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The Effect of Exercise on Weight Changes in Obese Nursing Students of Santa Elisabeth College of Health, Medan

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Abstract: Exercise is physical exercise for fitness and health. There are several types of exercise including jogging, cycling, swimming and dancing. Zumba dance is a physical activity with Latin dance movements and can help burn calories aimed at fitness and health, especially for people who are overweight (obesity) which is characterized by excessive fat accumulation due to an imbalance between energy in and energy out. This will have an impact on health and result in various chronic diseases. This study aims to analyze whether there is an influence of Zumba Dance on weight loss for students in the Nursing Study Program. Quantitative research type with a pre-experimental design using one group pretest-posttest design, total sampling technique with a total sample of 27 respondents. The instrument used is the observation sheet. After doing Zumba Dance, there was a weight loss of 27 people (100%), the Wilcoxon Sign Rank Test statistical test obtained p value= 0.001 ($p<0.05$) which means there is a significant influence between Zumba dance on weight loss in the nursing student program at the Santa Elisabeth College of Health Sciences who was obese. It is hoped that you will continue to do Zumba dance to maintain body weight balance, increase fitness and health, while maintaining a healthy diet

Keywords: *Caring Code;* Health Sciences; Student Learning Motivation

Introduction

Obesity is an excessive accumulation of fat (Amir et al., 2020) resulting from an imbalance between energy intake and expenditure, as well as a lack of physical activity. It has become a major health concern that requires serious attention, as obesity cases continue to increase every year and it ranks as the fifth leading cause of death worldwide, accounting for 2.8 million deaths annually (World Health Organization, 2020).

Obesity is now considered a global pandemic and a multifactorial pathology. Its increasing prevalence is largely associated with lifestyle changes, particularly poor dietary habits and insufficient physical activity, with rates reaching 17.35%. In 2016, more than 650 million individuals were classified as obese, including 37% of men and 38% of women with a BMI above 25 kg/m². Nearly 50% of people with obesity are concentrated in 10 countries: the United States, China, India, Russia, Brazil, Mexico, Egypt, Germany, Pakistan, and Indonesia (Shafiee et al., 2024).

According to the World Health Organization (WHO), around 40% of adults aged over 18 years are obese, with women being more affected (Eroğlu Kolayiş & Arol, 2020). Based on gender, adult women (>18 years) showed an obesity prevalence of 32%, with an increase of 18.1%. Among adolescents aged 16–18 years, the prevalence reached 1.4% (Surya Alamsah, 2019). In North Sumatra, particularly in Medan, the prevalence of obesity is 23.8% (Inayah et al., 2019). A preliminary survey conducted among 107 nursing students found that 21 students (19.62%) were obese with a BMI > 25.00.

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Obesity leads to various non-communicable diseases such as diabetes, hypertension, coronary heart disease, and stroke (Mu' et al., 2020). Therefore, prevention and management strategies are needed to reduce obesity rates or maintain weight balance through exercises such as running, jogging, cycling, swimming, and Zumba dance.

Zumba dance is a physical activity that incorporates Latin-inspired dance movements and is effective in burning calories and reducing body weight (Sylvia et al., 2020). Studies have shown that an 8-week Zumba dance program significantly reduces body weight ($p = 0.000$) (Eroğlu Kolayiş & Arol, 2020). Zumba has become one of the most popular fitness programs, practiced by over 14 million people across 185 countries, and has become a lifestyle trend (Saintika et al., 2020). Its combination of fast and slow movements, accompanied by engaging music, aims to burn calories in overweight or obese individuals and has positive effects on body weight (Aditya Kemal et al., 2021).

Based on this background, the author is interested in conducting a study on the Effect of Zumba Dance on Weight Reduction among Obese Nursing Students, to analyse whether Zumba dance has a significant impact on weight loss.

Method

The research design used in this study is a pre-experimental one-group pretest–posttest design, in which a single group is observed before and after the intervention (Nursalam, 2020). The statistical test used for data analysis was the Wilcoxon test.

Result and Discussion

Table 1. Distribution of respondents based on body weight before the Zumba Dance intervention among obese Nursing students at Santa Elisabeth Institute of Health Sciences, Medan.

No	Body weight before	*f (n)*	Percentage %	Body weight classification
1	56.0	1	3.7	Obesity
2	58.0	1	3.7	Obesity
3	60.0	1	3.7	Obesity
4	61.0	1	3.7	Obesity
5	63.0	1	3.7	Obesity
6	64.0	4	14.8	Obesity
7	65.0	1	3.7	Obesity
8	66.0	1	3.7	Obesity
9	67.0	2	7.4	Obesity
10	68.0	1	3.7	Obesity
11	69.0	2	7.4	Obesity
12	70.0	1	3.7	Obesity
13	71.0	2	7.4	Obesity
14	74.0	1	3.7	Obesity
15	75.0	1	3.7	Obesity
16	76.0	1	3.7	Obesity
17	77.0	1	3.7	Obesity
18	83.0	1	3.7	Obesity
19	86.0	2	7.4	Obesity
20	101.0	1	3.7	Obesity
Total		27	100	

Based on Table 1. obtained results from 27 respondents, there were respondents' body weight with 56 kg (3.7%), 58 kg (3.7%), 60 kg (3.7%), 61 kg (3.7%), 63 kg (3.7%), 64 kg (14.8%), 65 kg (3.7%), 66 kg (3.7%), 67 kg (7.4%), 68 kg (3.7%), 69 kg (7.4%), 70 kg (3.7%), 71 kg (7.4%), 74 kg (3.7%), 75 kg (3.7%), 76 kg (3.7%), 77 kg (3.7%), 83 kg (3.7%), 86 kg (7.4%), and 101 kg (3.7%) before Zumba dance

Table 2. Distribution of respondents based on body weight after the Zumba Dance intervention among obese Nursing students at Santa Elisabeth Institute of Health Sciences, Medan

No	Body weight before	*f (n)*	Percentage %	Body weight classification
1	55,0	1	3.7	Obesity
2	56,0	1	3.7	Obesity
3	57,0	1	3.7	Obesity
4	60,0	2	7.4	Obesity
5	60,5	1	3.7	Obesity
6	61,0	1	3.7	Obesity
7	62,0	1	3.7	Obesity
8	63,0	2	7.4	Obesity
9	64,0	1	3.7	Obesity
10	65,0	2	7.4	Obesity
11	66,0	2	7.4	Obesity
12	67,0	1	3.7	Obesity
13	68,0	1	3.7	Obesity
14	69,0	2	7.4	Obesity
15	70,0	1	3.7	Obesity
16	72,0	1	3.7	Obesity
17	75,0	2	7.4	Obesity
18	80,0	1	3.7	Obesity
19	82,0	2	7.4	Obesity
20	99,0	1	3.7	Obesity
Total		27	100	

Based on Table 2. the results obtained from 27 respondents, there were respondents' weight with 55 kg (3.7%), 56 kg (3.7%), 57 kg (3.7%), 60 kg (7.4%), 60.5 kg (3.7%), 61 kg (3.7%), 62 kg (3.7%), 63 kg (7.4%), 64 kg (3.7%), 65 kg (7.4%), 66 kg (7.4%), 67 kg (3.7%), 68 kg (3.7%), 69 kg (7.4%), 70 kg (3.7%), 72 kg (3.7%), 75 kg

(7.4%), 80 kg (3.7%), 82 kg (7.4%) and 99 kg (3.7) after Zumba dance

Table 3. Effect of Zumba Dance on Weight Reduction at Santa Elisabeth Institute of Health Sciences, Medan. Frequency Distribution of Respondents' Body Weight Before and After the Intervention

No	Body weight before	*f (n)*	*Percentage %*	Body weight classification	Body weight after	*f (n)*	*Percentage %*	Body weight classification
1	56.0	1	3.7	Obesity	55.0	1	3.7	Obesity
2	58.0	1	3.7	Obesity	56.0	1	3.7	Obesity
3	60.0	1	3.7	Obesity	57.0	1	3.7	Obesity
4	61.0	1	3.7	Obesity	60.0	2	7.4	Obesity
5	63.0	1	3.7	Obesity	60.5	1	3.7	Obesity
6	64.0	4	14.8	Obesity	61.0	1	3.7	Obesity
7	65.0	1	3.7	Obesity	62.0	1	3.7	Obesity
8	66.0	1	3.7	Obesity	63.0	2	7.4	Obesity
9	67.0	2	7.4	Obesity	64.0	1	3.7	Obesity
10	68.0	1	3.7	Obesity	65.0	2	7.4	Obesity
11	69.0	2	7.4	Obesity	66.0	2	7.4	Obesity
12	70.0	1	3.7	Obesity	67.0	1	3.7	Obesity
13	71.0	2	7.4	Obesity	68.0	1	3.7	Obesity
14	74.0	1	3.7	Obesity	69.0	2	7.4	Obesity
15	75.0	1	3.7	Obesity	70.0	1	3.7	Obesity
16	76.0	1	3.7	Obesity	72.0	1	3.7	Obesity
17	77.0	1	3.7	Obesity	75.0	2	7.4	Obesity
18	83.0	1	3.7	Obesity	80.0	1	3.7	Obesity
19	86.0	2	7.4	Obesity	82.0	2	7.4	Obesity
20	101.0	1	3.7	Obesity	99.0	1	3.7	Obesity
Total		27	100			27	100	

The measuring instrument used was a CAMRY brand weighing scale. The results of body weight measurements were recorded on an observation sheet to determine the effect of Zumba dance on weight reduction among obese nursing students. After data were collected from 27 respondents, a normality test was conducted using the Shapiro-Wilk test. The researcher chose the Shapiro-Wilk test because the sample size was less than 50. The results of the normality test showed that the data were not normally distributed. Therefore, the Wilcoxon Signed Rank Test was used.

Table 4. Analysis Results of Weight Reduction Before and After Zumba Dance among Nursing Students at Santa Elisabeth Institute of Health Sciences, Medan

Body Weight	N	Mean	Median	Std. deviation	Min-max	95%*CI*	*P value*
Body Weight Before	27	70.18	68.00	9.89	56.0-101.0	66.26-74.10	0.001
Body Weight After	27	67.83	66.00	9.63	55.0-99.0	64.02-71.64	0.001

Based on Table 4, the results of the Wilcoxon Signed Rank Test showed a p-value = 0.001 ($p < 0.05$). This indicates that from the 27 respondents, the mean body weight before the intervention was 70.18 kg (95% CI = 66.26 – 74.10) with a standard deviation of 9.89, while the mean body weight after the intervention was 67.83 kg (95% CI = 64.02 – 71.64) with a standard deviation of 9.63. Thus, there was a mean difference of 2.35 kg before and after the intervention. These results demonstrate a statistically significant difference in body weight between pre- and post-Zumba dance, indicating that Zumba dance has a significant effect on weight reduction among obese nursing students at Santa Elisabeth Institute of Health Sciences, Medan. Therefore, the alternative hypothesis (Ha) is accepted.

Discussion

Based on Figure 1, the results showed that before the Zumba dance intervention, all 27 respondents (100%) had body weights above the normal limit. The lowest body weight recorded among the nursing students was 56 kg, while the highest was 101 kg, with a mean of 70.14 kg. Therefore, all 27 students were classified as obese.

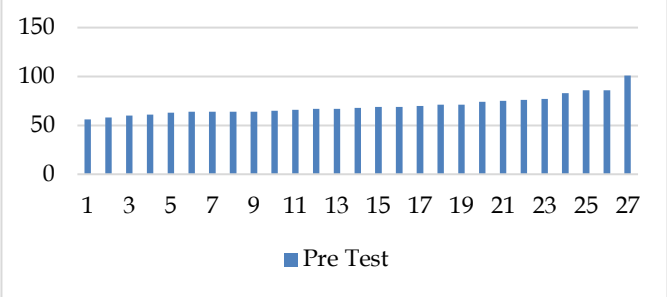

Figure 1. Body Weight Profile Before the Zumba Dance Intervention

Obesity is the excessive accumulation of fat due to an imbalance between energy intake and expenditure (Syifa & Djuwita, 2023). In both developed and developing countries, obesity has continued to rise. For example, in the United States, obesity prevalence increased from 2.9% in the 1960s to 15% in the 1980s, rose again to 20% in the 1990s, and reached 30% by the 2000s. Even Grade III obesity (BMI ≥ 40) rose from 4.7% to 13%. It is estimated that obesity-related deaths occur in nearly 400,000 people annually. The prevalence of obesity in several countries is as follows: United States 86.9%, China 62%, Russia 29.2%, Brazil 26.2%, Mexico 24.9%, Egypt 21.8%, Germany 17.1%, and Pakistan 16.7% (Masrul, 2018). In Asia, among students aged 10–24 years, 22.19% were found to be obese, including 15.1% in Indonesia (Pitil & Ghazali, 2022). Ariyanto et al. (2023) further emphasized that behavioral factors contribute significantly to obesity. Preventive behaviors among students are still lacking, with as many as 116 respondents (48.5%) showing poor habits such as not choosing healthy foods, frequent late-night snacking, and minimal physical activity. Besides behavioral aspects, other contributing factors include psychological, environmental, lifestyle, physical activity, and genetic influences (Nashirah, 2022). Similarly, among Nursing students, weight gain and obesity were influenced by unhealthy eating patterns, frequent late-night snacking, consumption of high-calorie and low-fiber foods, frequent intake of fast food and carbonated drinks, preference for sleeping instead of exercising, and overeating during stress.

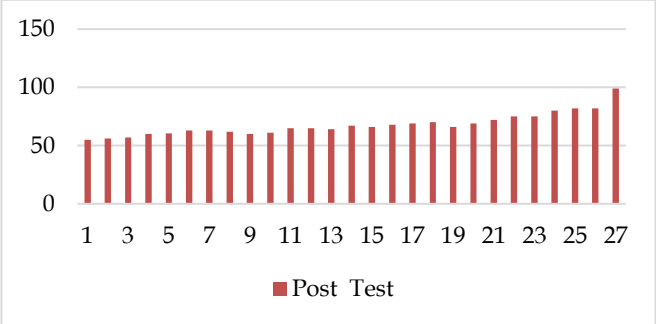

Figure 2. Body Weight Profile After the Zumba Dance Intervention

Based on Figure 2, the data showed that after the Zumba dance intervention, all 27 respondents (100%) experienced weight reduction. The lowest body weight recorded was 55 kg, while the highest was 99 kg, with a mean of 67.83 kg. Although the 27 nursing students were still classified as obese, a noticeable decrease in body weight was observed compared to before the Zumba dance intervention.

Dance is a form of physical activity that promotes fitness and serves as a suitable strategy for preventing both aging effects and obesity (Moreira-Reis et al., 2022). Regular physical exercise is an important factor in regulating body composition during growth; however, it should be noted that changes occurring during growth also influence strength and motor performance. Therefore, consistent and structured physical training is essential (Bülbül, 2020).

Various types of exercise can be used, including running, jogging, cycling, swimming, and dance, one of which is Zumba dance. Zumba is a Latin-inspired dance that is enjoyable and offers many benefits, one of the most significant being weight reduction (Sylvia et al., 2020). In a study conducted by Eroğlu Kolayiş & Arol (2020) involving 60 female volunteers with a BMI greater than 24.9, the participants' body weight decreased from 79.99 ± 10.91 kg to 72.83 ± 10.63 kg, BMI from 29.56 ± 4.12 to 28.31 ± 3.98, and body fat from 36.83 ± 6.1 to 13.7 ± 2.53. Similarly, Cahya Allistia et al. (2021) reported that after Zumba dance sessions, there were reductions in biceps fat (-5.60), triceps fat (-15.30), abdominal fat (-5.90), waist circumference (-11.40), thigh circumference (-4.20), and arm circumference (-4.20). These findings indicate that Zumba dance is effective for reducing body weight.

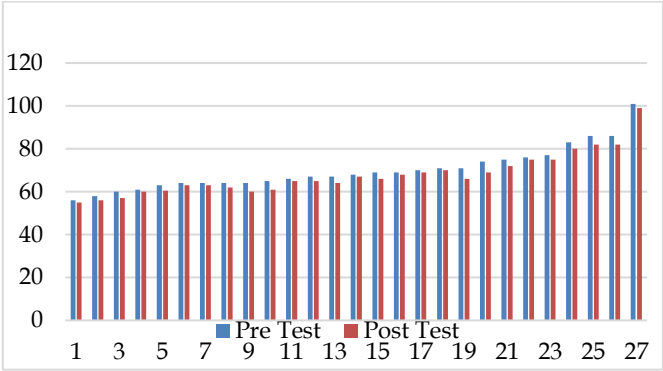

Figure 3. Effect of Zumba Dance on Body Weight Before and After the Intervention

The results of this study showed that among the 27 respondents, the mean body weight before the intervention was 70.18 kg (95% CI = 66.26 – 74.10) with a standard deviation of 9.89. Meanwhile, the mean body weight after the intervention was 67.83 kg (95% CI = 64.02 – 71.64) with a standard deviation of 9.63. Thus,

there was a mean difference of 2.35 kg before and after the intervention. The pre- and post-test analysis of Zumba dance using the Wilcoxon Signed Rank Test obtained a p-value = 0.000 ($p < 0.05$). These results indicate a statistically significant difference in body weight before and after Zumba dance, meaning that Zumba dance has a significant effect on weight reduction among obese nursing students at Santa Elisabeth Institute of Health Sciences, Medan.

This finding is consistent with the study of Kemal T. Aditya et al. (2021), which reported a significant effect of Zumba dance on weight reduction in obese individuals, with a p-value = 0.000, indicating a meaningful decrease in both body weight and body mass index (BMI). Similarly, Permadi et al. (2023) found that, in their study involving 20 respondents, the hypothesis testing results showed a t-count of 2.04 > t-table 1.729, leading to the rejection of Ho and acceptance of Ha. This also demonstrated a significant effect of Zumba dance on weight reduction.

Before the Zumba dance intervention, the lowest body weight recorded was 56 kg and the highest was 101 kg. After the intervention, the lowest body weight was 55 kg and the highest was 99 kg, showing a reduction of about 1–2 kg. However, the weight reduction was not yet optimal, which may have been caused by poor dietary behavior, such as the lack of interest in choosing healthy foods, frequent snacking during study, consumption of fast food and sugary foods, all of which contribute to an imbalance between calorie intake and calorie expenditure.

Mu' & Hanum (2022) also stated that weight gain can be influenced by several factors, including frequent consumption of fast food, limited understanding of healthy eating, and insufficient physical activity. Physical activity such as Zumba or Zumba dance is able to burn 500–800 calories per session, and is not only effective for weight reduction but also improves overall health and physical condition. In a study involving 38 respondents, a p-value = 0.001 was reported after four weeks of Zumba intervention, indicating a significant difference in body weight (Amir et al., 2020). Therefore, the less physical activity a person engages in, the higher the risk of obesity, whereas effective physical activity such as Zumba can minimize obesity prevalence and prevent more serious health consequences.

Zumba dance is a suitable form of physical activity for university students, as it is enjoyable, engaging, and easy to perform without the need for equipment or weights, making it highly popular in today's modern era. In this study, the Zumba sessions consisted of a combination of basic movements from salsa, beto shuffle, cumbia, reggaeton, and merengue march, using aerobic steps, along with other dance styles such as belly dance. This combination of movements plays an important role in burning a significantly higher number of calories in a shorter time.

Sundari S. et al. (2020), in their study involving 15 respondents, reported an average change in body weight of 0.452 ± 0.451 with a p-value of 0.012, indicating that Zumba dance had a significant effect on weight reduction. In their study, the highest body weight among respondents before Zumba dance was 75 kg and the lowest was 57.20 kg, with a mean of 64 kg. After the intervention, the highest body weight was 67.40 kg and the lowest was 50.30 kg, with a mean of 54.85 kg. Based on the hypothesis test results, it can be concluded that Zumba dance exercise significantly affects body weight reduction. This effect may be attributed to the fact that Zumba dance was performed three times per week; the increased frequency of regular and structured Zumba sessions led to greater fat burning and helped shape a more proportional body, while also improving heart health, balance, and flexibility.

Students who engage in Zumba dance regularly experience positive effects on significant weight reduction. For greater effectiveness, this should be accompanied by dietary regulation, such as reducing high-calorie and high-fat foods, increasing the intake of fibre-rich foods, and avoiding late-night snacking.

Conclusion

From the 27 respondents, who were Nursing students at Santa Elisabeth Institute of Health Sciences, Medan, it can be concluded that the mean body weight before the Zumba dance intervention was 70.14 kg, while the mean body weight after the intervention was 67.83 kg. The analysis yielded a p-value of 0.00, indicating that Zumba dance had a significant effect on weight reduction among the Nursing students. It is recommended that students continue to perform Zumba dance regularly and consistently, while also maintaining healthy eating habits.

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all authors have made a real contribution in completing this manuscript.

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Conflicts of Interest
The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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