

Effectiveness of A Lifestyle Modification Package On Obesity And Reproductive Health: A Pilot Study

Princey Shaji1*, Dr. Maharaj Singh2, Dr. Bharti Sahu3

1 Jabalpur institute of nursing science and research, Opposite Victoria hospital, Jabalpur, Madhya Pradesh, India

Email: princeyshaji@gmail.com

2 Professor & Research Head, NIMS Nursing College, Nims University, Rajasthan, Jaipur, India

Email: maharaj2009@yahoo.com

3 Associate Professor, Department of Obstetrics and Gynaecology, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India

Email: bhartisahu26@gmail.com

Abstract

Background

Obesity, a serious health problem, is a widespread affliction among women of reproductive age. The prevalence of obesity in Madhya Pradesh was 9.1 in the 4th NFH IN 2005. Rural areas have seen a shift towards higher income, better infrastructure, and more mechanized agriculture, all of which bring numerous health benefits but also lead to lower energy expenditure and more spending on low-quality processed food. All these factors contribute to a faster increase in overweight/obesity in rural areas. The purpose of the study was to introduce the importance of lifestyle modification packages among young women in a rural community.

Methods: To accomplish the objectives a Quasi-experimental, pre-interventional, and post-interventional control group design was conducted in a pilot study in the rural community of Barela, Jabalpur. Data was collected from 60 obese young women aged 20 years – to 40 years. The sample was selected through nonprobability purposive sampling technique.

Result: Calculated value $t=4.475$ for $DF=58$ has a P -value = 0.000, which shows that there was a significant difference between the mean BMI of the experimental and control group at post-duration. The calculated value $t=14.12$ for $DF=58$ has a P -value = 0.000, which shows that there was a significant difference between the mean pre- and post-reproductive health, and the effect of the intervention was significantly effective.

Conclusion: lifestyle modification package could become an important tool for maintaining BMI and good Reproductive health among young women.

Keywords: Obesity, Reproductive Health, Exercise, BMI, Diet, Physical Activity

Introduction

Obesity, a serious health problem, is a widespread affliction among women of reproductive age. Obesity and overweight refer to abnormal and excessive fat deposition that harms the body's health. The World Health Organization (WHO) defines overweight as having a body mass index (BMI) equal to or more than 25 kg/m², while obesity is defined as having a BMI

equal to or greater than 30 kg/m²[1]. Greater peripheral aromatization of androgens to estrogens influences gonadotropin production in obese women, according to Fedorcák, Storeng, et al., 2000. Insulin resistance and hyperinsulinemia in obese women produce hyperandrogenemia. Sex hormone-binding globulin (SHBG), growth hormone (GH), and insulin-like growth factor binding proteins (IGFBP) levels fall when leptin levels rise. As a result, the neuro-regulation of the hypothalamic-pituitary-gonadal (HPG) axis deteriorates. These changes could explain the impaired ovulatory function and, as a result, reproductive health. [2]. Lifestyle factors are aspects of a person's life that may have an impact on their general health and wellbeing. Weight, diet, exercise, stress, exposure to occupational and environmental hazards, and the age at which a woman has a family are all factors that can significantly affect a woman's reproductive health. Alcohol intake, caffeine use, cigarette smoking, and illicit drug use are all factors that negatively affect reproductive health (Sharma, Biedenharn, Fedor, & Agarwal, 2013) [3].

Bellver et al. (4) found a rise in the incidence of spontaneous miscarriage with increasing BMI in patients who had been treated by various ART, including embryo transfer using donor oocytes. The risk of miscarriage was found to be 38.1% in obese women, whereas this rate was 13.3% in patients with a normal BMI. In another study, the data from 1644 obese women were matched with 3288 controls with normal BMI. Metwally et al. (5) found a higher risk of early, late, and recurrent miscarriage in the obese group. Comprehensive lifestyle modification programs give weekly individual or group treatment to change activity and eating behaviors, according to Mc Caffery et al., 2017. According to the literature, lifestyle modification techniques, primarily dietary adjustments, are required. Low-fat, low-carbohydrate, low-glycemic-load diets and the Mediterranean diet are all examples of this. [6].

The present study aims to compare the post-interventional level of obesity and reproductive health in young women from a selected rural community in Jabalpur, Madhya Pradesh

Materials and methods

Research approach

A quantitative research approach was adopted in the study.

Research design

A quasi-experimental, pre-interventional, and post-interventional control group design.

Setting

The study was conducted in the selected rural community of Jabalpur. Barela village is the revenue of Jabalpur district Madhya Pradesh. Barela has 15 wards with a population of 6,665 and 5,955 females. After the initial survey was conducted by the investigators, it was decided to include six wards in the study and control group Based on the survey report, there were 3,999 young women residing in the two villages who were potentially eligible for the study.

Population

The population for this study included all obese young women whose BMI was more than 24.9. A total of 60 young obese women were selected as study samples who met the inclusion criteria

Sampling technique

The non-probability purposive sampling technique was used to select young obese women for the study. In the first stage, six wards (3 for a study group and 3 for a control group) were selected using the lottery method. During the second stage of sampling, a list of addresses for all women aged 20- 40 years was obtained from the primary health center. And all the young women were informed to gather at the primary health center and then weight and height were taken and BMI was more than 24.9 were taken for research purposes in the third stage, women who fulfilled the inclusion criteria were selected. Approximately 10 young obese women from each village participated in the study.

Ethical considerations

The prior permission for the study was taken from the block medical officer. All the women who took part in the study received written and spoken information about the study in Hindi. The voluntary participation of women was requested. In the consent form, the study's goals, advantages, drawbacks, and the time required to implement the lifestyle modification package were discussed. Women who accepted to participate in the study were free to leave at any time.

Data Collection

The pilot study was done from 1-08-2021 to 31-10-2021. Prior permission was taken from the block medical officer and consent was taken from the subjects. After the assessment of Pre-interventional **WHO Asian – Pacific BMI 60** obese young women were selected for the pilot study out of which 30 were taken up in the experimental and 30 in the control group. The BMI of the young woman was calculated by finding the height and weight of the young woman. The pre-interventional Reproductive health was assessed by a self-structured rating scale followed by the introduction of the Lifestyle modification package. The post-interventional data related to BMI and Reproductive health was collected after 12 weeks. The exercise was administered by the investigator only for the first two days they were reinforced to practice these exercises and diet on their own for the duration of 12 weeks and the investigator followed up telephonically every 7 days.

WHO Asian – BMI Classification

Nutritional status	BMI (Kg/m²)
Underweight	< 18.5
Obese I	25-29.9
Obese II	> 30

Description of the intervention package for changing one's lifestyle

Exercise and diet modification constituted the program's key components.

It was an organized training regimen created with a physiotherapist's assistance.

The floor workout that follows will help you lose body fat overall.

Plank: 30 seconds x 5 sets of five repetitions of the leg raise exercise.

Holding the leg at a 45-degree angle for five sets of 20 to 30 seconds in a side plank.

Knee chest exercise: five sets of 10- to 15-reps.

3 sets of 10-15 sit-ups are sufficient.

Walking: Walking briskly for 10 minutes per day, progressively increasing the duration from 10 to 25 or 30 minutes. For the first 24 weeks, an investigator gave the subjects exercises to do for 30 minutes per day, three times per week. Then, for the next 12 weeks, they were encouraged to practice the exercises on their own.

Diet: The structured lifestyle modification package included a roughly caloric intake based on the ICMR 2010 caloric requirement (energy required for BMR, which is 25 kcal/kg/day + energy for daily physical activity + energy for SDA), which was given to participants in accordance with their pre-study weight and BMI.

Young obese women were recommended to follow a diet plan (usually 1200–1500 kcal/day). This consisted of grammes of cereals per day, grammes of pulses per day, grammes of meat, including eggs, grammes of vegetables, including green leafy vegetables and skim milk, grammes of sprouts and salads, and grammes of fruit-and-sugar-free biscuits for snacks at 4 p.m.

Additionally, it was advised to limit your intake of sugar and fat to no more than 20 grammes each day. Pulses and legumes were a part of the vegetarian diet and advised consuming a daily minimum of 2000 cc of drinking water.

A practise journal was kept to show that lifestyle adjustment was regularly practised.

Every week, subjects will be followed up with via phone. Every week, subjects will receive telephone follow-up.

Before the intervention began, the subjects' baseline characteristics were noted.

a thorough medical background. The individuals' consent was obtained after receiving prior approval from the chief medical officer and block medical officer.

After the Pre-interventional BMI was determined, 300 obese young women were chosen for the study, 150 of them were assigned to the experimental group and 150 to the control group.

Finding the young woman's height and weight allowed for the calculation of her BMI.

With an accuracy of 0.1 cm, a stadiometer was used to measure height.

The young woman was made to stand without shoes, with her heels, buttocks, and occiput touching the measuring rod, her hands hanging by her sides, and her head kept pleasantly erect.

A handheld balancing scale with a 100gm precision was used to determine weight.

Young women were told to stand on the balance with their feet apart, without any shoes, and to look straight ahead.

Following the pre-test, the study group's obese young women were instructed on the lifestyle change programme. The researcher demonstrated the exercise to the study group.

The public hall was used for the exercise session. While the young women filled out the form and provided any necessary clarifications, the investigator stayed by their side.

Statistical analysis

Statistical Package for the Social Sciences version 16 software (SPSS Inc., Chicago, IL, USA) and Instant was used for the data analysis. The student's independent t-test was used to

compare values between the study and control groups. The chi-square test was used for comparison and association between the variables. A P-value less than 0.05 was considered to be statistically significant.

RESULT

Table No-1 Demographic Distribution of the subject among young women in Experimental and Control Groups.

AGE		Group		Total
		Experimental	Control	
20-25 Years	Count	14	4	18
	%	46.7%	13.3%	30.0%
26-30 Years	Count	6	6	12
	%	20.0%	20.0%	20.0%
31-35 Years	Count	3	12	15
	%	10.0%	40.0%	25.0%
36-40 Years	Count	7	8	15
	%	23.3%	26.7%	25.0%
Total	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	11.022	3	0.012	Significant
Type of family		Group		Total
		Experimental	Control	
Nuclear	Count	8	9	17
	%	26.7%	30.0%	28.3%
Joint	Count	14	18	32
	%	46.7%	60.0%	53.3%
Extended	Count	8	3	11
	%	26.7%	10.0%	18.4%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	5.159	3	0.161	non sig
Education Qualification		Group		Total
		Experimental	Control	

No formal education	Count	1	2	3
	%	3.3%	6.7%	5.0%
Primary School	Count	5	4	9
	%	16.7%	13.3%	15.0%
Middle School	Count	12	12	24
	%	40.0%	40.0%	40.0%
High School	Count	7	11	18
	%	23.3%	36.7%	30.0%
Intermediate	Count	5	1	6
	%	16.7%	3.3%	10.0%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	4	4	0.406	Non sig

Family income (Monthly)		Group		Total
		Experimental	Control	
< 10000 Rs	Count	1	3	4
	%	3.3%	10.0%	6.7%
10000-20000 Rs	Count	2	6	8
	%	6.7%	20.0%	13.3%
>20000 Rs	Count	27	21	48
	%	90.0%	70.0%	80.0%
Total	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	3.75	2	0.153	Non-sig
Age of menarche		Group		Total
		Experimental	Control	
10 Years	Count	14	5	19
	%	46.7%	16.7%	31.7%
11 Years	Count	8	1	9
	%	26.7%	3.3%	15.0%
12 Years	Count	6	17	23

	%	20.0%	56.7%	38.3%
>=13 Years	Count	2	7	9
	%	6.7%	23.3%	15.0%
Total	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	17.746	3	0.000	Sig
Method of conceiving		Group		Total
		Experimental	Control	
Natural conception	Count	12	12	24
	%	40.0%	40.0%	40.0%
Conceived by treatment	Count	10	8	18
	%	33.3%	26.7%	30.0%
Not Yet Conceived	Count	8	10	18
	%	26.7%	33.3%	30.0%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	0.444	2	0.801	Non Sig

Hormonal contraceptive use		Group		Total
		Experimental	Control	
Yes	Count	13	22	35
	%	43.3%	73.3%	58.3%
No	Count	17	8	25
	%	56.7%	26.7%	41.7%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	5.554	1	0.018	Sig

Parity		Group		Total
		Experimental	Control	
Nullipara	Count	8	7	15
	%	26.7%	23.3%	25.0%
First	Count	13	8	21

	%	43.3%	26.7%	35.0%
Second	Count	6	10	16
	%	20.0%	33.3%	26.7%
Third & Above	Count	3	5	8
	%	10.0%	16.7%	13.3%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	2.757	3	0.431	Non Sig
Family history of obesity		Group		Total
		Experimental	Control	
Yes	Count	10	10	20
	%	33.3%	33.3%	33.3%
No	Count	20	20	40
	%	66.7%	66.7%	66.7%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	0	1	1.000	Non Sig

Meal frequency per day		Group		Total
		Experimental	Control	
Two Times	Count	4	1	5
	%	13.3%	3.3%	8.3%
Three Times	Count	13	2	15
	%	43.3%	6.7%	25.0%
Four & More Times	Count	13	27	40
	%	43.3%	90.0%	66.7%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	df	P Value	Result
	14.767	2	0.001	Sig
Type of food consumed		Group		Total
		Experimental	Control	
Vegetarian	Count	11	6	17

	%	36.7%	20.0%	28.3%
Non-Vegetarian	Count	7	15	22
	%	23.3%	50.0%	36.7%
Egg Vegetarian	Count	12	9	21
	%	40.0%	30.0%	35.0%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	df	P Value	Result
	4.808	2	0.090	Non Sig
Frequency of Fast food consumption (junk food)		Group		Total
		Experimental	Control	
Once a Week	Count	6	2	8
	%	20.0%	6.7%	13.3%
Two times	Count	16	20	36
	%	53.3%	66.7%	60.0%
Three & More Times	Count	8	8	16
	%	26.7%	26.7%	26.7%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	df	P Value	Result
	2.444	2	0.295	Non Sig
Performing Exercises		Group		Total
		Experimental	Control	
Yes	Count	2	2	4
	%	6.7%	6.7%	6.7%
No	Count	28	28	56
	%	93.3%	93.3%	93.3%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	Df	P Value	Result
	0	1	1.000	Non Sig
Present Lifestyle Pattern		Group		Total
		Experimental	Control	
Sedentary	Count	12	17	29

	%	40.0%	56.7%	48.3%
Moderately	Count	13	3	16
	%	43.3%	10.0%	26.7%
Active	Count	5	10	15
	%	16.7%	33.3%	25.0%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	df	P Value	Result
	8.779	2	0.012	Sig

Sleep duration		Group		Total
		Experimental	Control	
> 8 Hrs	Count	14	26	40
	%	46.7%	86.7%	66.7%
<= 8 Hrs	Count	16	4	20
	%	53.3%	13.3%	33.3%
	Count	30	30	60
	%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value	df	P Value	Result
	10.8	1	0.001	Sig

Table:2 Comparison of Mean BMI of Two Groups

Group		N	Mean BMI	Std. Deviation	T-test	df	P value	Result
Pre BMI	Experimental	30	28.99	2.626	0.694	58	0.491	Non-Sig
	Control	30	28.59	1.710				
Post BMI	Experimental at 12 th week	30	25.70	2.468	4.475	58	0.000	Sig
	Control at 12 th week	30	28.31	2.030				

Student t test for two sample means Applied, P<0.05* significant

The above table shows the comparison of the mean BMI of Experimental and control groups at pre and post-durations. At pre-duration, the mean BMI of the experimental group (28.99) and control group (28.59) was found to be statistically non-significant (P>0.05), which makes that both groups are comparable at the pre-time interval. After the Intervention, the mean BMI of both groups was compared, and found that the mean BMI of the Experimental group (25.70) was statistically significantly lower than the mean BMI (28.31) of the control group. (P<0.05). Student t-test was applied whose calculated value t=4.475 for DF=58 have P value

= 0.000, which shows that there was a significant difference between the mean BMI of the experimental and control group at post duration.

Table: 3 Pre-Post Comparison-Experimental Group

Parameter	N	Mean BMI	Std. Deviation	Pair t-test	df	P value	Result
Pre BMI	30	28.99	2.626	26.314	29	0.000	Sig
Post BMI at 12 th week	30	25.70	2.468				

Paired t-test was applied whose calculated value $t=26.314$ with $df=29$ shows P Value = 0.000, which was statistically significant and shows a significant reduction in BMI values after the intervention.

Table:4 Pre-Post Comparison- Control Group

Parameter	N	Mean BMI	Std. Deviation	Pair t-test	df	P value	Result
Pre BMI	30	28.59	1.710	1.805	29	0.081	Non Sig
Post BMI at 12 th week	30	28.31	2.030				

The above table shows the pre-post comparison of the mean BMI of the control group, which was found to be statistically non-significant. ($P>0.05$). The mean BMI at post-duration (28.31) was reduced non-significantly from the mean value of (28.59) at pre-duration. Paired t-test was applied whose calculated value was $t=1.805$ with $df=29$ having P Value = 0.081, which was statistically non-significant and shows the non-significant reduction in BMI values of a control group as no intervention was done.

Table 5: Comparison of pre- and post-reproductive health

Group		N	Mean	Std. Deviation	T test	df	P value	Result
Pre Score	Experimental	30	18.50	2.529	1.549	58	0.127	NON SIG
	Control	30	19.47	2.300				
Post Score at 12 th week	Experimental	30	8.30	3.292	14.12	58	0.000*	SIG
	Control	30	19.23	2.674				

*Student t-test for two sample means Applied, $P<0.05$ * Significant*

The above table shows the comparison of the mean score of the Experimental and control group at pre and post-durations. At pre-duration, the mean value of the experimental group (18.50) and control group (19.47) was found to be statistically non-significant ($P>0.05$), which makes both groups are comparable at pre-time intervals. After the intervention, the mean score of both groups was compared and found that the mean score of the Experimental

group (8.30) was statistically significantly lower than the mean value (19.23) of the control group. ($P < 0.05$)

Student t-test was applied whose calculated value $t = 14.12$ for $DF = 58$ have $P\text{-value} = 0.000$, which shows that there was a significant difference between the mean value of the experimental and control group at post duration and the effect of the intervention was significantly effective.

Table: 6 Pre-Post Comparison- Reproductive Health Status Experimental Group

Parameter	N	Mean	Std. Deviation	Pair t test	Df	P value	Result
Pre Score	30	18.50	2.529	12.727	29	0.000	S
Post Score	30	8.30	3.292				

The above table shows the pre-post comparison of the mean value of an experimental group, which was found to be statistically significant. ($P < 0.05$). The mean value at post-duration (8.30) was reduced significantly from the mean value of (18.50) at pre-duration. Paired t-test was applied whose calculated value $t = 12.727$ with $df = 29$ shows $P\text{ Value} = 0.000$, which was statistically significant and shows a significant reduction in values after the intervention.

Table: 7 Pre-Post Comparison- Reproductive Health Status Control Group

Parameter	N	Mean	Std. Deviation	Pair t test	Df	P value	Result
Pre Score	30	19.47	2.300	1.756	29	0.090	NS
Post Score	30	19.23	2.674				

The above table shows the pre-post comparison of the mean value of control group, which was found to be statistically non-significant. ($P > 0.05$). The mean value at post-duration (19.23) was reduced but non-significantly from the mean value of (19.47) at pre-duration. Paired t-test was applied whose calculated value was $t = 1.756$ with $df = 29$ having $P\text{ Value} = 0.090$, which was statistically non-significant and shows the non-significant reduction in values of a control group as no intervention was done.

Discussion

With increased life expectancy women spend most of their time in household activity and the upbringing of the children. An individual's overall health and wellness are impacted by regular exercise, which may also offer some protection against obesity, cardiovascular disease, hypertension, diabetes, osteoporosis, and psychological stress.

Thus, more attention is needed for women, especially in the rural community where women are neglected. lifestyle medication has been utilized as a therapeutic tool to achieve positive health and to control and cure disease there have been multiple studies that have combined the many aspects of lifestyle modification such as diet, physical activity, and behavior therapy to investigate its effects on obesity.

Clark et al. (7) found that even a small weight loss in anovulatory obese infertile women resulted in improvements in ovulation, pregnancy rate, and pregnancy outcome. Wadden et

al. [8] Reported that lifestyle modification produces a 7% to 10% reduction in initial weight. Donnelly et al conducted a study 12-week weight loss program (which included a 1200 – 1500 kcal/d diet of meal replacements and conventional foods), followed by a 14-week weight maintenance program. Half of the participants received all instructions by way of group conference calls, and the other half attended on-site groups. Median weight losses at 12 weeks were 10.6 kg and 12.7 kg, respectively (P0.05), and at 26 weeks were 12.8 and 12.5 kg, respectively (and not significantly different). R L KOOTKIN also conducted a non-randomized trial with a 2-year follow-up period and showed an improvement in sexual quality of life following a lifestyle intervention that helped obese women lose weight [9] .

Thus, the above and various study support that lifestyle modification helps in the reduction of BMI and also improve reproductive health. through this study, the researcher found it very difficult in reviews the article of the same study

Moreover, more studies are necessary on obesity and reproductive health to describe actual lifestyle modification practices in rural areas in relation to international recommendations. As the rural area is moving towards the digital in this regard, an assessment of common contributing barriers and facilitators of exclusive lifestyle modification practices would be of great benefit. In addition, special attention should be given to correlations between obesity and reproductive health practices. National surveys should be carried out on a regular basis to provide current updates on indicators of obesity country.

The study's primary drawback is its small sample size. more exact results would come from studies with greater sample sizes and multicentric studies.

Since people in developing nations like India are less informed about their behaviours in their early years of maturity, health promotion must begin in those years.

Conclusion

The pilot study's findings revealed that conducting the main study in selected settings was feasible. There was no ambiguity in the tool and the tool was found feasible and practicable to proceed with the main study. After the pilot study, the reliability of the tool was established by the Test-Retest method hence the tool was considered reliable and valid and this was used further to proceed with the main study.

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