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Study to Assess the Effect of Isometric Exercise on Body Mass Index and Perceived Stress among Adolescent Girls

Ajith M, Yuvarani. S, R. Vijayalakshmi
Saveetha College of Nursing, Saveetha Institute of Medical and Technical Sciences, Chennai, India

Abstract

*Obesity is a serious public health concern in the Middle East and around the world, and in most Asian nations; its incidence is fast increasing. This paper reviews research on activity level differences in thin and obese persons, and basic research on energy balance, or intake/expenditure relationships. The study evaluates the impact of isometric exercise on adolescent girls on BMI and stress. Then convenience techniques were used to study the effects of isometric walking and jogging exercises for weight and fat loss. The selective effects of exercise for thin and heavy individuals, and the parametric effects of increased frequency or expenditure on weight loss. The anthropometric evaluation The World Health Organization stress scale was used to measure stress and determine the test's level of stress**. The results showed that among the demographic variables of adolescent girls, age, gender, type of family, diet pattern, level of education, number of siblings, living area and usage of substances had a statistically significant association with the patient's level of BMI and stress at the p0.05 level. The study found that isometric exercises can promote relaxation and enhance mental focus, and their regular practice was linked to a meaningful reduction in perceived stress. It is advised that more studies be conducted to examine the long-term impacts of aerobic exercise on body mass index and stress levels, as well as to investigate how they might be integrated with other exercise forms for optimal health outcomes.*

Keywords: *Body Mass Index, Isometric Exercise, Stress.*

Introduction

In the Middle East and around the world, obesity is seen as a serious public health concern, and in most Asian nations, its incidence is fast increasing [1]. Obesity increases the risk of acquiring functional problems, such as diminished muscle strength, especially as one ages. It also creates functional limits in the performance of the skeletal muscles. According to reports, older obese women with a body mass index of greater than 30 are three to four times more likely to experience functional impairments [2]. In terms of illness load and prevalence, obesity poses a threat to the health of the world's population. According to recent estimates, nearly 2 billion individuals worldwide are overweight or obese [3]. Despite a strong correlation between obesity and unfavourable coronary risk-factor status, the impact of obesity on the risk of coronary heart disease is still up for debate. Diabetes mellitus, hypertension, and excessive cholesterol levels are all caused by obesity [4]. Obesity is due to an imbalance between caloric intake and expenditure. One component of expenditure that has been receiving increasing research attention is exercise. This paper reviews research on activity level differences in thin and obese people, and basic research on energy balance, or intake/expenditure relationships. Then meta-analysis techniques were used to study the effects of aerobic walking and jogging exercises for weight and

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****Corresponding Author: ajivas25@gmail.com***

fat loss, the selective effects of exercise for thin and heavy people, and the parametric effects of increased frequency or expenditure on weight loss [5]. Recent research has shown a potential link between the development of hypertension (Carroll et al., 2001, Carroll et al., 2003, Matthews et al., 2004) and the advancement of carotid atherosclerosis (Barnett et al., 1997, Lamarck et al., Jennings et al., 2004) and elevated blood pressure (BP) in response to psychosocial stress. Consequently, cardiovascular reactivity tests have been suggested as a potential clinical tool for identifying the probability of hypertension (Turner, 1994) and offer a helpful paradigm for study on psycho-physiological processes [6].

Methodology

The study was conducted at Saveetha College of Nursing, Chennai. A quantitative investigation involving one twenty teenage girls was conducted. The sample strategy employed was convenience sampling methods. Adolescent girls between the ages of 18 and 25 made up the participants. The study did not include adolescent girls with mental health disorders or those who were unavailable at the time of data collection. A self-organizing survey instrument was designed to collect demographic and clinical data. The anthropometric evaluation The WHO stress scale was used to measure stress and determine the test's level of stress. The participants were informed of the study's objectives, methods, benefits, and dangers. They were also given the choice to discontinue participation at any time without facing consequences. By utilizing the mean standard deviation and descriptive statistics, data was examined using SPSS 16.

Results

Description of the Demographic Variables of the Adolescent Girls with Obesity

The age range of the majority of teenage girls was 18 to 20 years old (70%), followed by 21 to 25 years old (30%), and older still. 120 (100%) of the participants were teenage girls. Joint families made up 87 (72.5%) of the family types, while nuclear families made up 33 (27.5%). 53 (44%), and 67 (56%), of the teenage girls had a vegetarian diet. The adolescent girls' educational attainment was 48 (40%) in their first year of college and 72 (60%) in their second year. There are 92 (77%) people in their family with one to two siblings, and 28 (23%), with three or more siblings. Teenage girls were divided into three residential categories: semi-urban (38/32%), urban (33%) and rural (41%). Adolescent girls reported using drugs in 38 cases (32%), and in 82 cases (68%).

Assessment of BMI

BMI-Weight in kg/height in Meter Square

Table 1. Frequency and Percentage Distribution of Level of BMI among Adolescent Girls

BMI	WEIGHT STATUS	Frequency	Percentage
Below 18.5	Under weight	13	11%
18.5-24.9	Normal weight	78	65%
25.0-29.9	Over weight	12	10%
30.0-34.9	Obesity class I	18	15%
35.0-39.9	Obesity class II	0	0%
Above 40	Obesity class III	0	0%

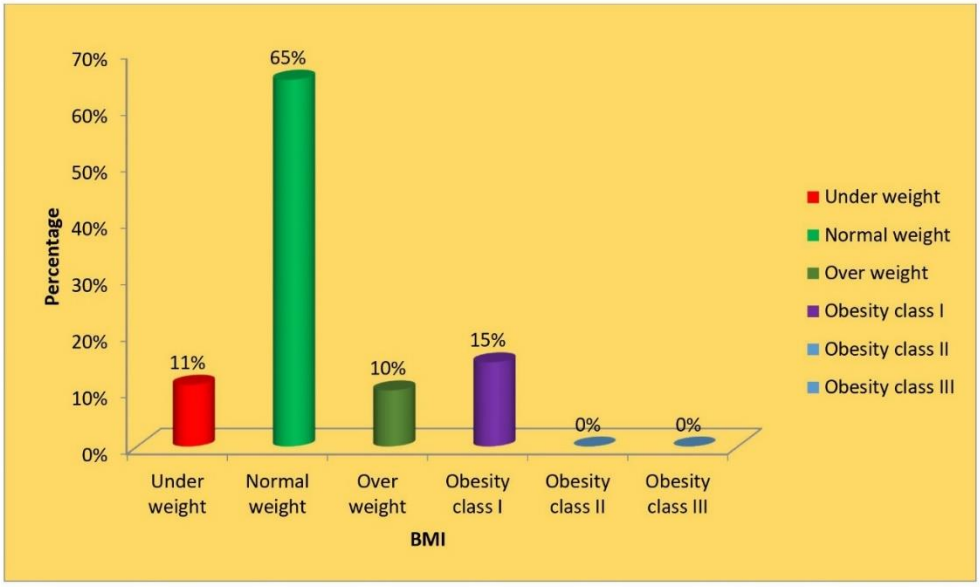

Figure 1: Frequency and Percentage Distribution of Level of BMI among Adolescent Girls

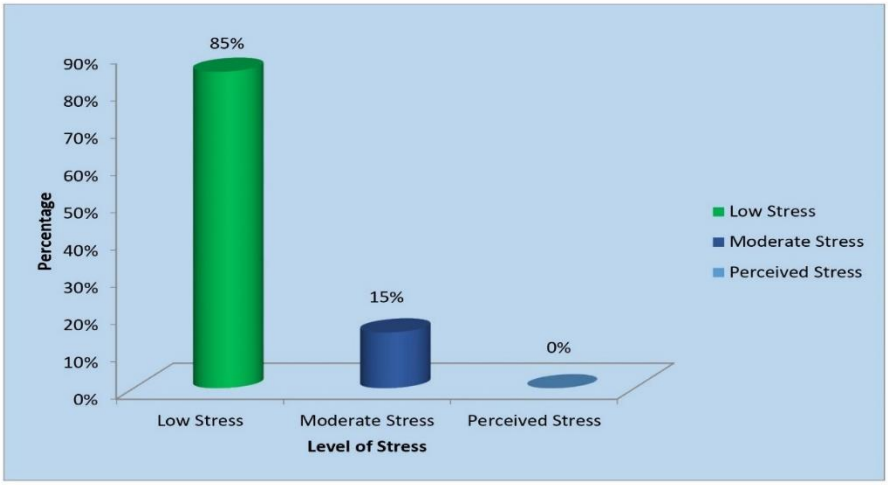

Figure 2. Frequency and Percentage Distribution of Level of Stress among Adolescent Girls

Table 2. Distribution of Level of Stress among Adolescent's Girls in Post Test

S.No	Level of Stress	Frequency	Percentage
1	Low Stress	102	85%
2	Moderate Stress	18	15%
3	Perceived Stress	0	0%

Table 3. Distribution of Mean, Standard Deviation on Level of Stress Pretest and Post Test

S. No	Test	Mean	SD	T value	Significance
1	Pre Test	25.25	7.39	23.2	> **Table Value Significant**

2	Post Test	9.09	3.07		

Association of Level of BMI and Stress Among Adolescent Girls with Selected Demographic Variables

The study discovered that, among the demographic variables of adolescent girls, age, gender, type of family, diet pattern, level of education, number of siblings, living area and usage of substance had a statistically significant association with the adolescent girls BMI and stress at the $p<0.05$ level. The other demographic variables did not show a statistically significant association with the patients' level of BMI and stress.

Discussion

The study revealed that Out of 120 students, 49 (41%) were female and from rural areas; 48 (40%) were first-year students, according to the survey. 10% of students had excess weight even though isometric exercise was taught on university campuses. This underscores the need for isometric exercise in accordance with the WHO stress scale Guidelines 2020 and anthropometric assessment.

Furthermore, this study clarified that whilst 93 (77%) of the participants experienced stress during the pretest, 102 (85%) reported no stress during the posttest (figure 2). This finding is corroborated by a study done in South Wales, United Kingdom, which showed that teenage girls with greater BMIs and stress levels also scored higher on the pretest and post-test. Following the intervention, students' positive views significantly increased in research done in the United Kingdom.

The results of the study showed that teenage girls' body mass index and stress level were effectively lowered. Their posttest mean score was 9.09 ± 3.07, which was considerably higher than their pretest score of 25.25 ± 7.39. On the other hand, only 9 out of 120 participants in a study that measured stress levels and BMI among adolescent females in medicine attained scores of 80–90% on both the pretest and posttest evaluation (figure 1).

Results

The study conducted involved a total of 120 students, revealing that 49 of them (41%) were female and resided in rural areas. Additionally, 48 participants (40%) were in their first year of university. Despite the introduction of isometric exercise programs on campus, it was found that 10% of the students were struggling with excess weight, highlighting a significant area for improvement in health and wellness initiatives. This situation emphasizes the importance of incorporating isometric exercises as recommended by the WHO Stress Scale Guidelines of 2020, alongside thorough anthropometric assessments to monitor student health effectively. The findings of the research demonstrated a noteworthy reduction in both the body mass index (BMI) and stress levels among adolescent girls who participated in the study. The posttest average score for these girls was 9.09 ± 3.07, which marked a significant improvement compared to their pretest average score of 25.25 ± 7.39. Conversely, only 9 out of the 120 participants achieved scores ranging from 80 to 90% on both pretest and posttest evaluations, indicating that a limited number of students excelled in managing their stress levels and maintaining a healthy BMI during the study.

Conclusion

The current study was found that participants' stress levels considerably decreased by isometric workouts. Because isometric exercises can promote relaxation and enhance mental focus, their regular practice was linked to a meaningful reduction in perceived stress. It was discovered that isometric exercise had very little effect on BMI.

Although there were some gains in strength and muscular tone, the BMI did not significantly decrease as a result of these workouts alone. This shows that, even while isometric exercises are good for mental health, those who want to significantly lower their BMI should combine them with other types of exercise and dietary changes. It is advised that more studies be conducted to examine the long-term impacts of isometric exercise on BMI and stress levels, as well as to investigate how they might be integrated with other exercise forms for optimal health outcomes.

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Conflicts of Interest

The author declares no conflict of interest.

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