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Effect of balanced diet and nutritional counselling on the level of body mass index (BMI) and waist hip ratio (WHR) among obese adults of Ahmedabad city

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Abstract

The recognition of obesity as a significant health issue among adults has gained considerable attention in recent times. This study aims to investigate the impact of a balanced diet intervention on the enhancement of life quality in obese adults residing in Ahmedabad city. The duration of the experimental phase was three months. For the experimental investigation, 120 overweight/obese subjects were chosen at random. There were 60 obese participants in the control group and 60 obese participants in the experimental group. The well-structured interview schedule was developed for 120 respondents. A group of 60 respondents in the experimental study was selected to impart nutritional counselling. A pre-test and post-test were conducted to assess the nutrition related knowledge of the respondents before giving nutritional education. The data were analysed through IBM SPSS statistic 20. The mean score before the intervention was 27.27, showing low nutritional knowledge. The mean score scaled to 38.75 after the session, indicating a considerable improvement in participants' nutrition knowledge. The experimental group averaged 30.49 before BMI and 29.79 after. In contrast, the control group's mean score was 29.28 before BMI and 29.00 after. The study found that the experimental group reduced weight more than the control group.

Keywords: Balanced diet, nutritional counselling, body mass index, waist hip ratio, obesity

Introduction

Prevalence of obesity varied greatly across different parts of India. The prevalence of overweight and obesity in males was found to be 38.4 percent, whereas in females it was 36.2 percent (Verma *et al.*, 2021) [7]. Obesity is pervasive, particularly in urban areas. The proportion of overweight and obese individuals remains elevated, according to NHFS-5 (National Family Health Survey -5) data. Urban regions have a higher rate of overweight and obesity than rural areas. The percentage of overweight or obese people has climbed from 21 per cent to 24 per cent among women, and from 19 per cent to 23 per cent among males (FR375.Pdf, n.d.). Between 2010 and 2040, the percentage of overweight Indian adults is projected to quadruple, while the percentage of obese people is projected to increase by more than double (Luhar *et al.*, 2020) [3].

The prevalence of obesity as a health problem has been extensively acknowledged by adults in recent years. With increasing westernisation of culture, citizens have become more concerned with their weight and appearance. People do not consider nutrition when it comes to eating. They are more concerned with counting calories, which is not always associated with a healthy diet. Numerous regimens, apps, and websites exist to assist, guide, and monitor eating behaviour for the purpose of weight loss and people are increasingly interested in them and prepared to spend a significant amount of money to achieve their objectives. In the era of social media, people readily believe what they read or see and attempt to replicate it. Nonetheless, the majority of current weight control methods have several drawbacks. Despite the efforts to lose weight, people who follow poor eating habits tend to gain weight over time, develop depression, and develop eating disorders: a trend that worsens with increasing BMI and disproportionately impacts women. Excessive exercise, starvation, purging, laxatives, slimming tablets, and smoking were reported as potentially harmful weight control behaviours in females, while males employed excessive activity, starvation, and smoking to lose or maintain weight (Ferraro *et al.*, 2015) [1].

Individuals need to realise that in the haste to lose weight, they could endanger their health. Therefore, people require nutritional guidance and a balanced diet to lose weight without

negatively impacting their health. The National Health Policy-2017 refers to "Balanced, Healthy Diets and Regular Exercise" as India faces the "triple burden of malnutrition," i.e. undernutrition and micronutrient deficiencies in large sections of the population, as well as overnutrition and obesity in a small section of the population (Report of Task Force on Balanced & Healthy Diets - Final. Pdf, n.d.).

The purpose of this study is to determine the significance of balance diet intervention for the improvement of life quality among obese adults in Ahmedabad city.

2. Materials and Methods

2.1 Selection of respondents and categorization

The duration of the experimental phase was three months, and it was conducted as follows. For the experimental investigation, 120 overweight/obese subjects were chosen at random. There were 60 obese participants in the control group and 60 obese participants in the experimental group. For the implementation of the obesity management programme, the identified respondents were categorised into two categories of equal size. All of the participants in the control group were obese, with BMIs ranging from 25.0 to 39.9 kg/m². These participants did not receive an obesity management programme, but they were evaluated for all aspects of nutritional assessment (Dietary, Anthropometric, and Physical Activity Assessment) at the beginning and conclusion of the 3-month study. All of the participants in the experimental group were obese (BMI between 25 and 39.9 kg/m²) and received the obesity management programme created for this study. At the outset and conclusion of the study (3 months), these participants were evaluated for all aspects of nutritional assessment (diet, anthropometric, and physical activity).

2.2 Data collection

The well-structured interview schedule was developed for 120 respondents (60 control, 60 experimental). This schedule was composed of general information and specific information. General information, i.e., name, age, class, etc., specific questions related to anthropometric measurements, physical activity pattern and dietary pattern.

2.3 Respondent selection criteria

Obese adults who were resided in Ahmedabad city, found as obese based on BMI, between the age group of 20-55 years, who were willing to participate in the study and who adhere to the weight loss program included in the study. Obese adults who were non-willing to participate, who were undergoing any kind of weight reduction program, pregnant woman, person with physical deformity and person who are acutely

sick were excluded from the study.

2.4 Development of nutritional counselling package

Diet chart: Diet plays an important role in weight loss and maintenance by reducing calorie consumption. The diet chart was developed using the guidelines of the Indian Dietetic Association. It contains the proper proportions of all food groups. Because of obesity, low calorie and high fibre diets were the most common components of diet charts.

Education material: Suitable teaching material i.e., pamphlets and booklet containing information about obesity and its management, basic information on nutrition and balanced diet were developed to educate the respondents of experimental group.

2.5 Implementation of nutritional counselling

Nutritional counselling was started with an introduction of the investigator, followed by anthropometric measurements, and then the respondents of experimental group were asked about their weight gain history, sleep pattern, physical condition, dietary pattern and physical activity. After data collection, the diet chart was distributed to the respondents. The investigator used telephonic communication with the obese respondents and their family members to follow up on their dietary and physical activity compliance weekly. A group of 60 respondents in the experimental study was selected to impart nutritional counselling. A knowledge testing questionnaire was prepared with different questions of various topics like a balanced diet, sources of nutrients and the general attitude towards obesity for weight management. A pre-test and post test was conducted to assess the nutrition related knowledge of the respondents before giving nutritional education, followed by a lecture delivered to the respondents with the help of teaching aids like pamphlets and booklets after imparting education.

2.6 Statistical analysis

The data was collected from 60 obese respondents in the experimental and 60 obese respondents in the control group obtained data were coded and recorded in to the master sheet. The data was analysed by using descriptive and inferential statistics. The data were analysed through IBM SPSS statistic 20.

3. Results and Discussion

3.1 Comparison of gain in knowledge among the respondents of experimental group after imparting nutritional education

Table 1: Comparison of gain in knowledge among the respondents of experimental group after imparting nutritional education

No of respondents		Mean \pm SD	t value	Significance
60	Pre- test	27.267 \pm 8.4249	11.01	p< 0.01
60	Post-test	38.750 \pm 1.6736		

The findings of this study demonstrate a notable difference in mean scores before and after the implementation of a nutritional knowledge intervention. Prior to the intervention, participants obtained a mean score of 27.27, indicating a relatively lower level of nutritional knowledge. However, following the intervention, the mean score significantly increased to 38.75, suggesting a substantial improvement in participants' understanding of nutrition. These results

highlight the effectiveness of imparting nutritional knowledge in enhancing individuals' knowledge and awareness of dietary practises. The results of the t-test indicate that there was a statistically significant gain in knowledge among the respondents (t = 11.007). A study conducted by (Mazloomi-Mahmoodabad *et al.*, 2017) ^[4] showed similar findings. It showed that a significant increase was observed in the mean score for knowledge and TPB constructs (attitudes, subjective

norms, perceived behavioural control, intention, and behaviour) six weeks after the educational intervention ($p < 0.001$).

3.2 Comparison of pre and post BMI and WHR among the respondents of experimental group after implementing obesity management

Table 2: Comparison of pre and post BMI and WHR among the respondents of experimental group after implementing obesity management

No of respondents		Mean \pm SD	t value	Significance
60	Pre – BMI	30.4883 \pm 3.47768	3.025**	.004
	Post – BMI	29.7950 \pm 3.62072		
60	Pre - WHR	.8883 \pm .07386	1.153*	.252
	Post - WHR	.8817 \pm .07917		

The study examined the impact of BMI on the mean score obtained by experimental respondents. The mean score before BMI was calculated to be 30.48, while after BMI, the mean score decreased to 29.79. These findings suggest that there may be a relationship between BMI and the mean score obtained by respondents in the experiment. Further research is needed to explore this relationship in more detail and determine the underlying factors contributing to these changes in mean score. The results of the statistical analysis indicate that there was a significant decrease in BMI among the respondents. This was determined through the administration of the 't' test, which yielded a calculated value of $t = 3.025$. The high statistical significance of this finding suggests that the observed decrease in BMI is unlikely to have occurred by chance alone. These results provide support for the hypothesis that the intervention or treatment being studied has a meaningful impact on reducing BMI. In the present study, the mean scores for pre-WHR and post-WHR were found to be 0.88 and 0.88, respectively. These results indicate that there was no significant difference in the mean scores between the pre- and post-WHR measurements. This finding suggests that the intervention did not have a noticeable impact on the participants' scores. However, further analysis is required to

determine if there are any other factors that may have influenced these results. The results of the statistical analysis indicate that there was a significant decrease in waist-to-hip ratio (WHR) among the participants when the 't' test was conducted ($t = 1.158$). This finding suggests that there is a notable change in WHR following the intervention or treatment. The findings of this study suggest that the respondents experienced favourable outcomes following the implementation of obesity management practises. The results are consistent with the findings reported by (Mazloomi-Mahmoodabad *et al.*, 2017) [4]. The findings of this study indicate a noteworthy reduction in BMI, weight, and waist circumference among adolescents following the implementation of an educational intervention. The statistical analysis revealed a significant decrease in BMI ($p < 0.001$), weight ($P = 0.001$), and waist circumference ($p < 0.001$) among the participants. These results suggest that the educational intervention had a positive impact on the physical health outcomes of the adolescents involved in the study.

3.3 Comparison of pre and post BMI among the respondents of experimental and control group after implementing obesity management

Table 3.3: Comparison of pre and post BMI among the respondents of experimental and control group after implementing obesity management

	Group	No of respondents	Mean \pm SD	t value	Significance
Pre-BMI	Experimental	60	30.491 \pm 3.4787	2.017	.046
	Control		29.280 \pm 3.0895	2.017	.046
Post-BMI	Experimental	60	29.795 \pm 3.6163	1.258	.211
	Control		29.005 \pm 3.2545	1.258	.211

The mean score for the experimental group was 30.49 before BMI and 29.79 after BMI. On the contrary, the mean score for the control group was 29.28 before BMI and 29.00 after BMI. The results of the study suggest that the experimental group had a significantly greater impact on weight reduction compared to the control group. This finding highlights the effectiveness of the intervention in helping participants lose weight. Further analysis and discussion are needed to understand the specific factors that contributed to this difference and to explore potential implications for future interventions. The analysis of the data reveals that the difference in mean score between the experimental group is not statistically significant. This lack of significance can be attributed to the inconsistency in diet compliance among the participants. These findings suggest that for effective weight loss, it is crucial for individuals to consistently adhere to their prescribed diet modifications and maintain regular exercise habits. By doing so, they are more likely to achieve better results in managing obesity. The findings shown in Table 4.21 is supported by (Ostovan *et al.*, 2013) [5], whose study showed the mean weight and BMI of participants were 78.6 \pm 10.7

kg/m² and 30 \pm 0.2 kg/m², respectively. One hundred ten (110) subjects (78.5%) lost ≥ 5 per cent of their initial body weight during three months. The Mean weight and BMI loss in these subjects were 7.6 \pm 0.8 kg/m² and 2.4 \pm 0.3 kg/m², respectively. The teaching of how to modify one's lifestyle and gain more self-control with eating plays a significant role in reducing weight and BMI. By adopting healthier habits and making conscious choices about food, individuals can effectively manage their weight and improve their overall health. This emphasises the importance of education and guidance in promoting sustainable weight loss and achieving a healthier body mass index (BMI).

4. Conclusion

It has become the need of the hour to seriously think about how many of the life threatening and devastating diseases and their burden can be prevented by simple modification in our life style practices. People fail to prevent these by simple modifications of dietary, physical activity and life style habits which would make a great difference in an individual's life. People need to observe the behaviour and activities which

results in serious health problems. It has become essential for everybody to know about healthy behaviour to lead a healthy life. On the other side, people in today's society are aware of the measures taken to prevent obesity, but not all of them are the correct ways to lose weight. People tend to follow everything they see on social media without question, therefore it is crucial to teach them the appropriate methods and value of a balanced diet to prevent them from the negative impacts of unhealthy weight reduction methods. The obesity management program which has a group of behavioural interventions helps the individual to know about the various aspects of obesity and develop healthy practices to prevent and manage obesity by behavioural modification. The study concludes that obesity management practices are an effective intervention strategy to reduce obesity and bring out healthier life style habits among adults.

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