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Original Research Article

Implementing Physical Exercise Programs to Reduce Overweight and Obesity among Schoolchildren in Vinh, Vietnam

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Abstract

To determine if targeted exercise could reduce overweight and obesity in schoolchildren, a 12-week study was conducted with 60 randomly assigned participants. One group (n=30) received an enhanced exercise intervention, consisting of two extra athletic training sessions per week in addition to their regular physical education. The control group (n=30) continued with the standard curriculum and twice-weekly physical education. Key measurements, including height, weight, waist circumference, body fat, and BMI, were taken as outcome measures. After 12 weeks, the exercise group showed significant improvements in all measured outcomes ($p<0.05$), indicating the program's success in combating overweight and obesity.

Keywords: Physical Exercise, Overweight, Obesity, Schoolchildren.

1. INTRODUCTION

Overweight and obesity are escalating global health crises impacting both developed and developing countries. The prevalence of these conditions rises significantly with age in children, increasing from 7% in those under five to 19% in 5-19 year olds [1, 2]. In 2016, over 2 billion people worldwide were affected, including more than 340 million children and adolescents [3]. This growing challenge is particularly acute in Asia [4, 5], notably in low- and middle-income countries like Vietnam [6, 7]. In Vietnam specifically, there's a rapid increase in both general and abdominal obesity, with the latter being especially pronounced among women, regardless of the diagnostic criteria used [8]. Studies consistently show a high prevalence of obesity among Vietnamese schoolchildren [9, 10], largely attributed to unhealthy diets and insufficient physical activity as they get older [11].

Physical activity and fitness are crucial in preventing overweight and obesity in children and adolescents. Research indicates that improving physical fitness in overweight youth can lead to numerous health benefits, including reduced body fat [12]. Furthermore, intervention has been shown to effectively lower children's BMI and waist circumference, successfully increasing their overall physical activity levels and school-based moderate-to-vigorous physical activity [13] and school-based programs are an effective way to reduce the number of overweight and obese children [14].

Currently, limited research exists on the impact of physical exercise programs on overweight and obesity among schoolchildren in Vinh City, Vietnam. This study, therefore, aims to evaluate the effectiveness of such a program in reducing these conditions in local schoolchildren.

2. MATERIAL AND METHODS

2.1. Participants

Sixty pupils (11 years old) from Vinh City, Vietnam, voluntarily participated in this study. They were randomly assigned to either an Exercise group or a Control Group, with 30 school children in each (15 boys, 15 girls). Before their involvement, parents gave written informed consent and shared their child's health history. We excluded any children with chronic pediatric diseases or orthopedic conditions that would limit their participation in exercise.

2.2. Intervention Protocol

The Exercise group followed a 12-week exercise program, meeting twice weekly outside of regular class time. Each 45-minute session included a 10-minute warm-up, a 25-minute main activity, and a 10-

minute cool-down. In contrast, the Control group maintained their usual school physical education lessons and were asked not to begin any new physical programs. To ensure consistency, the same instructors conducted all testing and training, using identical equipment, positioning, and techniques for physical tests, which were performed in the same order. Both groups were tested before and after the 12-week intervention. The selected exercises are: Catching and Runing, Ball bouncing, and Ball rolling, Ball dribbling, push-ups, squats, lunges, plank, stretch, rope jumping.

2.3. Outcomes Measurements and Data Collection

We collected the following data: Height (cm), Weight (kg), Waist circumference (cm), Body fat percentage (%), Body Mass Index (BMI).

2.4. Data Analysis

Statistical significance for all analyses was set at $p \leq 0.05$, meaning that results with a probability of occurring by chance of 5% or less were considered statistically significant. All quantitative data are presented as the mean value plus or minus the standard deviation (mean±SD). To assess differences in the measured variables between the research groups, an Analysis of Variance (ANOVA) was employed.

3. RESULTS

Effect of Physical Exercise Programs on Overweight and Obesity of Schoolchildren

Table 1: Comparision of variables performance between Exercise and Control groups at pre-test

Variables	Control Group		Exercise Group		F	Sig*.
	Mean	SD	Mean	SD		
Height (m)	1.386	0.036	1.387	0.035	0.012	0.915
Weight (kg)	50.19	2.06	49.89	2.24	0.291	0.592
Waist (cm)	67.50	1.73	76.20	1.90	0.407	0.526
Fat (%)	29.00	1.31	28.73	1.41	0.525	0.472
BMI	26.12	0.90	25.91	0.93	0.776	0.382

**Determined by One-way Anova; SD: Standard Deviation*

As detailed in Table 1, no significant differences were found between the two intervention groups across various variables. One-way ANOVA confirmed this for Height [F(1,58)=0.012; sig. = 0.915], Weight [F(1,58)=0.291; sig. = 0.592], Waist [F(1,58)=0.407; sig. >0.526], Fat [F(1,58)=0.525; p>0.472], and BMI [F(1,88)=0.776; p>0.382].

Table 2: Comparision of variables performance between Exercise and Control groups at post-test

Variables	Control Group		Exercise Group		F	Sig*.
	Mean	SD	Mean	SD		
Height (m)	1.386	0.036	1.391	0.40	0.218	0.642
Weight (kg)	50.19	2.06	47.51	2.18	23.918	0.000
Waist (cm)	76.50	1.73	74.01	1.66	32.004	0.000
Fat (%)	29.00	1.31	27.18	1.30	28.903	0.000
BMI	26.12	0.90	24.42	1.08	43.642	0.000

**Determined by One-way Anova; SD: Standard Deviation*

All dependent variables, except **Height** [F(1,58) = 0.218, p = 0.642], showed significant differences between the two intervention groups. Participants in the Exercise group reported significantly better scores than the Control group for **Weight** [F(1,58) = 23.918, p < 0.001], **Waist** [F(1,58) = 32.004, p < 0.001], **Fat** [F(1,58) = 28.903, p < 0.001], and BMI [F1,58) = 43.642, p < 0.000]. These results are detailed in Table 2.

4. DISCUSSION

The purpose of this study was to assess whether an exercise program could help reduce overweight and obesity among schoolchildren. Findings show that increased physical activity at school positively impacts the BMI and body composition of overweight and obese children. Therefore, increasing the required number of physical education lessons in school curricula is an effective way to combat childhood obesity [15, 16].

Consistent with prior research, our study found that physical activity was effective in reducing obesity and overweight in children within the experimental group. This positive effect on excessive body mass occurred even when children maintained their usual diet and lifestyle. [17]. Supporting this, Monteiro *et al*., also showed that dance training could positively influence BMI z-score and waist-to-height ratio in overweight and obese children [18]. Given the prevalence of childhood obesity in children with low physical activity, implementing structured educational programs and

raising awareness about obesity prevention in children and adolescents are recommended [19].

Aerobic training, both alone and combined with strength training, is linked to improved adiposity outcomes in overweight and obese children and adolescents [20]. Additionally, a 12-week physical activity program was shown to enhance obese schoolchildren's physical fitness and self-perception. Therefore, increasing the time for physical activity in schools and encouraging obese students' participation is recommended [21]. Another finding suggestes that eight weeks of school-based high-intensity interval training, combined with nutrition intervention (three sessions per week), has been shown to improve body composition and muscular and aerobic performance in overweight adolescent girls [22]. Continuous circuit training in physical education classes can reduce body mass index (BMI) and improve physical fitness in high school students with varying degrees of obesity [23].

Lack of regular exercise, a sedentary lifestyle, and consuming fatty foods contribute to obesity and overweight. Ultimately, engaging in physical activity promotes good posture and helps reduce medical costs [24]. An intervention program that combined play-based activities with nutritional recommendations successfully reduced body fat in children aged 8–12 years [25]. Physical exercise promotes positive changes in childhood obesity by primarily restoring cellular and cardiovascular balance, improving body composition, and activating metabolism. Thus, it acts as a crucial co-factor in combating obesity [26]. For obese children, regular physical activity leads to significant improvements, including better body composition (less fat, more lean mass), enhanced cardiorespiratory fitness and strength, increased caloric expenditure and resting metabolic rate, improved glucose tolerance and insulin sensitivity, healthier lipid metabolism, and reduced inflammation [27].

5. CONCLUSION

This 12-week study in Vinh, Vietnam, involved 60 primary schoolchildren participating in various physical exercises, including catching and running, ball activities (bouncing, rolling, dribbling), push-ups, squats, lunges, plank, stretching, and rope jumping. The program successfully reduced overweight and obesity among the schoolchildren, proving these exercises beneficial for decreasing fat percentage and body mass index (BMI).

Conflict of Interest Statement: The authors declare no conflicts of interest.

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