

Effectiveness of Nurse-led Multimodal Wellness Strategies on Body Mass Index, Quality of life, and Dietary pattern among Young Female Adults

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Abstract

Introduction: Overweight and obesity are significant lifestyle-related public health issues. The emerging issues of obesity among young female adults aged 18-25, is a demographic previously thought to be less affected by this health concern. The aim of the current study was to evaluate the effectiveness of nurse-led multimodal wellness strategies on body mass index, quality of life, and dietary pattern among young female adults.

Methodology: A quasi experimental non-equivalent, pre test-post test control group design was adopted for the study. Purposive sampling technique was used to choose the samples. A total of 60 samples were selected purposively, out of screening for BMI 300 which 30 were allotted to experimental and 30 to the control group. The technique used for data collection were anthropometric measurement like height, weight, and body mass index, quality of life questionnaire and structured dietary pattern questionnaire was used. A Nurse-Led Multimodal Wellness Strategies which included zumba dance and selected dietary interventions was given to the experimental group. Data were analysed using descriptive and inferential statistics.

Results: The current study findings highlight that Nurse- Led Multimodal Wellness Strategies was effective in reducing the BMI score in the experimental group [$t = 2.60$, $p = 0.05$] but no such difference was noted in post BMI score between the experimental and control group [$t = 1.01$, $p = 0.34$]. This highlights the need to continue the intervention beyond 6 weeks for effective results. It was also effective in increasing the overall and component wise quality of life of young female adults [$t = 16.01$, $p = 0.001$]; and improvement in dietary pattern [$t = 11.27$, $p = 0.001$]. There is significant association between pre-test level of BMI score and year of study (0.05); quality of life score and year of study (0.01); dietary pattern score and age in years (0.05).

Conclusion: This study highlights the effectiveness of Nurse-Led Multimodal wellness strategy for young female adults in reducing body mass index, improving quality of life and dietary pattern.

Keywords: Young female adults - Nurse- Led Multimodal Wellness Strategies, Body Mass Index, Quality of Life, Dietary pattern

1. Introduction

- Overweight and obesity are major lifestyle-related public health concerns worldwide. Obesity is a chronic, progressive, and relapsing disease characterized by excessive fat accumulation that adversely affects health (World Health Organization [WHO], 2024). Its prevalence has increased markedly over the past three decades, making it a major global health challenge (Chaudhary & Sharma, 2023).
- According to the WHO (2024), approximately 2.5 billion adults aged 18 years and above were overweight in 2022, including over 890 million with obesity. Globally, 43% of adults were overweight and 16% were obese. Obesity is a significant risk factor for non-communicable diseases, including type 2 diabetes, cardiovascular diseases, hypertension, stroke, and certain cancers (Powell-Wiley et al., 2021).
- Young female adults are particularly vulnerable to overweight and obesity because of biological, social, and lifestyle factors. Unhealthy dietary habits, physical inactivity, prolonged screen time, and academic stress have contributed to increasing obesity among college students (WHO, 2003; Gordon-Larsen et al., 2019). The National College Health Assessment (2020) reported that only 23% of college students meet the recommended physical activity guidelines, emphasizing the need for effective lifestyle interventions.
- Lifestyle modification through healthy nutrition, regular physical activity, and behavioural change remains the cornerstone of obesity management (Poobalan & Aucott, 2016). Nurses play a key role in promoting healthy behaviours through education, counselling, motivation, and continuous support, making nurse-led multimodal wellness strategies a promising approach for improving body mass index, dietary patterns, and quality of life (Lazarou & Kouta, 2010).
- The role of nurses in the obesity prevention in the young women has been under-researched despite nurses play a vast role in the healthcare workforce worldwide (World Health Organization, 2016). Thus, the current study is designed to determine the effectiveness of nurse-led multimodal wellness strategies on body mass index, quality of life, and dietary pattern with an intention that nurses apply lifestyle interventions in routine care for young female adults with obesity.

Objectives of the study

1. To assess the pre-test and post-test level of body mass index, quality of life, and dietary pattern among young female adults in the experimental and control group.
2. To evaluate the effectiveness of nurse-led multimodal wellness strategies on body mass index, quality of life, and dietary pattern among young female adults.
3. To associate the selected demographic variables with body mass index, quality of life, and dietary pattern of young female adults.

2. Review of Literature

- The phrase "literature review" encompasses the processes of identifying and searching for information regarding the current understanding of a particular topic. It also denotes a written synthesis of the latest findings on a research issue. The researcher conducted a comprehensive literature review on the chosen topic to enhance understanding of the problem and gather relevant information for the study. This involved utilizing resources such as Medline, the internet, and recent journals and books, categorized under specific headings:
 1. Global burden of overweight.
 2. Review on quality of life among young female adults.

3. Review related to zumba dance.
4. Review related to healthy diet and dietary counselling.

2.1 Reviews Related to the Global Burden of Overweight

The World Obesity Federation (2023) projected that nearly **3.3 billion adults** may have a high BMI by 2035, while WHO (2024) reported that **43% of adults were overweight** and **16% were obese** in 2022. Several studies have demonstrated increasing obesity among young adults and college students. Evans et al. (2020) reported a significant increase in BMI among undergraduate students in the United States. Shakya et al. (2023) observed a rapid rise in overweight and obesity among young adults in Nepal, particularly among women. Nam et al. (2021) also documented increasing obesity prevalence across all age groups in South Korea. G et al. (2022) identified physical inactivity, sedentary behaviour, and television viewing during meals as major risk factors for obesity among adolescents in Tamil Nadu.

2.2 Reviews Related to Quality of Life Among Young Female Adults

Stephenson et al. (2021) reported that higher BMI was associated with poorer HRQoL, particularly among individuals with obesity and multiple chronic conditions. Felix et al. (2020) found that adolescents with severe obesity had significantly lower physical and psychological well-being. Similarly, Van de Pas et al. (2022) reported poorer physical, psychological, and social functioning among children and adolescents with severe obesity. Lee et al. (2024) identified perceived stress, poor sleep quality, and inadequate social support as major determinants of reduced quality of life among young adults.

2.3 Reviews Related to Zumba Exercise

Vendramin et al. (2016) concluded that Zumba enhances aerobic fitness and psychological well-being while producing modest reductions in body weight. Angelica et al. (2018) demonstrated significant reductions in BMI, waist circumference, and waist-to-hip ratio following a four-week Zumba programme. Zhang et al. (2023) reported that dance-based interventions significantly reduced body weight, BMI, waist circumference, and body fat percentage. Other studies by Eroğlu Kolayış and Arol (2020), Aakanksha Sanjay Pandit and Rajguru (2021), Chavarrias et al. (2020), and Ljubojevic et al. (2022) consistently showed improvements in body composition, cardiorespiratory fitness, respiratory function, and psychological health following regular Zumba participation.

2.4 Reviews Related to Healthy Diet and Dietary Counselling

Chandrani et al. (2022) found significant reductions in obesity following structured dietary counselling. Rotunda (2024) concluded that short-term nutrition and physical activity interventions effectively promoted weight loss among adults with overweight and obesity. Hayes et al. (2020) observed improvements in diet quality and weight reduction among college students after behavioural interventions, while Phimarn (2017) reported that group dietary counselling was as effective as individual counselling in improving healthy eating behaviours among young adults.

Summary of Reviewed Studies

The reviewed literature consistently supports the effectiveness of Zumba exercise, healthy dietary counselling, and lifestyle modification in improving BMI, dietary patterns, and quality of life. These findings provide strong evidence for implementing nurse-led multimodal wellness strategies among young female adults.

3. Methodology

3.1 Research Design

Non equivalent pre test-post test, quasi experimental group design was used for the current study.

3.2 Setting of the Study

The study was conducted in two selected nursing colleges in Madurai District, Tamil Nadu. Sacred Heart Nursing College, Madurai, a private institution affiliated with The Tamil Nadu Dr. M.G.R. Medical University, Chennai, was selected as the experimental setting. Young female adults studying in the B.Sc. Nursing programme constituted the experimental group.

Vickram College of Nursing, Madurai, affiliated with The Tamil Nadu Dr. M.G.R. Medical University and approved by the Indian Nursing Council (INC) and the Tamil Nadu Nurses and Midwives Council (TNNMC), was selected as the control setting. Young female adults enrolled in the B.Sc. Nursing programme constituted the control group.

3.3 Population

The target population comprised young female adults studying in colleges of Madurai District, Tamil Nadu. The accessible population consisted of young female adults studying in selected nursing colleges of Madurai District, Tamil Nadu.

3.4 Sample and Sampling Technique

The total sample size for the study was 60 young female adults with **30 young female adults in the experimental group** and **30 young female adults in the control group**.

3.5 Criteria for Selection

Inclusion Criteria:

Young female adults who were,

1. Between the ages of 17-25 years
2. Female gender
3. Unmarried
4. Undergraduate
5. BMI of more than or equal to 23
6. Willing to participate in the study.

Exclusion Criteria:

Young female adults who were,

1. Already trained in zumba dance.
2. Participants with severe medical conditions like arthritis, cardiovascular diseases.
3. Taking prescribed drugs for weight reduction
4. Absent for any of the zumba sessions.

3.6 Description of the Tool

- The tool for current the study was consisted of four sections.

Section I: Socio-demographic Variables

A structured interview schedule was used to collect information on age, educational status, socioeconomic status, place of residence, dietary pattern, and previous experience with zumba fitness training.

Section II: Anthropometric Measurements

Body weight was measured using a calibrated digital weighing scale (accuracy ± 100 g), and height was measured using a calibrated stadiometer following standard procedures. Body Mass Index (BMI) was calculated using the formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m}^2\text{)}$$

BMI was classified according to the WHO Asian population criteria as underweight ($<18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}22.9 \text{ kg/m}^2$), overweight ($23.0\text{--}24.9 \text{ kg/m}^2$), obesity class I ($25.0\text{--}29.9 \text{ kg/m}^2$), and obesity class II ($\geq 30.0 \text{ kg/m}^2$) (Indian Journal of Community Medicine, 2018).

Section III: WHOQOL-BREF Questionnaire

Quality of life was assessed using the **WHOQOL-BREF**, a standardized instrument developed by the World Health Organization. The questionnaire consists of 26 items covering four domains: Physical Health (7 items), Psychological Health (6 items), Social Relationships (3 items), and Environment (8 items), along with two general questions assessing overall quality of life and general health. Items were rated on a 5-point Likert scale, and negatively worded items were reverse scored according to WHO guidelines. Domain scores were transformed to a 0–100 scale, with higher scores indicating better quality of life. For interpretation, scores were categorized as **Poor (0–50)**, **Moderate (51–75)**, and **Good (76–100)**.

Section IV: Structured Dietary Pattern Questionnaire

Dietary pattern was assessed using a structured questionnaire comprising 11 items that evaluated the frequency and quantity of food consumption. The questionnaire included items related to the consumption of junk foods, fried foods, fruits, vegetables, fish, meat, soft drinks, and eating outside. Each item was scored on a 4-point scale (0–3), with reverse scoring applied to Questions 9 and 11. The total score ranged from 0 to 33 and was interpreted as **Good (0–11)**, **Moderate (12–24)**, and **Poor (25–33)** dietary pattern.

3.7 Intervention

- Nurse-Led Multimodal Wellness Strategies refer to a set of interventions that was administered by the nurse researcher which included zumba dance and selected dietary interventions.
- **Zumba Dance:** Zumba was conducted **three times per week**, with each session lasting **60 minutes**. Each session included warm-up, aerobic dance exercises using Zumba music, and cool-down activities. The sessions were conducted in groups of 15 participants and were demonstrated and supervised by the nurse researcher, who was certified in Zumba instruction.
- **Selected Dietary Interventions:** The dietary intervention consisted of three components:
 1. **Structured Teaching:** A 60-minute educational session on healthy eating, including balanced nutrition, recommended food groups, foods to limit, and healthy lifestyle practices. The session was delivered using lectures, discussions, and PowerPoint presentations.
 2. **Dietary Counselling:** Individualized face-to-face counselling was provided based on dietary assessment. Participants received personalized guidance, goal setting, and follow-up to promote healthy dietary behaviours.
 3. **DigiNutriAlarm:** Health education messages containing dietary tips, reminders, and motivational content were delivered via WhatsApp **twice daily** (morning and evening) throughout the intervention period to reinforce healthy eating practices.

3.8 Data Collection Procedure

- On Week 1, eligible participants were screened, and written informed consent was obtained. Pre-test assessments were conducted for both the experimental and control groups using anthropometric measurements (height, weight, and BMI), the WHOQOL-BREF Questionnaire, and the Structured Dietary Pattern Questionnaire.
- The experimental group received Nurse-Led Multimodal Wellness Strategies for 6 weeks, which included Zumba dance (60 minutes, three sessions per week), structured teaching on a healthy diet,

individualized dietary counselling, and DigiNutriAlarm WhatsApp messages twice daily. The control group continued their routine activities without any intervention.

- During Week 7, post-test assessments were conducted for both groups using the same instruments as the pre-test. After completion of the study, the educational intervention was also provided to the control group as an ethical consideration.

3.9 Data Analysis

Data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (paired t-test, independent t-test, and Chi-square test) to evaluate the effectiveness of nurse-led multimodal wellness strategies on body mass index, quality of life, and dietary pattern among young female adults. A p-value of <0.05 was considered statistically significant.

3.10 Ethical Consideration

Ethical approval was obtained from the Institutional Ethical Committee. Informed consent was secured from all participants after explaining the purpose and procedure of the study. Confidentiality and anonymity were strictly maintained throughout the research.

4. Results and Findings

This section presents the analysis and interpretation of data collected to evaluate the effectiveness of nurse-led multimodal wellness strategies on body mass index (BMI), quality of life, and dietary pattern among young female adults. The results are presented according to the study objectives.

Table 1: Frequency and percentage distribution of the young female adults based on their demographic characteristics

N=60

Demographic variables		Group				χ^2 value
		Experimental Group(n=30)		Control Group (n=30)		
		n	%	n	%	
Age in years	18 years	4	13.33	9	30	$\chi^2=3.98$ p=0.26 [#]
	19 years	9	30	10	33.33	
	20 years	5	16.67	5	16.67	
	21 years	12	40	6	20	
Year of study	I year	4	13.33	8	26.67	$\chi^2=2.08$ p=0.55 [#]
	II year	9	30	8	26.67	
	III year	9	30	9	30	
	IV year	8	26.67	5	16.66	
Presence of co-morbidities	Yes	0	0	1	3.33	$\chi^2=1.01$ p=0.31 [#]
	No	30	100	29	96.67	
Place of residence	Urban	15	50	11	36.67	$\chi^2=1.08$ p=0.30 [#]
	Rural	15	50	19	63.33	
Past experience with zumba fitness training	Yes	0	0	0	0	$\chi^2=1.22$ p=0.05 [#]
	No	30	100	30	100	
Dietary pattern	Vegetarian	4	13.33	5	16.67	

	Non Vegetarian	26	86.67	25	83.33	$\chi^2=0.13$ $p=0.72^{\#}$
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Table 2: Comparison of mean pretest scores of BMI, quality of life, and dietary pattern of experimental vs. control group
N=60

Variables	Pre-test				Mean difference	Df	‘t’-value	p-Value
	Control group		Experimental group					
	Mean	SD	Mean	SD				
Body mass index	27.26	3.94	27.54	3.60	0.28	58	1.00	0.32 [#]
Quality of life	42.10	6.08	43.03	5.48	0.93		0.63	0.53 [#]
Dietary pattern	19.70	2.77	19.07	2.30	0.63		0.96	0.34 [#]

Table 3: Comparison of mean post test scores of BMI between experimental group and control group
N=30

Group	Mean	Standard Deviation	Mean Difference	't'-value	df	'p'-value
Experimental	26.35	3.31	0.95	1.01	29	0.34 [#]
Control	27.30	3.92				

The above data is pictured in the next graph.

Figure: 1 Comparison of mean pretest vs. post test scores of body mass index between experimental and control groups

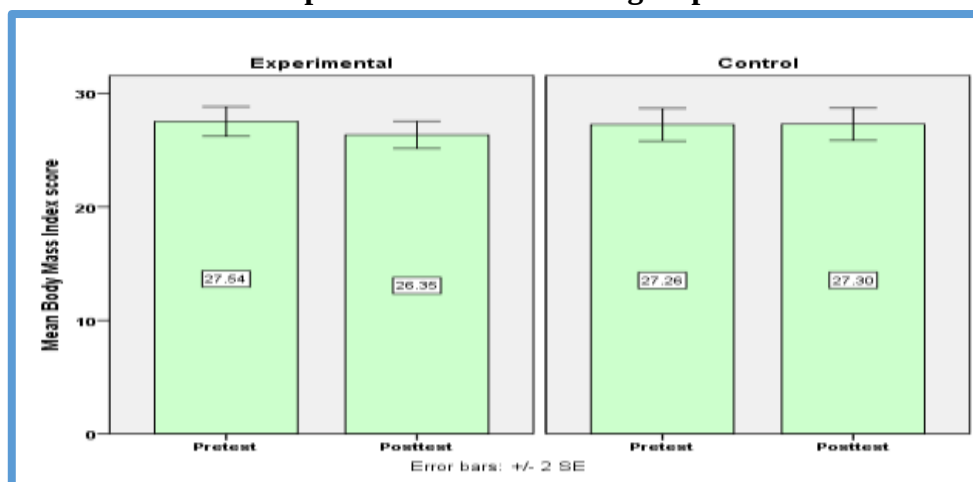


Table 4: Comparison of overall and component wise mean post test scores of quality of life between young female adults in the experimental group and control group
N=60

Component	Group	Mean	Standard Deviation	Mean Difference	't'-value	'P'-value
Physical health	Experimental	69.61	8.47	25.21	11.42	0.001***
	Control	44.40	8.63			
Psychological	Experimental	66.69	12.56	23.51	8.85	0.001***
	Control	43.18	7.36			
Social relationship	Experimental	70.42	8.30	27.25	10.93	0.001***
	Control	43.17	10.85			
Environment	Experimental	68.22	9.50	27.51	10.60	0.001***
	Control	40.71	10.57			
OVERALL	Experimental	68.74	7.15	25.88	16.01	0.001***
	Control	42.86	5.23			

The above data is pictured in the next graph.

Figure: 2 Comparison of mean pretest vs. post test scores of quality of life between experimental and control groups

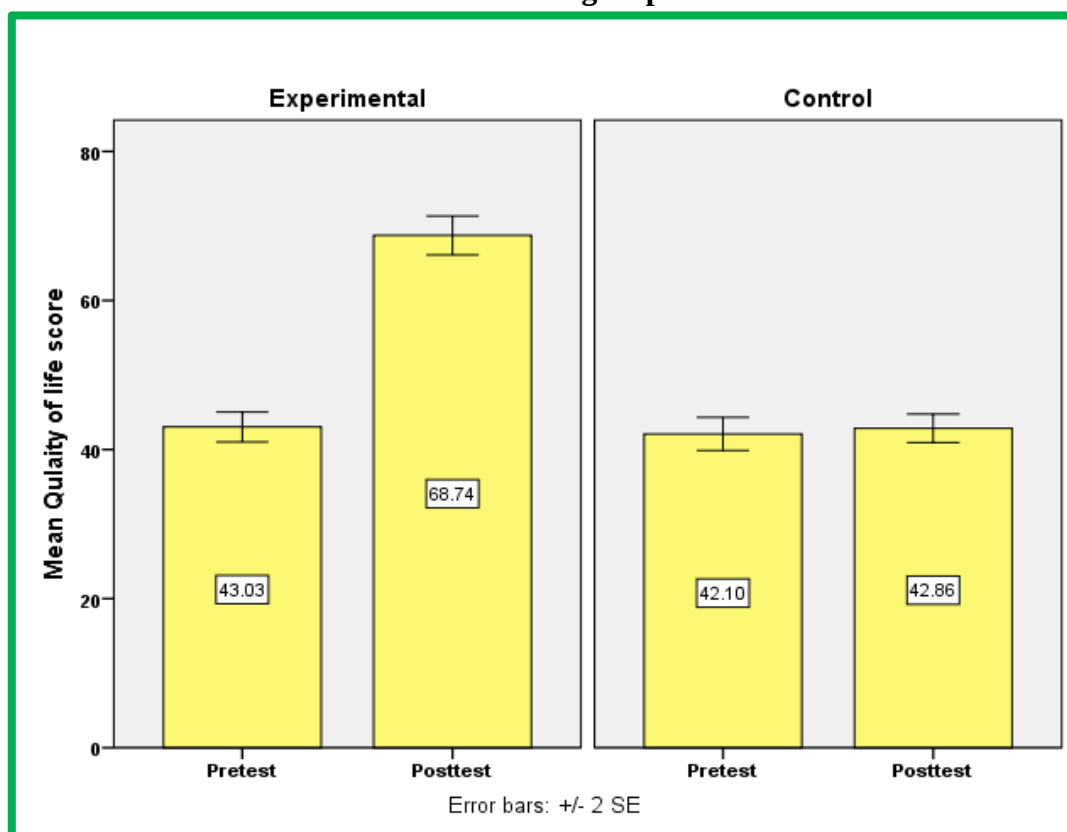


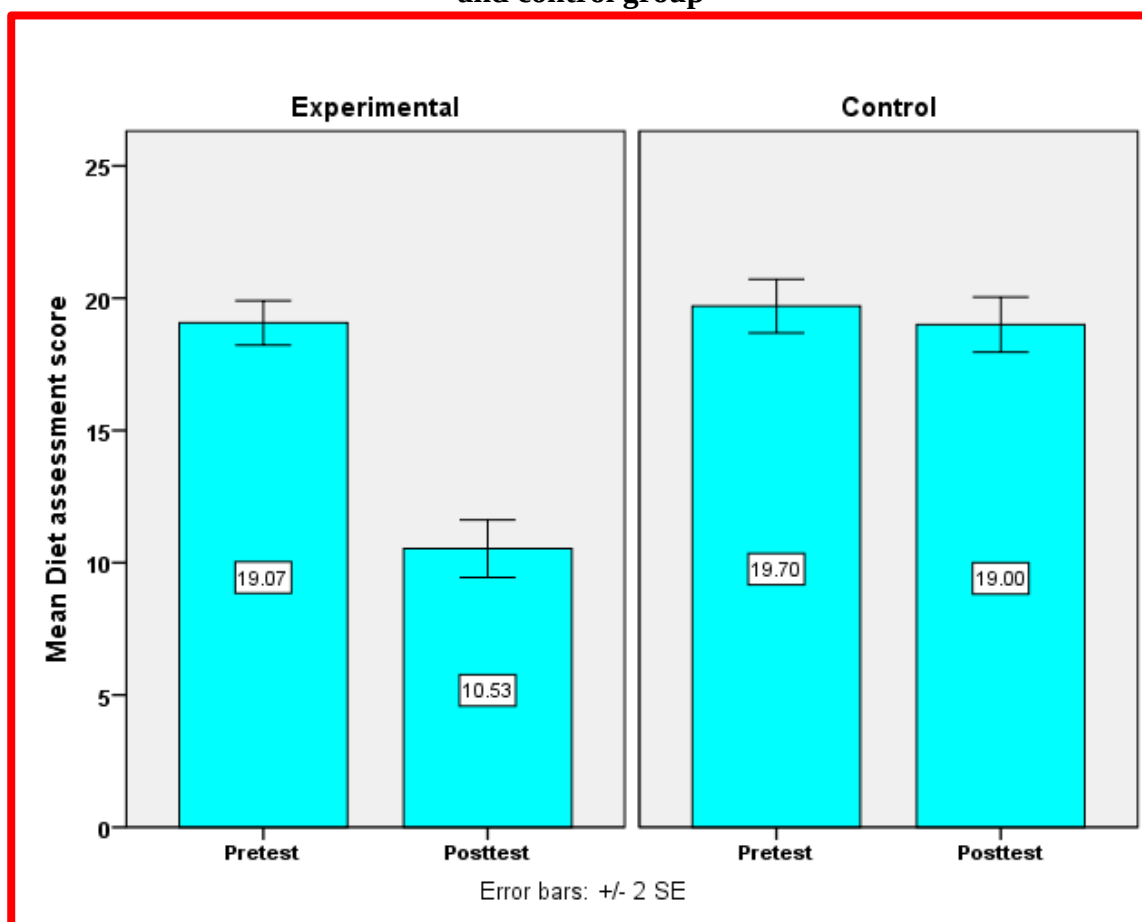
Table 5: Comparison of mean post test scores of dietary pattern between young female adults in the experimental group and control group

N=60

Group	Mean	Standard Deviation	Mean Difference	't'-value	'P'-value
Experimental	10.53	2.98	8.47	11.27	0.001***
Control	19.00	2.84			

The above data is pictured in the next graph.

Figure: 3 Comparison of mean pretest vs. post test scores of dietary pattern between experimental and control group



5. Discussion

- Obesity is an increasing health problem among young adults and may lead to complications such as cardiovascular diseases, diabetes mellitus, and poor quality of life. Among young female adults, obesity may also affect psychological well-being, self-esteem, and academic performance. College life is an important period for developing healthy lifestyle practices. Therefore, early health interventions are important to prevent obesity and promote healthy living.
- The present study was conducted to evaluate the effectiveness of **nurse-led multimodal wellness strategies on body mass index, quality of life, and dietary pattern among young female adults of selected colleges in Madurai district**. A quasi-experimental, non-equivalent pre-test and post-test

control group design was used. Sixty young female adults were selected by purposive sampling, with 30 participants in the experimental group and 30 in the control group. Data were collected using a demographic questionnaire, anthropometric measurements, WHOQOL-BREF, and a structured dietary pattern questionnaire. The intervention was provided to the experimental group, while the control group did not receive the intervention.

- In the experimental group, 40% of participants were 21 years old and 30% were 19 years old. In the control group, 33% were 19 years old. In the experimental group, 30% were studying in the second year and 30% in the third year. In the control group, 30% were third-year students and 26.6% each were first- and second-year students.
- In the experimental group, 50% of participants were from urban areas and 50% were from rural areas, whereas 63.33% of the control group were from rural areas. Most participants were non-vegetarians in both the experimental group (86.67%) and control group (83.33%).
- There was no statistically significant difference between the experimental and control groups regarding age ($\chi^2 = 3.98$, $p = 0.26$), year of study ($\chi^2 = 2.08$, $p = 0.55$), presence of co-morbidities ($\chi^2 = 1.01$, $p = 0.31$), place of residence ($\chi^2 = 1.08$, $p = 0.30$), past experience with Zumba ($\chi^2 = 1.22$, $p = 0.05$), and dietary pattern ($\chi^2 = 0.13$, $p = 0.72$).

5.1 Objectives I and II

The first objective was to assess the pre-test and post-test levels of BMI, quality of life, and dietary pattern. The second objective was to evaluate the effectiveness of nurse-led multimodal wellness strategies. Therefore, both objectives are discussed together.

5.1.1 Body Mass Index

- In the experimental group, 26.7% of participants were obese Class I and 46.6% were obese Class II during the pre-test. After the intervention, none of the participants remained in the obese Class II category, and 20% moved to the normal BMI category. In the control group, none of the participants were in the normal BMI category in either the pre-test or post-test.
- The findings showed a statistically significant difference between the pre-test and post-test BMI scores of the experimental group ($t = 2.60$, $p = 0.05$). However, there was no significant difference in post-test BMI scores between the experimental and control groups ($t = 1.01$, $p = 0.34$). This may indicate that a longer intervention period may be required to produce greater changes in BMI.
- The findings are consistent with **Angelica et al. (2018)** and **Zhang et al. (2023)**, who reported that Zumba was effective in reducing BMI. The findings are also supported by **Chandrani et al. (2022)** and **Rotunda (2024)**, who reported that nutritional interventions were effective in improving weight-related outcomes.

5.1.2 Quality of Life

- In the control group, 73.33% of participants had poor quality of life in the pre-test, which increased to 80% in the post-test. In the experimental group, 73.33% had poor quality of life in the pre-test and none had good quality of life. After the intervention, none had poor quality of life and 30% reported good quality of life.
- The mean overall quality of life score in the experimental group increased from **43.03 in the pre-test to 68.74 in the post-test**. The difference was statistically significant ($t = 16.82$, $p = 0.001$). A significant difference was also found between the post-test quality of life scores of the experimental and control groups ($t = 16.01$, $p = 0.001$).

- The improvement in quality of life may be due to the combined effects of Zumba, nutrition education, and regular health-related messages. The findings are consistent with **Vendramin et al. (2016)** and **Stonnington et al. (2020)**, who reported that Zumba and physical activity interventions improved quality of life.

5.1.3 Dietary Pattern

- In the control group, 76.67% of participants had a moderate dietary pattern in the pre-test and 83.33% in the post-test. In the experimental group, 86.67% had a moderate dietary pattern and 13.33% had a poor dietary pattern during the pre-test. After the intervention, 73.33% had a good dietary pattern and 26.67% had a moderate dietary pattern.
- A significant difference was found between the pre-test and post-test dietary pattern scores of the experimental group ($t = 14.44$, $p = 0.001$). A significant difference was also found between the post-test dietary pattern scores of the experimental and control groups ($t = 11.27$, $p = 0.001$).
- The improvement may be due to structured nutrition education and regular reinforcement through health-related messages. The findings are consistent with **Chandrani et al. (2022)** and **Rotunda (2024)**, who reported that nutritional interventions improved dietary practices.

5.2 Objectives III

- The third objective was to determine the association between selected demographic variables and BMI, quality of life, and dietary pattern.
- The findings showed no significant association between pre-test BMI and age ($\chi^2 = 3.98$, $p = 0.26$), presence of co-morbidities ($\chi^2 = 0.00$, $p = 1.00$), place of residence ($\chi^2 = 0.68$, $p = 0.40$), past experience with Zumba ($\chi^2 = 0.00$, $p = 1.00$), and dietary pattern ($\chi^2 = 1.28$, $p = 0.25$). However, a significant association was found between BMI and year of study ($\chi^2 = 9.04$, $p = 0.05$).
- A significant association was found between pre-test quality of life and year of study ($\chi^2 = 12.10$, $p = 0.01$). No significant association was found between quality of life and other selected demographic variables.
- The pre-test dietary pattern showed a significant association with age ($\chi^2 = 9.32$, $p = 0.05$). No significant association was found with year of study ($\chi^2 = 2.35$, $p = 0.50$), educational qualification ($\chi^2 = 0.00$, $p = 1.00$), presence of co-morbidities ($\chi^2 = 0.00$, $p = 1.00$), place of residence ($\chi^2 = 1.13$, $p = 0.28$), or past experience with Zumba ($\chi^2 = 0.00$, $p = 1.00$).
- Overall, the findings indicate that **nurse-led multimodal wellness strategies were effective in improving quality of life and dietary pattern and showed a positive effect on BMI among young female adults.**

6. Conclusion

- The study concluded that effectiveness of **nurse-led multimodal wellness strategies** on **body mass index (BMI), quality of life (QOL), and dietary pattern** among young female adults in selected colleges of Madurai district using a quasi-experimental non-equivalent pre-test–post-test control group design. A total of **60 participants** were selected through purposive sampling, with **30 participants each in the experimental and control groups**. The intervention consisted of **Zumba dance, structured health education, individualized dietary counselling, and DigiNutriAlarm WhatsApp messages** for a period of six weeks.

7. Recommendations

- This study can be conducted among other obese population within the community settings.
- A true experimental approach can be adopted in replicating the present study.
- The effectiveness of the current intervention can be assessed longitudinally.

8. Nursing Implications

- **Nursing Practice:** Incorporate nurse-led multimodal wellness strategies into routine practice to improve body weight, quality of life, and healthy dietary behaviours among young female adults.
- **Nursing Education:** Emphasize obesity prevention, lifestyle modification, and health promotion to prepare students for effective wellness interventions.
- **Nursing Administration:** Facilitate the implementation of nurse-led wellness programmes in educational institutions and community settings.
- **Nursing Research:** Further research with larger sample sizes and longer follow-up periods is recommended to determine the long-term effectiveness of nurse-led multimodal wellness strategies.

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