skeletal composition problems, physical injuries caused by excessive play time and other problems requiring attention and structured approach, it has been noted that more professional e-sport players are including physical exercise and diet plans [11].

Other side of e-sport is its positive effect on the basic motor skills of the players including accuracy, speed, agility, aiming, as well as on the psychomotor functions. Playing video games is a useful tool for increasing fine motor skills and movement coordination. Research has shown that action video games players have good hand-eye coordination and visual-motor capabilities, such as distraction resistance, peripheral vision information sensitivity and ability to locate greater number of objects in a limited time frame. Playing video games increases visual acuity, meaning that visual reaction time is becoming shorter, and the eye is becoming faster, which undoubtedly represents an advantage in everyday life.

Results show that the players have scored significantly higher results in hand movement accuracy tests, which is emphasized by shorter total time of task completion, 14.6 ± 2.9 s against 32.1 ± 4.5 s non player's times [12]. Some types of adventure games help developing problem solving, logic thinking and deduction abilities. In the researches of exertion, physiological and psychological processes taking place within e-sports, there are limited information's available.

Insight into present literature hints at questions revolving around the extent of physical activity and diet change on reduction of the health risks, as well as extent of the e-sport on increase of the same.

Individuals looking to become the best in e-sport competitions have to be in a good physical and mental condition, because the overall health wellbeing of the e-sport player is crucial, and only with an adequate physical state the it is possible to achieve peak levels of concentration, attention, reaction time and mental agility. Following the explosion of popularity of e-sports, research focused on organised and professional domain has quickly gained traction, but despite the e-sport popularity and video game evolution from recreational to professional levels, there is still a very limited number of studies aimed towards the professional e-sport players.

Most of the research is „focused solely on the violent action video games or on a specific game within a specific genre leaving aside numerous possible player habits in other game genres") [13]. Previous studies have also taken into consideration the influence of e-sport on physical activity of the players and the composition of their bodies, have dealt with the player movement, nutrition, sleep habits, effects of e-sport and can be used for developing later concepts of training. Research of identifying basic skills for success in e-sport is limited, but it has been noted that conditioning training and traditional sports training procedures can be beneficial for developing skills needed for good e-sports performance (attention span or reaction time)

Incorporating „real world", specific physical exercises, into the digital world could reduce the sedentary behaviour patterns and bring about big health benefits [10]. Physical training of moderate intensity, healthy cardiovascular system and balanced diet also have positive effect on the brain health and can significantly strengthen cognitive performance. That includes, among other, functions of memory recall and attention, as well as functions that benefit to execution of specific in-game actions. Conditioning coaches have a task to offer the foundations to healthy lifestyles, which results in forming of the structures and incorporation of measures that promote player conditioning in the domain of professional e-sport [10].

Technological explosion during the Covid 19 pandemics has executed a promotion of the „Physical e-sport". When the professional traditional sport has been put „on hold", the new Mixed-reality technologies and several others e-sport applications have been an important substitute and help for the elite athletes and users on all levels around the world, enabling them with alleviating the loss of conditioning.

Numerous digital solutions have been offered that enable the users to communicate while being the part of the virtual world of AR, VR and MR technologies, also enabling them to pursue their passions and profession without an increased infection risks [11]. Sport clubs have been very creative in offering virtual competitions using the network platforms (such as Zwift, Strava, Bkool), enabling some of the athletes to train in simulated scenarios and maintaining condition, and some of them have tried themselves in new discipline called „Physical e-sport" which has been built using the mobile VR system called VAIR Field which includes physical activity of players [14].

Delivered physical performances on virtual professional have been largely comparable to performances of the traditional sports. The claim that the main difference between e-sport and traditional sports is physical movement has been partially brought into question, which resulted in narrowing the borders between traditional sports and e-sports.

Another evident difference is noticed between the dedicated professional e-sport players and „problematic" players.

Good sign of possible improvements of the health condition and health behaviours is a result of a web poll which shows that a majority of players of e-sport supports the claim that conditioning, sleep and diet have a positive effect on their e-sport performances [15], whole more than half of the participants (55.6 %) believes that physical training has a positive effect on their e-sport performances [16]. Players that are serious in their pursuit of a professional career in e-sport spend almost all of their „waking time" in activities related directly or indirectly to e-sport in order to „practice and improve cognitive processes needed for fulfilling the requirements of the game and the skill of gaming itself" [17].

Modifications to training procedures in e-sport, which have been so far predominantly digital, and its incorporating into the „real world", is possible by integrating physical activity and other behaviours connected to health into training routines of e-sport players. New findings about the health of e-sport players in 2020 show that 80% of participants have been adhering to recommendations of the World Health Organization of incorporating physical activity for at least 2.5 hours per week [18].

Average sleep time per day of the total sample of the „eSport 2019" study has been 7.1 hours, and now is 7.4 hours on workdays and 8.3 on the weekends [18]. Like in the previous years, average level of the physical activity among the target group is significantly above the World Health Organization recommendations(more than 9.5 hours/week) which is one hour more than noted in the „eSport 2019" research which demands positive reaction of the increase of the physical activity levels within all e-sport players groups.

The exemption is the increased usage of energy drinks which is considerably higher than among e-sport players than within the other demographic groups. This is most likely present due to large number of various beverage producers present as sponsors [19].

It is obvious that e-sport players belong to the group that has bigger body fat values and that their everyday step count is still low. According to the findings gained by club member polls, body mass index (BMI) of e-sport athletes is 26.03 ± 1.85, number of steps is 6646 ± 3400, and daily e-sport hours are 9.35 ± 1.12. Previous research has shown that as game time in e-sports increases, BMI increases as well, and the step number goes down [8]. Simple, but effective approach to tracking physical activity levels is step counting by the individual within a given day. Result of the counting steps accuracy tests is 98.6 % [20].

Recent study has shown the scale of obtaining data of physical activity using the smartphone applications, describing the data on 717.527 iPhone users from 111 countries between the ages 16-44 [21].

Most of e-sport players did not fulfil the physical activities guidelines, indicating on potential future health risks [22]. Effects of physical activity on professional e-sport players health(as well as other e-sport players) are based on changes of vital functions of the organism and metabolism caused by exercise. For that reason it is very important to add the physical „assistance" training to „digital" training [23]. Portable smart devices are used to track physical activity and general health of e-sport players, estimate energy reserves during the day and conduct preparations for intensive playing [24].

4. CONCLUSION

The Physical activity represents irreplaceable source of physical and mental health. It is also directly and indirectly connected to quality of performance of e-sport players.

On the other hand, although e-sport players spend a lot of time in front of screens interacting with digital devices, they are not the most endangered digital media user category due to prevention of possible health risks through physical activity. This paper has shown value and potential of studying e-sports within sport sciences, and possible implications that results of e-sport research can have on general population.

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