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Impact of Nutrition Education Program on Prevention of Obesity Among Adolescent Girls in Ballia District of Uttar Pradesh: An Analytical Study

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Abstract
Obesity is the key element of carried out the disease at mostly earlier stages of their life, it developed the various types of "non-communicable diseases (Parajuli & Prangthip, 2025; Behrman, 2020). the main diseases of diabetes and cardiovascular diseases" are seen at the mostly younger age (S, Rohilla, Kalyani, & Babbar, 2021). Nutrition extension program in schools/collage are explored the key strategy to address these issues by promoting good eating habits and increasing awareness of the consequences of poor nutrition. Keeping in view of the above said the conducted study was exploring the effectiveness of nutrition extension programs in preventing obesity among adolescents' girls. The present study conducted on the selected Inter College in Dubhar and Bansdih on the basis of origin of college in the Block in Ballia District of Uttar Pradesh. 12 Obese adolescent girls from each Inter College were selected making a total 120 obese adolescent girls, BMI classification (WHO) was used for Obesity. Nutrition extension education programme on prevention of obesity was imparted to obese adolescent girls in groups through lecture method and display of chart, poster and distribution of pamplet and their doubts were cleared. Significant improvement in BMI status was found after nutrition extension education. After intervention statically change was found the normal BMI increased between obesity respondent the numerical 0 to 27. The result indicates that the nutrition extension educational program is seen the significantly positive and healthy impact on reducing obesity/overweight among adolescent girls. The study concludes that obesity among adolescent girl is strongly influenced by less physical activity, poor nutritional knowledge, unhealthy lifestyle and unhealthy dietary pattern because these factors contribute to increased obesity during adolescent age. findings confirm that the structured nutrition education programme had a positive impact on obesity prevention among adolescent girls.

Keywords: Adolescents, Obesity, Intervention

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Introduction
Adolescence has a most important period of life that is significantly dynamic changes at the physical and mental level. In the present scenario the Obesity and overweight are carried out the several health issues among adolescent girls (Satapathy, et al., 2024). According to WHO said that the Obesity and overweight are defined as the accumulation of abnormal/ excessive deposition of fat that impairs the health of the individual. the previously several studies reveals that Obesity among adolescents in India are significantly found out the variation i.e. 3.6% to 11.7% (Badigar, Madan, & S, 2025). similarly, the study found out, "Morbidity from diabetes, cancers, cardiovascular disease and arthritis because of obesity was 50 percent to 100 percent higher among obese individuals suffering from childhood or adolescent obesity" (Harward T, 2019). Nutrition program in schools/collage has been proposed as a key strategy to address these issues by promoting good eating habits and increasing awareness of the consequences of poor nutrition. Naram et al. (2024) By equipping adolescent girls with high knowledge about healthy foods and its quantity for daily consumption, nutrition programs aim to prevent the development of obesity and associated diseases like type 2 diabetes, heart disease, and various other chronic conditions of the adolescents. Nadesakanthan et al. (2023) This research paper explores the effectiveness of nutrition programs in preventing obesity among adolescents' girls.

Objectives
- To investigate the obesity among adolescent girls.
- To explore the nutrition Program for obese adolescent girls.
- to find out the Impact of Nutrition Program on Prevention of Obese adolescent girls.

Review of Literature
S. Seema et.al (2021). the study explore the prevalence and contributing factor among adolescent obesity in the present era. for the study author has used a questionnaire method for gathered primary data. The study reveals that 6.8% of the adolescent respondents are suffering from the obesity whereas 17.1% out of them are founded the overweight. The significant factor are founded i.e. socio economic, eating behaviour, physical activities , mode of transportation, sport participation. author suggested that the policy makers are should be mandatory about to health awareness program.

Sumathy Ponnambalam et.al. (2022) study investigated the effectiveness of education program among adolescent of schools in Puducherry region in India. For the study descriptive research method has adopted and structure questionnaire were used a tools for gathered primary data. The questions were consist of close and opened. The study revels that majority of the respondents were suffering from the overweight due to several reason likewise heavy eating, transportation facility, fatty fooding, beverages and so other. The study reveals that fewer respondents are not suffering overweight and obesity. author suggest that there is need of present hour to conducted health awareness program and regular mapping the BMI among adolescent girls.

Methodology

The study was conducted in ten randomly selected Inter College in Dubhar and Bansdih Block in Ballia District of Uttar Pradesh. 12 Obese adolescent girls from each Inter College were selected making a total 120 obese adolescent girls, BMI classification (WHO) was used for Obesity.

Chart, Poster and Pamplet with details on balanced diet, healthy and unhealthy food, diseases related to obesity, importance of physical activity, prevention of obesity, causes, types, risk involve in obesity were prepare in Hindi language.

Nutrition extension education programme on prevention of obesity was imparted to obese adolescent girls in groups through lecture method and display of chart, poster and distribution of pamplet and their doubts were cleared. The sessions were repeated during period of 15 days, after a period of 30 days a post test was organised for adolescent in groups using the same questionnaire.

The impact of nutrition extension programme was studied chi-square & paired t-test.

Data analysis and result discussion

Table 1: Age wise response rate of respondents

Sr. No	Age Group	Respondents	
		Frequency	Percentage
1	13-15 years	29	24.17
2	16-17 years	40	33.33
3	18-19 years	51	42.50
Total		120	100

Table-1 showed the data on age distribution of the adolescent girls. The above table clearly indicated that 24.17% respondents were 13-15 years age group, while 33.33% of them were 16-17 years of age group. Majority of the respondents i.e. 42.5 % were found in 18-19 years of age group.

Table 2: Family income of the Respondents

Sr. No	Income Group	Respondents	
		Frequency	Percentage
1	Low	27	22.50
2	Middle	64	53.33
3	High	29	24.17
Total		120	100

Table no. 2 showed the data on family income group of the respondents. According to the table data 22.5% of them were belonging to low-income group. More than half 53.33 % respondents given their response to the middle income group while rest of them 24.17% of respondents concerned to the high income group of family.

Table 3: BMI Status of the Respondents Before and After Intervention

Sr. No	BMI Category	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Normal	00	00.00	27	14.17
2	Overweight/obese	120	100.00	93	85.83
Total		120	100	120	100

Table-3 indicates the data on BMI status of the adolescent girls. All the obese respondents were included for the study, so before intervention all the response rate of respondents were overweight/obese. After intervention statically change was found the normal

BMI increased from 0 to 27. This change in BMI showed a positive impact of nutrition extension education program.

Table 4: Fast Food Consumption of the Respondents Before and After Intervention

Sr. No	Pattern	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Daily	37	30.83	19	15.83
2	Weekly	49	40.83	43	35.83
3	Occasionally	34	28.33	58	48.33
Total		120	100	120	100

Table-4 showed the data on fast food consumption of the respondents. According to table data before intervention 30.83% of the respondents were given their opinion to the consuming fast food on daily basis, while 40.83% of them consuming fast food on weekly basis and 28.33% of them were consuming fast food on occasion. On the other hand after intervention daily consumption of fast food decrease from 30.83% to 15.83% percent while occasionally consumption of fast food increase from 28.33% to 48.33%, which means nutrition extension education program also positively impacted on fast food consumption.

Table 5:Meal skipping of the Respondents Before and After Intervention

Sr. No	Meal skipping	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Yes	73	60.83	35	29.17
2	No	47	39.17	85	70.83
Total		120	100	120	100

Table-5 revealed the data on meal skipping of the adolescent girls. According to data before intervention more than half 60.83 percent of the respondents has skipping meal, which is the main cause for poor metabolism. After intervention meal skipping decrease from 60.83 percent to 29.17 percent. So it can say that the nutrition extension education programme had a positive impact on meal skipping patter which reducing the poor metabolism and obesity/overweight risk.

Table 6: Breakfast Consumption of the Respondents Before and After Intervention

Sr. No	Breakfast	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Regular	41	34.17	83	69.17
2	Irregular	79	65.83	37	30.83
Total		120	100	120	100

Table-6 showed the data on breakfast consumption of the adolescent girls. Data indicate that the before intervention more than half (65.83 percent) of the respondents found in irregular consumption group, which was the serious health concern for adolescent health. After intervention irregular breakfast consumption decrease from 65.83 percent to 30.83 percent and regular fast food consumption increase from 34.17 percent to 69.17 percent, which showed the positive impact of nutrition extension education on breakfast consumption. Finally statically change was found in breakfast consumption.

Table 7: Physical Activity of the Respondents Before and After Intervention

Sr. No	Activity Level	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Low	61	50.83	25	20.83
2	Moderate	35	29.17	53	44.17
3	High	24	20.00	42	35.00
Total		120	100	120	100

Table-7 revealed the data on physical activity of the adolescent girls. Data showed that before intervention more than half (50.83 percent) of the respondents had low physical activity while 29.17 percent were found in moderate physical activity. Only 20 percent of them found in high physical activity group. After intervention high physical activity increase form 20 percent to 35 percent and moderate physical activity increase from 29.17 percent to 44.17 percent. Respondents with low physical activity decrease from 50.83 percent to 20.83 percent which means the nutrition extension education programme had positive impact on physical activity level of the adolescent girls.

Table 8: Water Intake of the Respondents Before and After Intervention

Sr. No	Water Intake	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Adequate	39	32.50	80	66.67
2	Inadequate	81	67.50	40	33.33
Total		120	100	120	100

Table-8 revealed the data on water intake of the adolescent girls. Before intervention only 32.5 percent of the respondent's intake adequate water while rest of them were found in inadequate water intake group. After intervention adequate water intake increased form 32.5 percent to 66.67 percent and inadequate water intake decreased form 67.5 percent to 33.33 percent. Improved water consumption indicates the positive impact of nutrition extension education programme on water intake pattern, so we can say that the intervention successfully encouraged healthier hydration pattern and practices.

Table 9: Nutritional Knowledge Level of the Respondents Before and After Intervention

Sr. No	Knowledge Level	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	Poor	55	45.83	13	10.83
2	Moderate	43	35.83	35	29.17
3	Good	22	18.33	72	60.00
Total		120	100	120	100

Table-9 showed the data on knowledge level of the adolescent girl. The finding in table data reveal that before intervention 45.83 percent of the respondents had poor nutritional knowledge while 35.83 percent of them had moderate knowledge level. Only 18.33 percent of them had good nutritional knowledge. After intervention statically change was observed, respondents with good nutritional knowledge increased from 18.33 percent to 60 percent while respondents with poor knowledge level decreased from 45.83 percent to 10.83 percent. This change indicates that the nutrition extension programme was highly effective for increasing knowledge level of the adolescent girls.

Table 10: Obesity Risk Category of the Respondents Before and After Intervention

Sr. No	Risk Category	Before Intervention		After Intervention	
		Frequency	Percentage	Frequency	Percentage
1	High Risk	59	49.17	23	19.17
2	Moderate Risk	37	30.83	41	34.17
3	Low Risk	24	20.00	56	46.67
Total		120	100	120	100

Table-10 showed the data on obesity risk category of the adolescent girl. Before intervention near about half (49.17 percent) of the respondents were found in high risk category wile 30.83 percent of them were in moderate risk category. 20 percent of the respondents found in low risk category. After intervention low risk respondents increased from 20 percent to 46.67 percent, moderate risk also increased from 30.83 percent to 34.17 percent. High risk respondent decrease form 59 to 23. These findings indicates that the nutrition extension education programme is very effective in reducing obesity risk.

Table 11: McNemar test Analysis

Sr. No.	Variable	X^2-Value	P-value	Result
	BMI	25.04	<0.0001	Highly Significant

Table 11 revealed the data on McNemar test analysis. Significant improvement in BMI status was found after nutrition extension education. Majority of the respondents moved from obese/overweight to normal BMI. The result indicates that the nutrition extension education had a very positive and healthy impact on reducing obesity/overweight among adolescent girls.

Table 12: Chi-square Analysis

Sr. No.	Variable	X^2- Value	P-value	Result
1	**Fast Food Intake**	12.67	<0.01	Significant
2	**Meal skipping**	24.09	<0.001	Highly Significant
3	**Breakfast Consumption**	24.31	<0.001	Highly Significant
4	**Physical Activity**	15.72	<0.001	Highly Significant
5	**Water Intake**	20.57	<0.001	Highly Significant
6	**Knowledge score**	53.36	<0.001	Highly Significant
7	**Obesity Risk**	20.55	<0.001	Highly Significant

Table-12 showed the data on chi square analysis of the study finding. Analysis of the data showed significant association between nutrition extension education programme and categorical variables i.e., fast food intake, Meal skipping, Breakfast consumption, Physical activity, Water Intake, Knowledge score and Obesity risk.

Summary

Significant improvement in BMI status was found after nutrition extension education. After intervention statically change was found the normal BMI increased from 0 to 27. The result indicates that the nutrition extension education had a very positive and healthy impact on reducing obesity/overweight among adolescent girls. Significant association between nutrition extension education programme and categorical variables i.e., fast food intake, Meal skipping, Breakfast consumption, Physical activity, Water Intake, Knowledge score and Obesity risk. These all the findings confirm that the nutrition extension education programme had a positive and healthy impact on improving dietary pattern and other lifestyle behaviour of the adolescent girls.

Conclusion

The study concludes that obesity among adolescent girl is strongly influenced by less physical activity, poor nutritional knowledge, unhealthy lifestyle and unhealthy dietary pattern because these factors contribute to increased obesity during adolescent age. findings confirm that the structured nutrition education programme had a positive impact on obesity prevention among adolescent girls.

Recommendations

1. College should organised regular physical activity and sports competition to reduce obesity risk.
2. Awareness regarding obesity prevention should be increased through regular extension activities.
3. Nutrition education programs should be organised regularly in both urban and rural areas.

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