

IMPACT OF VIDEO GAMES ON CORE MUSCLE ENDURANCE & QUALITY OF LIFE IN PREMATURE VIDEO GAMERS.

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Abstract—Background: Overall well-being & Musculoskeletal health is affecting due to continuous & rapid increase in video gaming among adolescents. Weakened core muscles, reduced endurance leads to negative quality of life due to poor posture & prolonged sedentary lifestyle. The aim of this study is to assess the relationship between online gaming addiction, core muscle endurance, quality of life in adolescent video gamers.

Methods: An observational cross-sectional study was performed for over six months in gaming centres across Pune. A total of 100 adolescents (mean age 16.2 years; 60 males, 40 females) were selected depending on inclusion criteria of ≥ 200 hours of gaming career and ≥ 60 hours of gameplay in the last month. Online Gaming Addiction Scale (OGAS), Horizontal Plank Test for core endurance, and World Health Organization Quality of Life (WHOQOL) scale were the outcome measures. Statistical analysis was performed using Spearman's rank correlation to assess relationship between variables.

Results: The mean core endurance hold time was 20.8 ± 9.24 seconds, mean OGAS score was 24.4 ± 2.92 , and mean WHOQOL score was 29.6 ± 9.35 . No significant association was found between gaming addiction and core endurance ($\rho = .02$, $p =$

$.860$) or between gaming addiction and WHOQOL ($\rho = .17$, $p = .089$). However, a positive correlation was observed between core endurance and quality of life ($\rho = .44$, $p < .001$), indicating that participants with better core endurance reported higher quality of life.

Conclusion: There was no relationship between Gaming addiction severity & core endurance or quality of life. Improved quality of life was associated with stronger core endurance highlighting the importance of physical fitness in adolescent gamers. Future research should include larger and more diverse samples, and develop physiotherapy-led programs to reduce adverse effects of prolonged gaming.

I. Introduction

Video games are the online games played on PC/laptop. Share of video gaming is gradually increasing in the whole world. Recently, the International Olympic Committee [IOC] has added video games to the Olympics in the form of Olympic

Esports Games which is a big achievement for video gamers. Due to this, the movement and outdoor sports activities have considerably reduced leading to sedentary lifestyle causing weakness in core muscles.

The Internet & other media are reported to have important social media & mental health effects in adolescents. The term "video games" does not always differentiate between console & Internet/computer video games but instead suggests a loose clustering. Console video games include Nintendo, Sony PlayStation, Microsoft Xbox, & others. Internet video games refer to computer games played online in a community sitting with other players.

Console games are played with other players, but most are “single player” & are meant to be played alone. Internet games, however, are designated for “multi player” & are played with others online, usually at distant sites. Console games are less expensive than video games & do not require a computer.

Console game themes include sports, action, strategy, family, puzzle, role playing games & stimulation, while video games themes designed for Internet use are more specific & are mainly action & strategy. The incidence of ADHD continues to rise & is a significant challenge on medical, financial & educational resources. ADHD is a complex disorder that often requires input from the affected child or adolescent, teachers, parents & physicians in order to be diagnosed correctly & treated successfully.

Some authors have focused on specific aspects of the phenomenon. For instance, a survey of high school students found that 15% of the subjects used video games to escape from outside pressure., & 2 years later the same authors reported that the video gamers did not indicate high rates of playing to escape bad family situations. It has also been found that high involvement with a new video game soon decreases, which might be considered evidence for the absence of tolerance. In line with this, Griffiths (1991) adapted from DSM – R (APA 1987) a set of criteria shown to discriminate against pathological gambling effectively. His scale comprises nine dimensions of addiction, & a score of four or more criteria is considered as an indication of video game dependence. Similarly, Fisher adapted the criteria for pathological gambling in the DSM – IV (APA 1994) to provide a screening measure of addictive use of video games. The author’s scale was presented as DSM – IV-JV (J= Juvenile; V= Arcade video game). If the person answered “yes “to four of the nine items of the questionnaire, the person was deemed to be a video game “addict”¹.

Investigating the current research on the impact of video games on children is significant as it reveals the issue arises with a relatively new form of media that has captivated many young audiences. Exploring the nuances of video games that manifest in the variety of gaming styles & considering the age at which children interact provides insight into the relationship between parental involvement and children’s behavioral outcomes. By undertaking the task of assessing the influence of video games & media on children, the public can form an informed opinion & avoid merely labeling new media as inherently harmful².

Sitting for a long time is associated with a decrease in metabolic energy expenditure, which may be cause of overweight & obesity. Sitting may increase the load on lumbar vertebrae, restricting movement. It may also give rise to musculoskeletal diseases. Sitting for a long time decreases utilization of the lower extremity muscles mobilized in standing & movement, & stress resulting from the continuous loads on the muscles around the vertebrae may be increased, possibly bringing about changes in the performance of the muscles around the vertebrae. Muscle performance includes muscle strength, endurance & flexibility. Weakened muscle strength around the vertebra & instability of the vertebrae resulting from damage to the soft tissue may result in musculoskeletal lesions & lumbar pain. Muscle strength refers to the work performance of the muscles when they contract or extend. Endurance refers to the ability of the muscles to maintain low intensity exercise for a long time.

Sedentary postures impose considerably greater load on the lumbar region than standing postures. The increased load on the muscles around the vertebrae & on the vertebra. Reduced physical activity also weakens the strength of muscles & leads to decrease in flexibility, an imbalance in body composition, & a decline in physical strength such as cardiovascular & respiratory endurance³.

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II. NEED OF STUDY

- Prolonged sedentary lifestyle due to online gaming can lead to weakened core muscles due to lack of physical activity causing musculoskeletal conditions like back pain and poor posture.
- Many gamers adopt poor posture while gaming, such as slouching or hunching over a screen, which puts additional strain on the spine & surrounding muscles, contributing to neck & back pain.

III. AIMS AND OBJECTIVES

AIM:

- To find out the Impact of Video Games on Core Muscle Endurance and Quality of Life In Premature Video Gamers.

OBJECTIVES:

- To find out the impact of video games on muscle endurance using side plank test, horizontal plank test and online gaming addiction scale.
- To find out the impact of video games on quality of life using World Health Organization Quality of Life.

MATERIAL AND METHODOLOGY:

- Study design: - It's an observational study
- Study duration: - 6 months
- Sampling size: - 30
- Study place: - Gaming centers in & around Pune

OUTCOME MEASURES

A. For extent of addiction: -

- Online Gaming Addiction Scale

B. For core strength: -

- Core strength is a person's ability to stabilize their core. The greater the stability, greater is the control over the position & movement of the area of body. The major muscles involved in pelvic stability include the pelvic floor muscles, transversus abdominis, multifidus, internal & external obliques, rectus abdominis, erector spinae & diaphragm.

Horizontal plank test: -

Horizontal plank test is an isometric core strength exercise that involves maintaining a position like pushup.

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B] For quality of life: -

Quality of life is often regarded in terms of how a certain ailment affects a patient on an individual level.

World Health Organization Quality of Life [WHOQOL]: -

WHOQOL scores each of 26 items on a 1 – 5 scale, with 1 representing worst & 5 representing the best. WHOQOL focuses on four domains: Physical health, psychological wellbeing, social relationships & environmental health are calculated by averaging the scores with each domain & multiplying with 4. Finally, these domains are converted to 0 – 100 scale, with 0 representing the worst & 100 representing the best.

IV. INCLUSION CRITERIA

- Age group 14 to 18 years.
- Online Gaming Addiction Scale scores 3 or more per question.
- At least 200 hours of gaming career.
- At least 60 hours of playing last month.

V. EXCLUSION CRITERIA

- Person playing no other sports.
- Not willing to participate.
- Recent injury related to lower back

VI. PROCEDURE

- Permission from the Institutional ethical committee will be taken.
- Different cybercafés in & around Pune will be approached & permission will be obtained prior to the study.
- All subjects will be explained about the study.
- Informed consent will be taken from subjects.
- Online Gaming Addiction Scale score will be measured & subjects with score 3 or more per question will be included in study.
- Demographic data will be taken.

VII. DATA ANALYSIS AND INTERPRETATION

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26.0.

Continuous variables were summarized using mean, standard deviation, median, minimum, and maximum values, while categorical variables were summarized as frequency and percentage. Normality of the continuous variables was assessed using the Shapiro-Wilk test. Since Core Endurance Hold Time and Online Addiction Gaming Scale scores were not normally distributed, non-parametric analysis was applied for the primary objective testing. Therefore, Spearman's rank correlation coefficient (ρ) was used to examine the association of online gaming addiction with core endurance hold time and quality of life. A p value of <

.05 was considered statistically significant. As the present dataset contained a single Core Endurance Hold Time variable rather than separate side plank and horizontal plank scores, the muscle endurance objective was analyzed using the available core endurance measure. The study design was observational; therefore, results were interpreted as associations rather than causal effects. A total of 97 participants were included in the analysis, with a mean age of 16.20 ± 1.35 years; 58 (59.80%) were male and 39 (40.20%) were female. The mean Core Endurance Hold Time was 20.80 ± 9.24 seconds, the mean Online Addiction Gaming Scale score was 24.40 ± 2.92 , and the mean World Health Organization Quality of Life score was 29.60 ± 9.35 . Shapiro-Wilk testing demonstrated that Core Endurance Hold Time ($p < .001$) and Online Addiction Gaming Scale scores ($p = .004$) were not normally distributed; accordingly, Spearman's rank correlation was used for inferential analysis. There was no statistically significant association between Online Addiction Gaming Scale score and Core Endurance Hold Time ($\rho = .018$, $p = .860$), indicating that greater gaming addiction scores were not associated with lower or higher core endurance in this sample. Likewise, there was no statistically significant association between Online Addiction Gaming Scale score and quality of life ($\rho = .174$, $p = .089$), suggesting that the study did not demonstrate a significant relationship between gaming addiction severity and WHOQOL score. However, an additional analysis showed a moderate positive association between Core Endurance Hold Time and quality of life ($\rho = .443$, $p < .001$), indicating that participants with better core endurance tended to report better quality of life.

TABLE 1: Depicts gender wise distribution of students

Gender	n	Percent
Female	40	40
Male	60	60

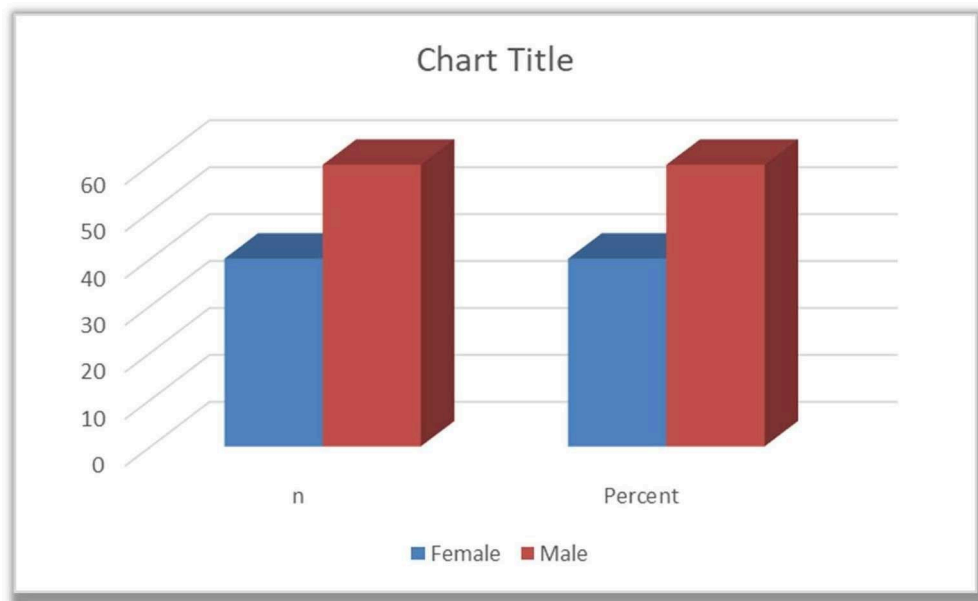


TABLE 2 Spearman Correlation: Core Endurance vs WHOQOL

Variable 1	Variable 2	Spearman's rho (p-value)
Core Endurance Hold Time	WHOQOL	0.44 (<.001)

TABLE 3. Spearman Correlation: Online Addiction vs Core Endurance & WHOQOL

Variable 1	Variable 2	Spearman's rho	p-value
Online Addiction Gaming Scale	Core Endurance Hold Time	0.02	0.86
Online Addiction Gaming Scale	WHOQOL	0.17	0.089

VIII. RESULT

There was no statistically significant association between online gaming addiction score and core endurance hold time ($\rho = .02$, $p = .860$). Similarly, no significant association was found between online gaming addiction score and WHOQOL score ($\rho = .17$, $p = .089$). However, a moderate positive association was observed between core endurance hold time and quality of life ($\rho = .44$, $p < .001$), suggesting that participants with better core endurance tended to report better quality of life.

IX. DISCUSSION

The study was done to find out the Impact of Video Games on Core Muscle Endurance and Quality of Life in Premature Video Games. Horizontal plank test, WHOQoL & OGAS scales were used for the study.

The sample consisted of 100 adolescents with a mean age of 16.20 years. The sample was predominantly male, with 60 males (60%) and 40 females (40%). Core endurance hold time and online addiction gaming scores were significantly non-normal, whereas WHOQOL scores significantly deviate from normality.

- Video games & Core endurance

Core endurance refers to the ability of the muscles in the abdomen, pelvis & lower back to maintain low intensity exercise for a long time. Core endurance plays a crucial role in balance & coordination development, maintaining correct posture. Adolescents who play online games for longer time often experience reduced core muscles activation causing muscle deconditioning & also leads to gradual weakness of abdominal & back muscles. Gaming requires minimal physical movement causing reduced endurance capacity due to inactive core muscles.

Number of factors are responsible resulting in reduced core muscle endurance. Weak core muscles like Obliques, Lower back muscles, Rectus abdominis, Transverse abdominis affects the posture resulting fatigue. Poor neuromuscular activation occurs due to failure in engagement of deep core muscles & lack of coordination between core & glutes. Weak supporting muscles are the major contributor reducing core endurance especially shoulder muscles, Glutes & Quadriceps. Increased weight further increases the load on core muscles. It is observed commonly in overweight or obese individuals & individuals having higher abdominal fat. Reduced muscle endurance due to sedentary lifestyle, lack of core-specific training. Shallow breathing pattern leads to fatigue reducing core endurance.

The total number of sample size was ($n=100$). The mean core endurance value of 20.8 seconds ($SD \pm 9.24$), measured via the Horizontal Plank Test, reflect a moderate level of core muscular endurance among the participants. Normative reference values for the horizontal plank test in adolescents based on a study of Manuel Moya-Ramon et.al [06] suggest that values in this range are below optimal benchmarks for physical fitness indicating that the sample as a whole may exhibit reduced core stability relative to age-matched non- gaming populations. In a study done by Deniz Tuncer [04], there was a negative correlation between Online Gaming Addiction Scale & horizontal plank test for core muscle endurance which aligns with the present study.

- Video games & Quality of Life

Video game has become a popular activity among adolescents for entertainment. While gaming offers entertainment, adolescents' quality of life is getting a negative impact due to excessive screen time. Quality of life consists of body health including posture, sleep or disease. Lengthy gaming periods involve improper posture that include Neck pain, Slouched posture, Wrist & Finger pain. Disturbed sleep patterns due to late- night gaming sessions lead to insomnia. Gaming without breaks is often associated with increased junk food consumption, skipping meals, Binge eating. Continuous gaming often leads to lack of exercise leading to obesity.

Presence of the following factors affects the scoring of the WHOQOL scale resulting in reduced quality of life. Poor physical health reduces the pain health domain including persistent/recurrent pain, disturbed sleep cycle, reduced mobility which is often the biggest reason leading to low scores. Serious issues leading to mental health such as anxiety & depression, reduced self-esteem, cognitive difficulties can lower the psychological domain lowering the scores. Unfavorable environment is the very important factor that includes financial instability, reduced or limited access for healthcare facilities, lack of transport, pollution & poor housing. Low scores in Functional limitations that comprises of increased dependency, reduced productivity, failure to perform daily activities correlates with low QoL ratings.

The total number of sample size was (n=100). The mean quality of life score of 29.6 (SD ± 9.35), measured via World Health Organization Quality of Life Scale, reflect reduced quality of life among the participants which aligns with the review of Nayereh Kasiri Dolatabadi et.al [08].

A moderate positive association was observed between core endurance hold time and quality of life, $\rho = .44$, $p < .001$. This was not one of the study's stated primary objectives, but it indicates that participants with better core endurance tended to report better quality of life.

X. CONCLUSION

The sample was predominantly male, with 60 males (60%) and 40 females (40%). A moderate positive association was observed between core endurance hold time and quality of life which indicates that participants with better core endurance tended to report better quality of life.

XI. ACKNOWLEDGEMENT

The success & result of this project required a lot of guidance & I am extremely privileged to have got this all along the completion of my project. I owe my deepest gratitude to my project guide Dr. Neeraja Deshmukh (PT), who took a keen interest to our project work & guided me along, till the completion by providing all the necessary information throughout numerous consultations. I will forever be grateful for the knowledge & skills I gained working under you. I respect & thank our principal who allowed me to do this wonderful project on the topic "Impact of Video Games on Core Muscle Endurance & Quality of Life in Premature Video Gamers". I am thankful & fortunate enough to get constant encouragement, support & guidance from all teaching staff at TMV's Indutai Tilak College of Physiotherapy, Pune which helped me in completing my project work.

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