Effectiveness of Educational Interventions to Improve Knowledge Related to Obesity among School Going Adolescents in Selected Schools of Eastern India

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ABSTRACT

Background: To address the overweight and obesity problems among children and adolescents, interventions in school is an important strategy.

Objective: To find out the changes in knowledge following educational interventions related to obesity among school going adolescents.

Methods: A quasi-experimental study was conducted among adolescent students of two private schools from June 2016 to August 2018. A total of 173 students were included, 86 from control school and 87 from intervention school. A pre-designed & pre-tested questionnaire was used for data collection which included ORK-10 (Obesity Risk Knowledge questionnaire). An integrated educational package was prepared and used for intervention school. After one year, data were collected to assess the changes in knowledge related to obesity.

Results: At baseline, mean score of ORK-10 of all students were 5.05 ± 1.60 (Intervention school= 4.93 ± 1.73, control school= 5.16 ± 1.46). Significance increase was observed in the total score in the students of intervention school (p=0.000) during follow up. A significant improvement was seen in knowledge regarding factors related to obesity among the students of intervention school.

Conclusion: Cost effective, simple school based intervention programs are needed as routine school activity to encourage the adolescents for reduction of obesity and related morbidities.

Key Words: Overweight, Pediatric obesity, Awareness, Teens, School children

INTRODUCTION

Obesity among children and adolescents is progressively increasing now a days all over the world.[1] Obesity has become a major concern as elevated body weight contributed to 4 million deaths globally, number of overweight/ obese infants and children amplified from 32 to 41 million globally. As per WHO "In developing countries, the vast majority of overweight or obese children live in, where the rate of increase has been more than 30% higher than that of developed countries". In last 40 years, number of obese children and adolescents has amplified ten times higher (WHO). In most of the countries including India, two-fold increase of overweight and obese children has been observed in past two decades.[2,3] According to Indian Academy of Pediatrics (IAP) National Task Force for Childhood Prevention of Adult Diseases: Childhood Obesity in 2004, prevalence of

obesity ranges from 6% to 24% was seen among children and adolescents from school based data in India.[4] To address the overweight and obesity problems among children and adolescents, interventions in school have been established as an important strategy to improve knowledge related to obesity which in turn prevent obesity. Previous researches had shown that intervention towards healthy behaviours had modest results. Observed effects in their study imply high levels of knowledge, awareness and positive attitude towards healthy eating.[5] With this background an interventional study has been planned to find out effects of educational interventions among school going adolescents of Bhubaneswar, as such type of study has not been conducted in this region so far. Therefore this study was planned to find out the changes in knowledge following educational interventions related to obesity among school going adolescents.

MATERIALS AND METHODS

A quasi-experimental study was conducted among adolescent students of two private schools of Bhubaneswar over a period of two years and four months from June 2016 to August 2018. Each school had 3 to 4 sections in class VII and IX consisting of around 90 students in each section. One section was randomly selected by lottery method and all students of the selected section from class VIII and IX were included in this study. A total of 173 students were included, 86 from control school and 87 from intervention school. Ethical approval was obtained from institutional ethics committee. Principal of both the schools were approached and written permission was taken. Assent from all students and informed written consent from their parents/ guardians was obtained. A pre-designed & pre-tested questionnaire was used after taking informed consent from the parents/guardian and assent from the students. This questionnaire included ORK-10 (Obesity Risk Knowledge questionnaire)[6] and some important questions to assess various cause effect links and prevention of obesity. The questionnaire is in English language and self-administered. Each question answered correctly on the ORK-10 form is equal to 1 and there were no negative scores. The minimum score was 0 and the maximum score was 10. Those who answered ≥ 5 questions correctly were considered to be aware and those who answered < 5 questions correctly were considered to be unaware.

To improve the knowledge, attitude and behaviour of the students towards obesity prevention and management, an integrated educational package was prepared. Control school students were given printed educational materials in the form of a carefully prepared poster. Both poster and educational package were prepared before the baseline data collection. Intervention school students were intervened by an integrated educational package. Before giving educational intervention to the students, this pack-

age was shared with the principal of the school and class teacher of concerned sections. Intervention was done by arranging interactive sessions with the students in their respective classes. Power-point presentations and videos were used for interactive sessions. Intervention was done by arranging interactive sessions with the students in their respective classes. Power-point presentations and videos were used for interactive sessions. The intervention was done by single investigator to maintain the uniformity. During the interactive sessions, discussion has been done by power-point presentations and videos. In initial two months of the intervention, one interactive audio-visual session of 40 minutes each, one per week was conducted for each section in the smart classroom with the help of the respective class teacher. A total of 8 interactive sessions were conducted over two months for both the classes of the intervention school. The sessions were regarding food and nutrients, energy and its role in weight gain, maintenance of ideal body weight through dietary modification and physical activity, stress relaxation including meditation & yoga. The intervention activities had been reinforced by interactive session in the next six months by conducting one session fortnightly. On completion of the intervention, data were collected to assess the changes in knowledge, attitude, behaviour towards diet and physical activity. Follow up data were collected after 1year of intervention.

Statistical analysis: The data collected were entered in Microsoft Excel spreadsheet and imported to SPSS software. The data were analysed in the Department of Community Medicine, IMS & SUM Hospital, Bhubaneswar, Odisha IBM SPSS Statistics software version 20 was used for data analysis. Descriptive statistics were expressed as frequencies (percentages), means, median, standard deviations and 95% confidence interval. Independent t-test and paired t-test were performed to compare means of continuous variables. Chi-squared test and McNemer Chi-squared test were used to test association between categorical variables. P value less than 0.05 considered as statistically significant.

Ethical considerations: Approval for the study was obtained from the Institutional Ethics Committee of the medical college with reference number IMS-SH/SOA/16074.

RESULTS

A total of 173 students have included in this study. The age of school going adolescents included in the study varied from 12-15 years. The mean age was 13.46 ± 0.75 years. About 60% of participants were boys and 40% were girls. Majority of them (98.8%) were Hindus, 95.4% belonged to general caste. Nearly two-third of the participants (65.3%) belonged to nuclear families followed by joint families (34.7%). Half of the students (50.3%) had no siblings.

At baseline, mean score of ORK-10 of all the students

were 5.05 ± 1.60 (Intervention school= 4.93 ± 1.73, control school= 5.16 ± 1.46). Out of these ten questions, in six questions more than 50% students could not give the correct response. Among all the stu- dents, least correct response was observed in question no 3 (20.2%) followed by question no 10 (29.5%), 9 (32.2%), 6 (48%), 7 (48.6%), 5 (49.7%), 2 (59%), 8 (61.8%), 4(71.1%), 1 (84.4%). (Table 1)

Table 1: Obesity Risk Knowledge- 10 (ORK-10) (Baseline)

Statements	Correctly answered			p value
	Overall (N=173)(%)	Control (N=86)(%)	Intervention (N=87)(%)	
"A person with a 'pot-belly' shaped abdomen has an increased risk of get-ting diabetes"	146 (84.4)	77 (89.5)	69 (79.3)	0.064
"Obesity increases the risk of getting bowel cancer"	102 (59)	58 (67.4)	44 (50.6)	0.024
"An obese person who gets diabetes needs to lose at least 40% of their body weight for clear health benefits"	35 (20.2)	14 (16.3)	21 (24.1)	0.198
"Obese people can expect to live as long as non-obese people"	123 (71.1)	65 (75.6)	58 (66.7)	0.196
"Obesity increases the risk of getting breast cancer after the menopause"	86 (49.7)	47 (54.7)	39 (44.8)	0.196
"Obesity is more of a risk to health for people from South Asia (e.g. India and Pakistan) than it is for White Europeans"	83 (48)	37 (43)	46 (52.9)	0.195
"There is no major health benefit if an obese person who gets diabetes, loses weight"	84 (48.6)	41 (47.1)	43 (49.4)	0.818
"Obesity does not increase the risk of developing high blood pressure"	107 (61.8)	54 (62.8)	53 (60.9)	0.800
"It is better for a person's health to have fat around the hips and thighs than around the stomach and waist"	56 (32.2)	26 (30.2)	30 (34.5)	0.550
"Obesity increases the risk of getting a food allergy"	51 (29.5)	25 (29.1)	26 (29.9)	0.906
Total (Mean score ± SD)	**5.05 ± 1.60**	**5.16 ± 1.46**	**4.93 ± 1.73**	**0.000**
(95% Confidence Interval)	**(4.84-5.33)**	**(4.85-5.45)**	**(4.52-5.35)**	

F.N.: Chi-squared test was used to know the difference for all statements in ORK-10 and Independent T test was used for the mean score between control and intervention group.

Table 2: Comparison between two groups (Baseline Vs Follow up) (ORK10)

Statements	Control (N=86)			Intervention (N=87)		
	Baseline (%)	Follow-up (%)	p value	Baseline (%)	Follow-up (%)	p value
"A person with a 'pot-belly' shaped abdomen has an increased risk of getting diabetes"	77 (89.5)	77 (89.5)	1.000	73 (83.9)	73 (83.9)	0.125
"Obesity increases the risk of getting bowel cancer"	58 (67.4)	58 (67.4)	1.000	51 (58.6)	51 (58.6)	**0.016**
"An obese person who gets diabetes needs to lose at least 40% of their body weight for clear health benefits"	14 (16.3)	21 (24.4)	0.065	39 (44.8)	39 (44.8)	**0.000**
"Obese people can expect to live as long as non-obese people"	65 (75.6)	60 (69.8)	0.180	67 (77)	67 (77)	**0.012**
"Obesity increases the risk of getting breast cancer after the menopause"	47 (54.7)	42 (48.8)	0.227	46 (52.9)	46 (52.9)	0.092
"Obesity is more of a risk to health for people from South Asia (e.g. India and Pakistan) than it is for White Europeans"	37 (43)	41 (47.7)	0.338	53 (60.9)	53 (60.9)	**0.016**
"There is no major health benefit if an obese person who gets diabetes, loses weight"	41 (47.1)	36 (41.9)	0.180	57 (65.5)	57 (65.5)	**0.000**
"Obesity does not increase the risk of developing high blood pressure"	54 (62.8)	53 (61.6)	1.000	56 (64.4)	56 (64.4)	0.453
"It is better for a person's health to have fat around the hips and thighs than around the stomach and waist"	26 (30.2)	28 (32.6)	0.687	43 (49.4)	43 (49.4)	**0.000**
"Obesity increases the risk of getting a food allergy"	25 (29.1)	32 (37.2)	0.065	43 (49.4)	43 (49.4)	**0.000**
Total (Mean score ± SD)	5.16±1.46	5.21±1.12	0.582	4.93±1.73	6.07±1.28	**0.000**
(95%Confidence Interval)	(4.85-5.45)	(5.06-5.43)		(4.52-5.35)	(5.82-6.31)	

F.N.: McNemar Chi-squared test was used to know the difference for all statements in ORK-10 and Paired T test was used to know the dif-ference in mean score between baseline and follow-up for both control and intervention group.

Table 3: Awareness regarding Obesity (Baseline Vs Follow up) (As per ORK-10)

Variables	Control (N=86)			Intervention (N=87)		
	Baseline (%)	Follow-up (%)	p value	Baseline (%)	Follow-up (%)	p value
Aware (score ≥ 5)	56 (65)	61 (71)	0.302	53 (61)	79 (91)	**0.000**
Not aware (score <5)	30 (35)	25 (29)		34 (39)	8 (9)	

F.N.: McNemar Chi-squared test was used to know the difference for all statements in ORK-10 between baseline and follow-up for both control and intervention group.

Figure 1: Knowledge regarding factors contributing to abnormal body weight (baseline vs. Follow-up)
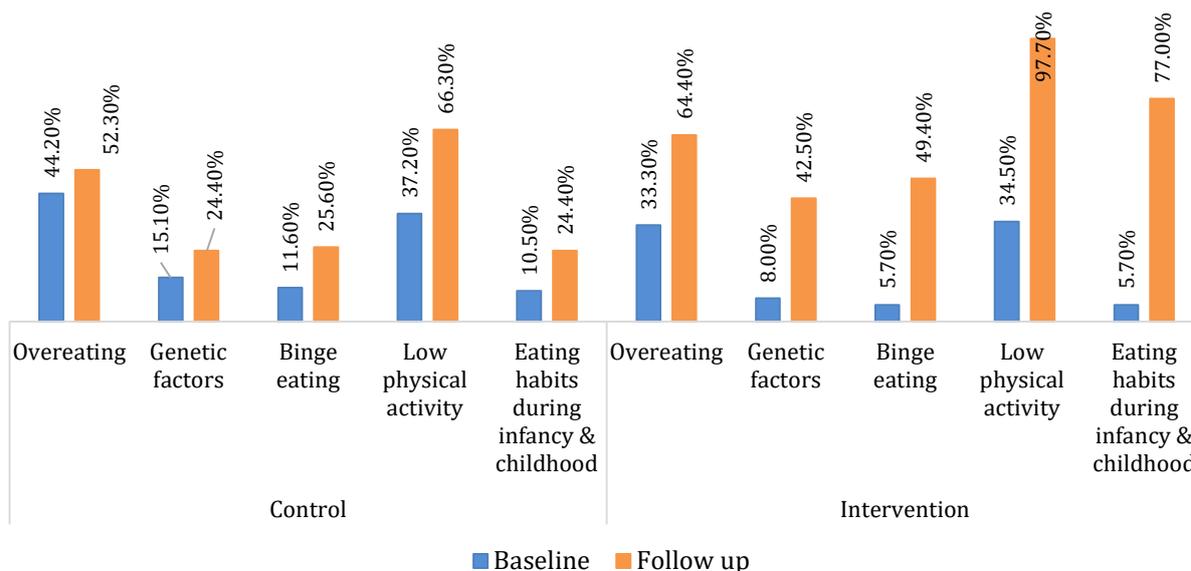

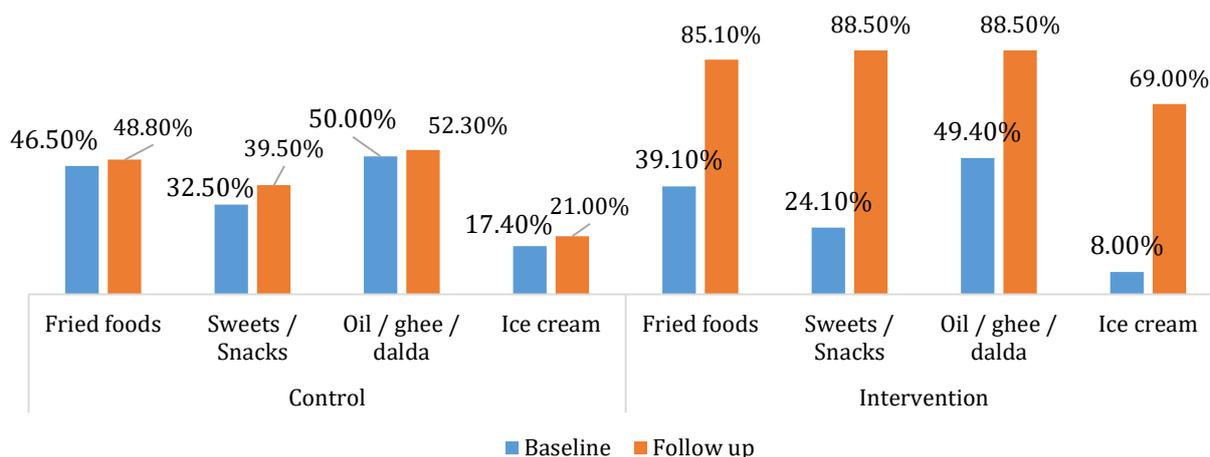**Figure 2: Knowledge regarding food stuff promotes weight gain (baseline vs. Follow-up)**

Figure 3: Knowledge regarding health problems due to excess body weight (baseline vs. Follow-up)
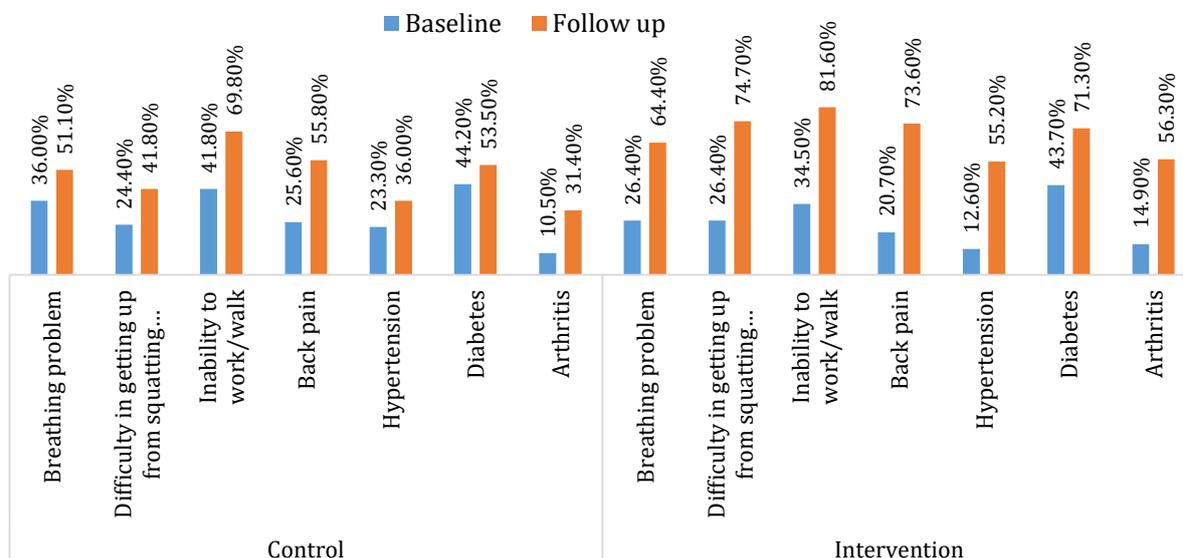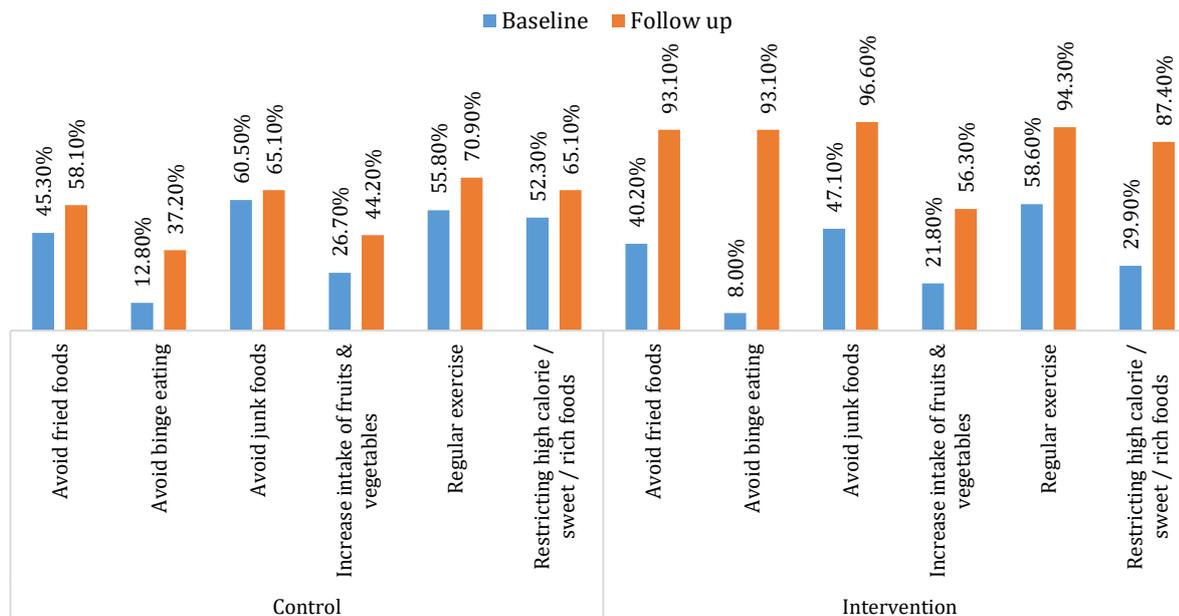
Figure 4: Knowledge regarding healthy practices to prevent obesity (baseline vs. Follow-up)

During follow-up after 1 year, mean score of ORK-10 of the students of control school was 5.21 ± 1.12 and in intervention school was 6.07 ± 1.28 (Table 2). There was significance increase observed in the total score in the students of intervention school (p=0.000). In seven out of ten questions, a significant increase was observed in the correct response among the students of intervention school. (Table 2)

Awareness measured by ORK-10 have been improved during follow-up. It was seen that 71% students in control school and 91% students in intervention school were considered to be aware about obesity as they had scored 5 or more. Significant improvement was seen regarding awareness among the students in intervention group (Table 3).

Initially low knowledge was observed regarding various contributory factors of obesity (at baseline) among the students of both the schools. During the follow-up, knowledge regarding factors contributing to abnormal body weight was improved in students of both control and intervention schools (p<0.05) (Figure 4). Response from the students of intervention school were- overeating (64.4%), genetic factors (42.5%), binge eating (49.4%), low physical activity (97.7%), eating habits during infancy and childhood (77%). (Fig 1)

When the students of the intervention group were asked about various foods which can promote weight gain, near 90% of the students of intervention group said fried foods, sweets/ snacks, oil/ghee/dalda, 69% said ice cream (Fig 2). Knowledge about foods promoting weight gain has been improved significantly among the students of intervention group (p<0.05).

Knowledge regarding health problems due to excess body weight improved significantly among students of both schools (p<0.05). Response from the students of intervention school were breathing problems (64.4%), difficulty in getting up from squatting position (74.7%), inability to work/ walk (81.6%), back pain (73.6%), hypertension (55.2%), diabetes (71.3%), arthritis (56.3%) (Figure 3).

It was observed that, 87.4% to 96.6% students of intervention school told avoiding fried foods, junk foods, sweets etc. and doing regular exercises can prevent obesity (Figure 4). Knowledge regarding healthy practices to prevent obesity was improved among students of both schools (p<0.05) except knowledge of avoiding junk foods for prevention of obesity among students of control group (p=0.125).

DISCUSSION

In this study, the mean age of the study participants was 13.46 ± 0.75 years. Among our study population 60.1% were male and 39.9% were female. Most of the participants (98.8%) were Hindus, which was similar to that reported (95%) in NFHS- 4 (2015-16) (7) for the state of Odisha. Participants belonged to SC and SEBC category was 4.6% which was less than that stated in NFHS- 4 report for Odisha.[7] This might be due to that students included in this study were from private schools in urban area. Among the students, 64.7% lived in nuclear family which was similar to the reported 64.1% in NFHS- 4 report for Odisha. No difference was found in education and occupation of parents of students in both schools.

Njelekela NA et al in their study found that knowledge about childhood obesity among school children was moderate and had negative attitude towards obesity.[8] In a study done by Triches R M et al[9], it was observed that obesity among school stu-

dents was found to be associated with limited nutrition knowledge and unhealthy eating habits and these children were five times more likely to be obese. In our study at baseline mean ORK-10 score was 5.05 ± 1.60 (control- 5.16 ± 1.46; intervention- 4.93 ± 1.73) and 63% students (control-65%; intervention-61%) considered to be aware about obesity as they had scored 5 or more. After the intervention, mean score of ORK-10 has increased significantly (p=0.000) and awareness also increased (61% to 91%) significantly (p=0.000) among the students of intervention school. In another study done by Alasmari H et al in Saudi Arabia, among the school students, mean ORK-10 score was 3.15 and 25.4% were considered to be aware.[10] This variation might be due to the difference of place of the study conducted. Different other studies had used ORK-10 to assess the knowledge regarding various aspects of obesity.[10,11,12] In this study a significant improvement was seen in knowledge regarding factors contributing to abnormal body weight, foods promoting weight gain, health problems related to obesity, healthy practices to prevent obesity among the students of intervention group. Students of control group also have gained knowledge regarding obesity that may be due to the education material provided to them and school academics. Knowledge of the adolescent students also found to be increased after 12 weeks of intervention done by Bayne-Smith M et al.[13]

Integrating educational programs on healthy lifestyle behaviour in schools may be an effective strategy to have impact on knowledge about obesity and other non-communicable diseases resulting in reduction in morbidity in adolescents and adults.

CONCLUSION

Interactive sessions by means of power point presentation and videos in English for 40 minutes each, one per week over 2 months were helpful to improve knowledge regarding different aspects of obesity assessed by using ORK 10 scale. Knowledge regarding different aspects of obesity has improved significantly in the adolescents. Knowledge regarding factors contributing to abnormal body weight, foods promoting weight gain, health problems related to obesity and healthy practices to prevent obesity during follow up in both schools but the proportions were much higher among the students of intervention school. So cost-effective, simple school-based intervention programs are needed as routine school activity to encourage the adolescents for reduction of obesity and related morbidities.

LIMITATIONS

The study included only private school students, so the generalization of the outcome of this study may be limited. Inclusion of the teachers directly in the intervention program might have improved the outcome of the study.

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