A Study to Assess the Effectiveness of Text Message Intervention on Prevention and Management of Obesity among Adolescents

Beautily. V[1], Thilagavathi N[2], Astheetha S[2]

[1]Assistant Professor, Department of Community Health Nursing, SIMATS, Thandalam, Tamil Nadu, India
[2]BSc Nursing, Saveetha College of Nursing, SIMATS, Thandalam, Tamil Nadu, India

ABSTRACT

Background: Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting the children as well as adults, it is now so common that is replacing the more traditional public health concerns including malnutrition. It is one of the most significant contributors to ill health. For industrialized countries, it has been suggested that such increase in body weight have been caused primarily by reduced levels of physical activity, rather than by changes in food intake or by other factors. **Methods**: A quantitative experimental research was conducted among 60 obese adults. Clients meeting these inclusion criteria were divided into two groups of 30 members in each group. Out of 60 sample, 30 sample in experimental group and 30 sample in control group. A purposive sampling technique was used to select the samples. The purpose of the study was explained to the samples and written informed consent was obtained from them. The demographic graphic variables and clinical variables were collected by multiple choice questionnaire. Body Mass Index (BMI) for Pre-test assessment was assessed in the 1st day of data collection both in the experimental group and control group. The Body Mass Index (BMI) level was assessed by measuring as the weight in kilograms divided by the square of the height in metres (kg/m^2). The text message intervention with motivational messages, exercise, foods to be taken and foods to be avoided was sent to the experimental group twice daily, for 14 days. The control group followed regular routine. The post-test was conducted in control group and experimental group on the 14th day after text message intervention. Collected data were analysed by descriptive and inferential statistics. **Result**: The result in the post-test between the experimental and control group was found to be statistically significant at p<0.001 level, this clearly infers that text message intervention for prevention and management of obesity among adolescents in the experimental group was found to be effective than the adolescents with obesity in control group who follow regular activities and lifestyle habits.

KEYWORDS: Obesity, Text message intervention, Adolescents, Body Mass Index (BMI)

INTRODUCTION

Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting the children as well as adults, it is now so common that is replacing the more traditional public health concerns including malnutrition. It is one of the most significant contributors to ill health. For industrialized countries, it has been suggested that such increase in body weight have been caused primarily by reduced levels of physical activity, rather than by changes in food intake or by other factors.

OBJECTIVES OF THE STUDY

1. To assess the pre-test and post-test values of BMI among the obese adolescents in experimental group and control group.

2. To assess the effectiveness of text message intervention among obese adolescents of the experimental group.

3. To find the association between the post-test levels of BMI and their selected demographic variables of obese adolescents in experimental group and control group.

METHODS AND MATERIALS

The criteria for sample selection are all obese adolescents of both gender of age group 13 – 19 years. The data collection period was done, prior permission and ethical clearance was obtained from the institution (SIMATS). The purpose of the study was explained to the samples and written informed consent was obtained from them. The demographic graphic variables and clinical variables were collected by multiple choice questionnaire. Body Mass Index (BMI) was assessed both in the experimental group and control group by measuring weight in kilograms and height in metre^2.

The study was conducted to assess the effectiveness of text message intervention on prevention and management of obesity among adolescents. About 60 adolescents, who met within inclusion criteria, were selected by using a purposive sampling technique. 30 subjects were assigned in experimental group and 30 in control group. The study was conducted at koyambedu. Informed consent was obtained from each participant and the benefits of text message intervention was explained. The investigator established good rapport with the persons of the study to ensure their cooperation and collected the data regarding demographic variables. Pre-test assessment of Body Mass Index (BMI) was assessed in the 1st day of data collection both in the experimental group and control group. The text message intervention with motivational messages, exercise, foods to be taken and foods to be avoided was sent to the experimental group twice daily, for 14 days. The control group followed regular routine. The post-test was conducted in control group and experimental group on the 14th day after text message intervention.

Sample size:

Sample size was 60 who are obese, who met the inclusion criteria. Out of 60 samples, 30 samples in the experimental group and 30 samples were control group.

Inclusion criteria

➢ Adolescents of both male and female.
➢ Adolescents who are willing to participate in the study
➢ Participants with access to the internet could participate in the study.

➢ Participants with age of 13 to 19 years.
➢ Adolescents able to understand English and willing to give informed consent were included.

Exclusion criteria:

➢ People who were not interested in the study
➢ People with low cognition (mentally challenged)
➢ People who were involved in another research study.
➢ People who were very sick.

Procedure

Clients meeting these inclusion criteria were divided into two groups of 30 members in each group. Out of 60 sample, 30 sample in experimental group and 30 sample in control group The study was conducted at koyambedu. Informed consent was obtained from each participant and the benefits of text message intervention was explained. The investigator established good rapport with the persons of the study to ensure their cooperation and collected the data regarding demographic variables. Pre-test assessment of Body Mass Index (BMI) was assessed in the 1st day of data collection both in the experimental group and control group. The experimental group were put on standard diet and exercise for 14 days along with text message intervention with motivational messages, exercise, foods to be taken and foods to be avoided was sent twice daily. The control group followed regular routine. The post-test was conducted in control group and experimental group on the 14th day after text message intervention, by measuring Body mass Index by measuring weight in kilograms and height in metre^2 (kg/m^2). Collected data were analysed by descriptive and inferential statistics.

RESULTS:

Out of 60 samples, table 1 shows that both in the experimental and control group most of the adolescents 18(60%) were aged between 16 – 19 years, 16(53.3%) were female, 22(73.4%) were Hindus, 12(40%) were studying 9th standard – 10th standard & 11th standard – 12th standard respectively, 30(100%) were residing in urban area and belonged to middle class and were nonvegetarian, 22(73.3%) were doing sedentary level of physical activity, 13(43.3%) had walking history of less than 500 meter and 1 kilometer respectively. 14(46.7%) had no dietary restriction and 18(60%) were sleeping for 6 – 7 hours.

The table also shows that in the experimental group 20(66.7%) had BMI of 36 – 40 kgm^2 and in the control group, 23(76.7%) had BMI in the range of 36 – 4 kgm^2.

Table 1: Frequency and percentage distribution of demographic variables of adolescents in the experimental and control group.

N = 60(30+30)

In the pretest of experimental group, the mean score was 29.56±2.59 and in the post-test the mean score was 27.23±2.65. Whereas in the control group, the pretest mean score was 29.01±2.24 and the post-test means score was 28.97±2.23.

Table 2: Assessment of pretest and post-test level of BMI scores among adolescents in the experimental and control group

N = 60(30+30)

Body Mass Index	Pretest		Post-test	
	Mean	S.D	Mean	S.D
Experimental Group	29.56	2.59	27.23	2.65
Control Group	29.01	2.24	28.97	2.23

The table 3 depicts that the pretest mean score of BMI among adolescents in the experimental group was 29.56±2.59 and the post-test mean score was 27.23±2.65. The mean difference score was 2.33. The calculated paired 't' test value of t = 12.408 was found to be statistically significant at $p<0.001$ level which clearly infers that there was reduction in the level of BMI after the administration of Text Message Intervention among adolescents in the experimental group.

Whereas in the control group the pretest mean score of BMI among clients with type 2 diabetes mellitus in the control group was 29.01±2.24 and the post-tests mean score was 28.97±2.23.

The mean difference score was 0.04. The calculated paired 't' test value of t = 1.980 was not found to be statistically significant which clearly infers that there was no significant reduction in the level of BMI among the adolescents in the control group.

Table 3: Comparison of Body Mass Index among adolescents within and between the experimental and control group

N = 60(30+30)

Group	Pretest		Post-test		Mean Difference Score	Paired 't' test value
	Mean	S.D	Mean	S.D		
Experimental Group	29.56	2.59	27.23	2.65	**2.33**	**t = 12.408 p=0.0001 S***
Control Group	29.01	2.24	28.97	2.23	0.04	t = 1.980 p=0.057 N.S
Mean Difference Score	0.55		**1.74**		***p<0.001, **p<0.01 S - Significant N.S – Not Significant
Student Independent 't' test & p-value	t = 0.891 p=0.377, N.S		**t = 2.757 p=0.008, S****		

The table 4 shows that the demographic variables BMI **(F=39.603, p=0.0001)** and dietary restrictions **(F=3.284, p=0.037)** had shown statistically significant association with post-test mean score of BMI among adolescents at $p<0.001$ and $p<0.05$ level respectively and the other demographic variables had not shown statistically significant association with post-test mean score BMI among adolescents in the experimental group.

Table 4: Association of post-test level of BMI among adolescents with their selected demographic variables in the experimental group   n= 30

Demographic Variables	Frequency	BMI
		One Way ANOVA / Unpaired 't' test Value
Age (in years)		t = 1.599
13 – 15 years	12	p=0.122
16 – 19 years	18	N.S
Gender		t = 1.368
Male	14	p=0.182
Female	16	N.S
Religion		F = 0.460
Hindu	22	p=0.636
Christian	4	N.S
Muslim	4	
Educational status		F = 2.296
7th standard – 8th standard	-	p=0.120
9th standard – 10th standard	12	N.S
11th standard – 12th standard	12	
Undergraduate 1st year	6	
Residency		
Urban	30	-
Rural	-	
Economic status		
Upper class	-	
Middle class	30	-
Lower class	-	
Dietary habits		
Vegetarian	-	-
Non-vegetarian	30	
BMI (Body Mass Index)		**t = 39.603**
30 – 35 kgm^2	-	**p=0.0001**
36 – 40 kgm^2	20	**S*****
Above 40 kgm^2	10	
Family history of obesity		t = 0.101
Yes	18	p=0.920
No	12	N.S
Physical activity per day		t = 0.044
High level	-	p=0.965
Moderate level	8	N.S
Sedentary level	22	
Walking history per day		F = 0.212
Less than 500 meter	13	p=0.810
1 kilometer	13	N.S
More than 1 kilometer	4	
Dietary restriction		**F = 3.284**
Carbohydrate	2	**p=0.037**
Fat	6	**S***
Sugar and dairy products	8	
None	14	
Sleeping hours		F = 1.208
8 hours	2	p=0.315
6 – 7 hours	18	N.S
Less than 6 hours	10	

The table 4 shows that the demographic variables BMI **(F=39.603, p=0.0001)** and dietary restrictions **(F=3.284, p=0.037)** had shown statistically significant association with post-test mean score of BMI among adolescents at p<0.001 and p<0.05 level respectively and the other demographic variables had not shown statistically significant association with post-test mean score BMI among adolescents in the experimental group.

This clearly infers that text message intervention for prevention and management of obesity among adolescents in the experimental group was found to be effective than the adolescents with obesity in control group who follow regular activities and lifestyle habits.

DISCUSSION:
The text message intervention with motivational messages, exercise, foods to be taken and foods to be avoided shows reduced Body Mass Index (BMI) levels among obese adolescemts in the experimental group.

CONCLUSION:
The present study assessed the effectiveness of text message intervention among adolescents with obesity. The result in the post-test between the experimental and control group was found to be statistically significant at p<0.001 level, this clearly infers that text message intervention for prevention and management of obesity among adolescents in the experimental group was found to be effective than the adolescents with obesity in control group who follow regular activities and lifestyle habits.

REFERENCES
[1] Jelalian E, Evans EW. Behavioral intervention in the treatment of obesity in children and adolescents: implications for Mexico. Nutr Rev. 2017 Jan; 75(suppl 1):79-84. doi:10.1093/nutrit/nuw035. PMID: 28049752; PMCID: PMC5207006.

[2] Kar SS, Kar SS. Prevention of childhood obesity in India: Way forward. J Nat SciBiol Med. 2015 Jan-Jun; 6(1):12-7. doi:10.4103/0976-9668.149071. PMID:25810628; PMCID: PMC4367021.

[3] P. Srivastav et al. / Diabetes &Metabolic Syndrome: Clinical Research &Reviews 14 (2020) 1195e1204

[4] Nicolucci, A., Maffeis, C. The adolescent with obesity: what perspectives for treatment? Ital J Pediatr**48**, 9 (2022). https://doi.org/10.1186/s13052-022-01205-w

[5] Sashindran, V. K., Dudeja, P. Obesity in School Children in India. In: Anugwom, E. E. Awofeso, N., editors. Public Health in Developing Countries - Challenges and Opportunities [Internet]. London: Intech Open; 2020 [cited 2022 Aug 22]. Available from: https://www.intechopen.com/chapters/69588 doi: 10.5772/intechopen.89602

[6] World Health Organization. Childhood overweigh and obesity. Global strategy on diet, physical activity and health. Geneva; World Health Organization. 2020. Available at https://www.who.int/dietphysicalactivity/childhood. Accessed on 10 May 2020.

[7] World Health Organization. What are the causes for children and adolescents to become obese. Global strategy on diet, physical activity and health. Geneva; World Health Organization. 2020. Available at: https://www.who.int/dietphysicalactivity/childhood. Accessed on 10 May 2020.

[8] World Health Organization. STEPS Geneva: World Health Organization; 2017. Available at: https://www.who.int/ncds/surveillance/steps/STEPS_Manual.pdf. Accessed on 10 May 2020.

[9] Park K. Parks textbook of social and Preventive medicine. 25th edition. Jabalpur: M/s BanarsidasBhanot; 2019; 429.

[10] VISWAMBHARAN, Jaya Koothupalakkal; BINA, Thomas; RAPHAEL, Lucy. Prevalence and determinants of obesity among adolescent school children of North Kerala. International Journal Of Community Medicine And Public Health, [S.l.], v. 7, n. 8, p. 3142-3148, july 2020. ISSN 2394-6040. Available at: <https://www.ijcmph.com/index.php/ijcmph/article/view/6588>. Date accessed: 22 aug. 2022. doi: http://dx.doi.org/10.18203/2394-6040.ijcmph20203391.

[11] https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

[12] Ells, L.J., Rees, K., Brown, T. et al. Interventions for treating children and adolescents with overweight and obesity: an overview of Cochrane reviews. Int J Obes**42**, 1823–1833 (2018). https://doi.org/10.1038/s41366-018-0230-y

[13] https://www.msdmanuals.com/en-in/home/children-s-health-issues/problems-inadolescents/obesity-in-adolescents

[14] https://www.unicef.org/media/92331/file/Advocacy-Guidance-Overweight-Prevention.pdf

[15] Hemmer, Heidi (2009) "Impact of Text Messaging on Communication," Journal of Undergraduate Research at Minnesota State University, Mankato: Vol. 9, Article 5. Available at: https://cornerstone.lib.mnsu.edu/jur/vol9/iss1/5.

[16] Partridge SR, Gibson AA, Roy R, Malloy JA, Raeside R, Jia SS, Singleton AC, Mandoh M, Todd AR, Wang T, Halim NK, Hyun K, Redfern J. Junk Food on Demand: A CrossSectional Analysis of the Nutritional Quality of Popular Online Food Delivery Outlets in Australia and New Zealand. Nutrients. 2020 Oct 12; 12(10):3107. doi: 10.3390/nu12103107. PMID: 33053705; PMCID: PMC7601596.

[17] Grega LM, Assi SJ, Hekler EB, Weibel N, Golaszewski NM, Godino JG. SMART 2.0: A Multimodal Weight Loss Intervention for Young Adults. Ext Abstr Hum Factors Computing Syst. 2019 May; 2019:LBW0214. doi: 10.1145/3290607.3312940. PMID: 33033808; PMCID: PMC7539792.

[18] Keating SR, McCurry M. Text messaging as an intervention for weight loss in emerging adults.

Journal of the American Association of Nurse Practitioners. 2019 Sep 1; 31(9):527-36.

[19] McGirr C, Rooney C, Gallagher D, et al. Text messaging to help women with overweight or obesity lose weight after childbirth: the intervention adaptation and SMS feasibility RCT. NIHR Journals Library, Southampton (UK); 2020. PMID: 32223118.

[20] Bahreynian M, Salehi M, Khoshhali M, Kelishadi R. Impact of text message-based intervention for weight control and health-promoting lifestyle behaviors of overweight and obese children. J Educ Health Promot. 2020 May 28; 9:108. doi: 10.4103/jehp.jehp_707_19. PMID: 32642464; PMCID: PMC7325749.

[21] Chandra N, Anne B, Venkatesh K, Teja GD, Katkam SK. Prevalence of Childhood Obesity in an Affluent School in Telangana Using the Recent IAP Growth Chart: A Pilot Study. Indian J Endocrinol Metab. 2019 Jul-Aug; 23(4):428-432. doi: 10.4103/ijem.IJEM_151_19. PMID: 31741901; PMCID: PMC6844167.