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Video Gaming Increases Physical Activity

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Abstract: The *2005 Dietary Guidelines for Americans* and *Mypramid* recommend that children get 60 minutes of moderate level exercise each day. Obesity has become a serious health concern for children and adolescents. Idaho currently has an obesity rate of 10.1% for children ages 10-17. As a response to this, the Nintendo Wii was introduced into a 4-H after-school program in Idaho. Data was collected to determine if participating in exergames was an effective way to be physically active for youth ages 9-12 years of age.

Introduction

Obesity has become a serious concern for children and adolescents. Seventeen percent of youth, ages 6-11 years, are considered overweight or obese; this has increased from 6.5% (National Health and Nutrition Examination Surveys 1976-1980 and 2003-2006). Of the children who are considered overweight or obese, 25% will become obese adults (Centers for Disease Control & Prevention, 2008).

The Surgeon General recommends that children get 60 minutes of moderate level exercise each day (U.S. Department of Health and Human Services, 2005). Research shows that there are three main contributors to health and weight: family, eating, and media (Lanigan & Power, 2008). Youth ages 8-12 years spend 56 minutes each day playing video games (Chamberlin & Gallagher, 2008). Because children value screen-based activities (Lanningham-Foster et al., 2006) it is necessary for parents, educators, and health professionals to look at ways to stimulate children mentally and physically.

Exergaming, which is new terminology for physically active video gaming, has shown to be an avenue for increasing activity levels in children. In 2006, Nintendo introduced the gaming console called the *Wii.* The *Wii* was revolutionary because it not only included movement with the lower part of the body but also the upper body. It also made it possible for people to play activities that are traditionally played outside of the house such as baseball, boxing, or bowling right in their living rooms.

Our Response

In 2007, the Nintendo *Wii* was introduced in an after-school program in Southern Idaho. This study reported here sought to determine if participating in exergames was an effective way to be physically active for youth ages 9-12 years of age/4th-6th graders. Researchers received human assurances approval for the data collection, and signatures were required by the participant and the parent for the youth to be included in data collection.

Youth participated in two out of the three different *Wii* activities (Tennis, Boxing, and Dance Dance Revolution [DDR]). These activities were selected by the amount of movement needed to play each game. Participants played each activity for 20 minutes. Heart rate was recorded before and after each activity. Pedometers were worn by participants during the activity, and the number of steps taken during each activity was recorded.

Youth then participated in two different traditional sports activities: capture the flag and kick ball. A youth committee comprised of three after-school participants determined the traditional activities that would be played. These activities were played for 20 minutes, and heart rate and pedometer recordings were recorded the same as for the *Wii* activities. Each activity was played on a different day so the children's heart rates would not already by accelerated by activity.

Participants were asked at the end of all activities how hard they felt they played and how well they liked the activity. Youth were also asked a series of questions regarding their preferences for activities and whether or not they preferred to play on the *Wii* or pursue traditional activities.

Program Outcomes

Demographics

Of the 25 participants who provided demographic information, nine were female, and 16 were male. Eighteen were white, one was Asian American, and six were Hispanic. The age range for these individuals was 9-12 years of age.

Exertion Levels

Using the perceived exertion scale "Perceived Exertion for Practitioners: Rating Effort with the OMNI System" (Robertson, 2004), youth were asked to determine their exertion levels based on the scale presented. Table 1 shows the percentage of participants who had a perceived exertion level of 5 and above or 8 and above.

Table 1.
Perceived Exertion Levels

	DDR	Tennis/Boxing	Capture the Flag	Kick Ball
5 or above	80%	84%	68%	63%
8 or above	36%	60%	64%	32%

Activity Enjoyment

Using the scale below, youth were asked to indicate their preference of each activity.

1	2	3	4
Dislike the Activity - Would not Play	Activity was alright - Not	Activity was good - Would play	Activity was fun - Would definitely play

again	favorite	again	again

Table 2 shows the percentage of participants who rated the activities as a 4.

Table 2.
Activity Enjoyment

DDR	72%
Tennis/Boxing	76%
Capture the Flag	79%
Kick Ball	26%

Heart Rate

All participants had their heart rate taken before and after each activity. Results indicated that 52% of participants playing DDR showed at least an 11-point increase in heart rate. Results also indicated that 44% of participants playing tennis/boxing saw an increase of 11 points or higher.

Results from traditional activities indicated that 59% of youth had a 20-point increase or higher in heart rate while playing capture the flag, and 37% of participants had a 10-point increase or higher while playing kick ball.

Steps Taken

Youth wore pedometers on their waist bands during each of the activities. Steps were recorded and averaged. Youth should take an average 12,000 steps per day (The Presidents Challengeâ Benefits of Fitness: Why these activity amounts). The average number of steps taken playing the Nintendo *Wii* DDR was 802. The average number of steps taken on the Nintendo *Wii* Tennis/Boxing was 746. Youth took an average of 1,171 steps playing capture the flag and 789 steps playing kick ball. These activities were only played for 20 minutes each.

Conclusion

As parents, educators, and health professionals look for avenues to increase children's activity levels, exergaming is an excellent option. Exergames is a way to stimulate children's minds as well as their bodies. The research reported here shows that the majority of children had increased heart rates and had average pedometer readings of 600. The children's enjoyment rating indicates that using exergames is engaging and an effective method for increasing physical activity in youth. With the popularity of the Nintendo Wii, exergaming is an avenue for Extension educators and health professionals to incorporate physically and mentally stimulating activity into their programming. Future studies could include using pedometers as a way for children to self-monitor movement during physical activity, exergames, or sports.

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