Research Article

Evaluating the effects of video games on blood pressure and heart rate

R. Jagadheeswari[1], R. Gayatri Devi[2]*, A. Jothi Priya[2]

ABSTRACT

Introduction: Heart rate and blood pressure (BP) are measured to obtain a quick evaluation of a person's health. Two types of video games are used, and a comparative study is done. This is useful because it helps in comparing the amount of stress given by a M-rated game when compared to a E-rated game. This study on video games and heart rate was conducted to find the effects of video games on the health. **Materials and Methods:** A total of 30 individuals between the age group of 12 and 18 were selected (both males and females) for this study. They were allowed to play two games - one E rated and another M rated. Their heart rate and BP were recorded before and after the games using an electronic BP monitor. The data were recorded and assessed. **Result:** The normal average values of systole, diastole, and heart rate were found to be 127.5 mmHg, 86 mmHg, and 84 bpm, respectively. After E-rated games, the values were found to be 128.3 mmHg, 86.4 mmHg, and 85 bpm, respectively. After playing M-rated games, the systole was found to be 130.67 mmHg, diastole was 87 mmHg, and the heart rate was 87 bpm. **Conclusion:** The study revealed that M-rated games increased BP and heart rate more when compared to E-rated game. The comparative study between variation in heart rate of males and females shows that variation is more prominent in males than in females.

KEY WORDS: Blood pressure, Bradycardia, Diastole, Heart rate, Systole, Tachycardia

INTRODUCTION

Blood pressure (BP) and heart rate usually determine the health condition of the person. Activities that provoke change include exercise, stress, anxiety, and sleep. Our nervous system provides a flight or fright response also known as acute stress response to increase the chances of survival when we meet with a danger. Hence, when our mind is focused on video games with intense action, our Adrenal medulla gland secretes adrenaline thereby increasing the BP and heart rate. Playing video games has implications for health.[1] Most video games are usually E rated for everyone and M-rated for mature audience. These ratings were given by the Entertainment Software Rating Board.[8,9] Video games have permanently altered the way people spend their free time. Playing video games is no longer exclusive to children, since many adults have become ardent gamers as well. With more intense visuals, violence, and interactive online gaming, video games have seeped into our everyday lives. The risks of video games include addiction and increased aggressiveness.[2] The normal heart rate of a person is 60–100 beats per minute.[3] When our body is subjected to any kind of stress, such as video games, the heart rate and BP tend to increase slightly. Tachycardia is a fast heart rate defined as above 100 bpm at rest,[4] whereas bradycardia is a slow heart rate defined as <60 bpm at rest. Abnormalities of heart rate may indicate a diseased condition of the subject.[5] Violent video games usually tend to be more thrilling and obsessing than their more peaceful counterparts. As a result, we can observe an increase in heart rate. It could also be the increased excitement level which causes increased anxiety. However, not all individuals are affected by exposure to violent computer games, but most individuals are affected. Action gamers are better at ignoring distractions and also on focusing on the main task.[6] Some research also suggests that video games may even increase players' attention capacities.[7] Video game is also known to provide easy computer knowledge for children, and correlations have been drawn between male and female video gamings.[12] This

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[1]Department of Physiology, Saveetha Dental College, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai, Tamil Nadu, India, [2]Department of Physiology, Saveetha Dental College, Saveetha Institute of Medical and Technical Science, Saveetha University, Chennai, Tamil Nadu, India

***Corresponding author:** R. Gayatri Devi, Department of Physiology, Saveetha Dental College, Saveetha University, 162, Poonamallee High Road, Chennai – 600 077, Tamil Nadu, India. Phone: +91-9962988697.
E-mail: gayatri.physio88@gmail.com

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study is conducted to estimate the immediate effects of video games on heart rate and BP of a person. This can also create awareness about the ill effects of video games among youngsters.

MATERIALS AND METHODS

A total of 30 individuals between the age group of 12 and 18 were selected (both males and females) for this study. They were allowed to play two games - one E rated and another M rated. The game chosen for E rated was Subway Surfers and for M rated was Counter-Sstrike. Their heart rate and BP were recorded before and after the games using an electronic BP monitor. The data were recorded, and the comparison was drawn.

RESULT

Heart rate was increased after playing M-rated games when compared at rest and after playing E-rated games. A slight increase in BP was observes in participants after playing M- and E-rated games.

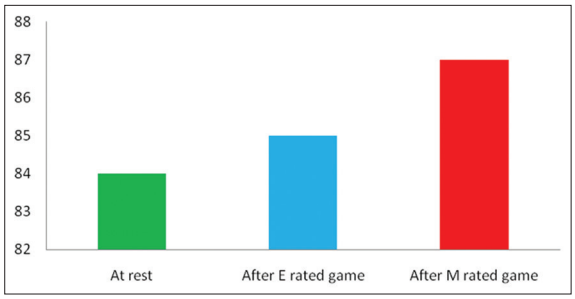
DISCUSSION

After the experiment, the variability in the heart rates in males and females, M-rated and E-rated games, was analyzed using bar graphs. Table 1 shows the normal average values of heart rate and BP for all the three conditions. The normal average values of systolic and diastolic pressure and heart rate were found to be 127.5 mmHg, 86 mmHg, and 84 bpm respectively. After E rated games, the values were found to be 128.3 mmHg, 86.4 mmHg and 85 bpm, respectively. After playing M-rated games, the systole was found to be 130.67 mmHg, diastole was 87 mmHg, and the heart rate was 87 bpm. From Table 2, it is clear that the heart rate after E-rated games was almost the same as those in normal condition. There is a significant increase in the heart rate of a normal person due to M-rated games. Graph 1 shows the comparison of heart rates under normal condition, after E- and M-rated games. Here, the M- rated game (counter strike) has more violent content which may be one of the reasons for the increase in anxiety of the patient, which ultimately resulted in an increase in heart rate and BP.

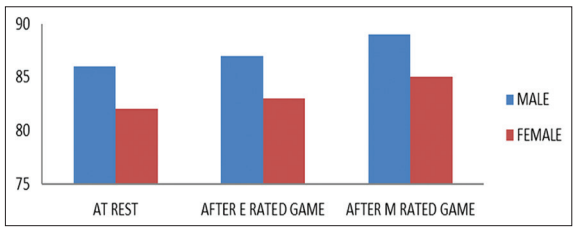
The simulated violence of video games may influence a player's thoughts, feelings, and physical arousal, and this, in turn, creates a short-term (and possibly a long-term if played regularly) effect on an individual's interpretation of an aggressive or violent act.[13,14] Violent behavior in a virtual environment such as video games could lead to players' increased sensitivity of the moral codes that they violated, due to immoral behavior in M-rated video games eliciting guilt in players.[15]

Factors such as overall physical health of the subjects and any medications taken may have had a direct effect on their heart rates. The level of game playing experience, level of coordination, and interest may indirectly affect the heart rates. However, since the main objective of the study was to examine subjects' change in heart rate and BP pre- and post-activity rather than the differences in heart rates of the subjects, these factors would have had a minimal effect on the findings.

Table 3 shows the variation of heart rate in males and females. For males, the heart rate was 86 ± 9.37



Graph 1: Heart rate among 30 participants using different video games



Graph 2: Variation of heart rate in male and female

Table 1: BP and heart rate after using two different types of games

Study group	Systole (mmHg)	Diastole (mmHg)	Heart rate (/min)
Normal	127.5	86	84
After E-rated game	128.3	86.4	85
After M-rated game	130.67	87	87

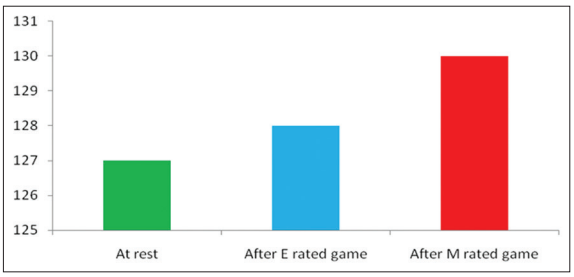
BP: Blood pressure

Table 2: Heart rate among 30 participants using different video games

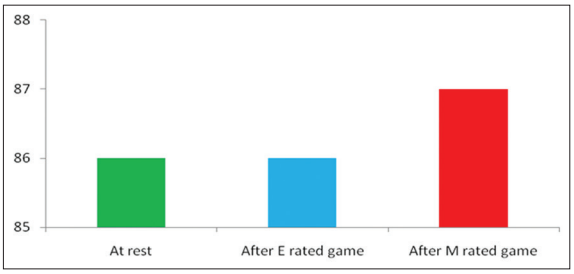
Parameters	At rest	After E-rated games	After M-rated games
Heart rate/min	84±9.03	85±9.27	87±9.01

Table 3: Variation of heart rate in male and female

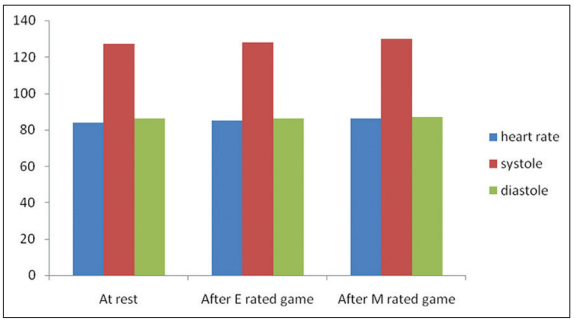
Gender	At rest/min	After E-rated games/min	After M-rated games/min
Male	86±9.37	87±9.83	89±9.04
Female	82±8.50	83±8.50	85±8.81



Graph 3: Variation in systolic pressure



Graph 4: Variation in diastolic pressure



Graph 5: Comparison of blood pressure and heart rate in E- and M-rated games

bpm before gaming, 87 ± 9.83 bpm after E-rated game, and 89 ± 9.04 bpm after M-rated game. For females, the heart rate was 82 ± 8.50 bpm before gaming, 83 ± 8.50 bpm after E-rated game, and 85 ± 8.81 bpm after M-rated game. Graph 2 shows the comparison of heart rate between male and female participants with their responses to gaming. From the study, it is clear that the variation in heart rate is more prominent in males than in females after both the games. It may be due to variation in adrenaline levels of males and females. Males also show more response and interest toward games which may be one of the reasons for more variation in heart rate. Despite the dominant perception that most gamers are men,[10] the ratio of female-to-male gamers is a balanced one, in the society.[11] Graphs 3,4 and 5 show the variation of BP (systole and diastole); however, there was only a small increase in the BP of the participants after playing M- and E-rated games. Systolic pressure tends to increase more after playing M-rated game when compared to E-rated game. We conclude that playing video games raises BPs and that the more exciting games raise it the most. The main reason behind this response is secretion of adrenaline from the adrenal gland as an acute stress response. This adrenaline thereby increases the BP and Heart rate.

CONCLUSION

From the study, it is clear that M-rated games increased heart rate and BP more than E-rated games. It is also clear that variation in heart rate and BP is more prominent in males than in females.

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