

Original Article

Effect of Educational Booklet and Lecture on Nutritional Behavior, Knowledge and Attitude on Third-Grade Male Guidance School Students

Mostafa Vahedian¹, Roya Sadeghi², Rohollah Farhadlu^{*3}, Azamossadat Nazeri⁴, Azizallah Dehghan⁵, Mohammad Hassan Barati⁶

¹. MSc in Epidemiology, Clinical Research Development Center, Qom University of Medical Sciences, Qom, Iran.

². Associate Professor, Department of Health Education and Promotion, School of Health, Tehran University of Medical Sciences, Tehran, Iran

³. MSc in Health Education, Clinical Research Development Center, Qom University of Medical Sciences, Qom, Iran.

⁴. Clinical Research Development Center, Qom University of Medical Sciences, Qom, Iran.

⁵. Research Center for Modeling in Health, Kerman University of Medical Sciences, Kerman, Iran.

⁶. Razi School of Nursing and Midwifery, Kerman University of Medical Science, Kerman, Iran

Received: 16/9/2013

Accepted: 3/2/2014

Abstract

Introduction: Most inappropriate healthy behaviors originate in the experience of childhood and adolescence, and healthy nutrition during maturity period plays an effective role in the human growth and health.

Materials and Methods: In this semi experimental study, the effect of various educational methods on nutritional knowledge, attitude and behaviors of guidance school students in Qom city was evaluated in the period of 2011-12 and compared by using a four-part questionnaire (demographic, knowledge, attitude and behavior characteristics). Three schools were selected by cluster sampling method and from each school, 110 students were randomly grouped (330 students) to control, booklet and lecture groups. Firstly, the questionnaires were completed by students as a pretest and then nutritional educational program was performed for three groups in three sessions; and three months later the same questionnaires were used.

Results: Interventions caused a significant increase in the mean scores of knowledge, attitude, and behavior of two experimental groups ($P < 0.05$) although this difference was not statistically significant in control group ($p > 0.05$). The mean differences of knowledge and attitude sections in lecture group were more statistically significant than booklet group ($p < 0.05$).

Conclusion: Both educational methods increased the level of nutritional knowledge, attitude, and behaviors of students and it was more significant in lecture group. Collectively, the results of this study demonstrated positive effects of educational health programs on promotion of nutritional knowledge, attitude, and behaviors of students. Therefore, it is necessary to consider educational programs in order to improve nutritional behavior.

Keywords: Nutritional Status; Health Education; Health Knowledge, Attitudes, Practice

* **Corresponding author; Tel/Fax:** 00989127575116, **Email:** Rfarhadlu@yahoo.com

Introduction

Adolescence is the transition from childhood to youth, which is accompanied with spurt physical growth and maturity. This period is one of the most challenging periods of human growth. In this phase, the steady growth of infancy will increase abruptly^[1].

Appropriate foods should be prepared for children in the middle of childhood period (8 to 13 years old) in order to facilitate rapid growth of adolescence period; hence the attention to children's nutrition is of great importance^[2]. Now the adolescent population of the world is 1200 million^[3]. Adolescents make up for the 20% of the total population of the world, of which 84% live in developing countries^[4]. About 20% of height growth and 50% of weight gain of adults are acquired in adolescence^[5]. According to aforementioned figures, children are considered as a comprehensive population, who are in priority for interventional strategies. Since weight loss is very difficult as an adult, preventive strategies should be determined on children^[6].

Dietary patterns of adolescent are formed during this period, which can affect adolescents' food needs and receiving diets^[7]. The nutritional habits of adolescents are different from other age groups. This group inclines to skip meals, eat junk foods, convenience food, following diets to lose weight, and irrational regimes^[8].

Comparing the parents and adolescents, adolescents consume more junk and fast foods

and less dairy^[9]. Adolescents tend to consume meals with their friends outside. Fast foods are convenient and there is a strong tendency to omit main meals and consume industrial snacks. These dietary habits can continue in adulthood and subsequently affect dietary behaviors and the amount of nutrient intake^[10].

Prevention of obesity in adolescence is one of the most important health issues. According to the obtained results from the study of sugar and lipid in Tehran, 18 % of adolescents suffered from overweight or obesity and 12-18% of teenagers between 11-19 years old had hyperlipidemia with the cholesterol level above 200 mg/dl^[11].

In Iran, obesity is more prevalent in adolescence. According to the reports of WHO in 1988, Iran is amongst the first seven countries in the world in terms of the high incidence of obesity during adolescence^[12].

Obesity in adolescents between 12 -18 years old not only causes depression and threats psychological health, but also it can cause several complications such as cardiovascular diseases, hypertension, diabetes mellitus, colon cancer, and osteoarthritis in adulthood^[13].

On the other hand, a study in Iran revealed that 12% of adolescents suffer from chronic energy deficiency based on body mass index and 16% suffer from anemia^[14]. In another

research, the prevalence rate of malnutrition amongst Shahrod city students based on weight for age, height for age, and weight for height were 6.6%, 8.1%, and 5.9%, respectively ^[15]. Also, inappropriate food habit is one of the most important factors affecting the development of nutrient mineral deficiency specially calcium, vitamins B6, A, C, and obvious or hidden malnutrition and subsequently can cause behavioral changes in human ^[16].

Although general training is considered with the purpose of increasing people's nutritional knowledge, there is a significant gap between what is recommended as received foods and what we see as practical nutritional behaviors. If health enhancement programs are designed based on current knowledge, attitude, and behavior of people, it can be successful in the terms of healthy nutrition ^[11].

Appropriate nutritional behavior regarding healthy nutrition principals require adolescent's awareness in this field. Although knowledge is not the same as behavior, it can be considered as a determining factor in nutritional behaviors ^[17]

Correction of nutritional behaviors in the childhood and adolescence periods, which are accompanied with ever-increasing stages of growth can have lots of benefits. These benefits include appropriate designing and implementation of the nutritional programs in schools in order to remove nutritional problems and provision of health in this age

group, which can help to increase attention and concentration of students during learning process and improve their performance by eliminating short-time or transient hunger in students with malnutrition ^[18]. Also, research works have demonstrated that the behavior and health of those children whom did not consume breakfast in long-term are affected. Adolescence is considered as an important period of life, which is accompanied by basic education. In this period of life, nutrition and health are of great importance to make the maximum use of educational opportunities ^[19].

The appropriate and nutrient snacks during school hours are very important, because around the noon even the students who have eaten breakfast become hungry and this hunger might cause them to attend their classes without necessary concentration for learning, but the quality of their performance and learning ability will increase by consumption of appropriate snacks ^[20]. There is no doubt that children who participate in health education and take an active role will reach a better perception of these concepts ^[21]. Since most food habits are formed and fixed in adolescence, it is important to pay attention to nutritional knowledge, attitude, and behavior of adolescence ^[18]. The importance of health education in schools is highlighted because of following reasons:

- 1) Children are more capable of learning
- 2) Adequate educational factors are accessible

3) The compulsory presence of students improves the efficacy of educational programs

4) Increasing the number of students can lead to expanding dimensions of education

The relationship of students with their family and relatives can extend the educational issues ^[22]. This study compares the effect of two nutritional educational methods by evaluation of nutritional knowledge, attitude, and behaviors of adolescents in Qom city, specially for guidance school students and suggests appropriate educational methods to decrease threatening nutritional behaviors based on the role of knowledge and attitude in improvement of behaviors.

Materials and Methods

This semi experimental study investigates the effect of two educational methods. One of these methods is using educational booklet, which is considered as one of the most prevalent methods and presents the knowledge and experience, integrally and completely. If this method is accompanied with comprehensive interest, it can lead to increase of knowledge and change of attitude.

Another method consists of lecture, question and answer, and poster. It can be an effective method in increasing the knowledge and attitude of students by using interesting techniques (like poster in this study), presentation of lecture, and questioning about issues misunderstand by audiences or the ones

which have not been discussed and remained as a gap in audience mind.

This study was interventional. The evaluated participants in this study were the governmental third-grade male guidance school students in Qom city in 2011-12. The necessary sample size for this study was determined 95 persons with confidence interval of 95% and capacitance test of 80%, but the sample size in each educational group reached 110 persons (330 people totally) because of probability of 10% outflow. Multi stage cluster sampling method was used in this study. At First, four regions were selected randomly from 4 accessible regions. Then amongst governmental male guidance schools in this region, three schools were selected randomly and from each school, 3 classes of third-graders with 34 students in each were chosen. Of these schools, 2 were grouped randomly in experimental groups and one of them in control group.

A four-part questionnaire was used in order to obtain related data. This questionnaire includes demographic, knowledge, attitude, and behavioral parts. The general questionnaire consisted of 12 questions related to demographic, social, and economic information. Knowledge questionnaire consisted of 15 multi choice questions and attitude questionnaire including 12 questions with Likert scale. The behavior questionnaire comprised of 2 parts: 1- 30 optional checklist 2- assessment of nutritional behaviors with 10 questions. The maximum acquirable scores

from knowledge, attitude and behavior questionnaires were 15, 48 and 50, respectively.

Content reliability was used to determine validity of the questionnaire. For determination of reliability, the questionnaires were completed by 30 students in addition to students participated in the study.

Alfa Cronbach coefficient was 0.84, 0.75, and 0.71 for knowledge, attitude and practice parts, respectively.

Studied independent variables included family dimension, type of home ownership, education level and occupation of father, education level and occupation of mother, grade point average, number of rooms, amount of allowance, extra curriculum programs and history of weight loss diets.

After orientation of students about how to complete the questionnaire and answering their questions regarding this issue, the demographic, knowledge, attitude, and behavior questionnaires were distributed. In order to implement educational interventions, the content of educational booklet was determined by using educational books, valid journals, and articles so that several important nutritional aspects in adolescents (including inappropriate snacks, high lipid, sugar, calorie, junk and convenience food and less vegetable and fiber consumption, fast eating) were determined according to investigations^[23, 24].

After determination of mentioned parameters and learning capacity of third-grade male guidance school students, the educational content was determined for both educational methods. Then, specific educational method was implemented in all groups except control group.

The implemented educational programs were in such a way that in booklet group, some explanation was given to students about the importance of issue, and then by developing motivation and interest for studying the booklets (giving presents or gifts to students who answer the questions correctly after studying booklets on next session), the booklets were distributed amongst students within 2 sessions and in 2 books.

In lecture and question and answer groups, the training was done during lecture sessions and presenting posters in order to create the sense of curiosity and interest in students and question and answer sessions were held in three one- hour sessions. After 3 months of educational methods, the knowledge, attitude, and behavior questionnaires were distributed between three groups again.

Statistical tests applied in this research included: descriptive statistics, paired sample t-test, ANOVA test, Correlation coefficient and logistic regression model which were done by SPSS 16 software and a value of $P < 0.05$ was considered statistically significant.

Results

All Participants were 15-year old, and were similar in terms of demographic variables such as education level, occupation of father and mother, family income, amount of allowance, the number of home rooms and residence and there were no significant difference between them ($p>0.05$).

According to the result of ANOVA test, the average knowledge score before intervention in control group was a little more than lecture and booklet groups, so that the difference of the mean knowledge scores between booklet and control groups was in significant level of $p=0.01$ and between lecture and control group was $p=0.01$. But after educational interventions the mean knowledge score in lecture and booklet groups increased significantly, so that the mean difference between control and

booklet groups and lecture and control groups reached a significant level of $p=0.001$ and there was a significant difference between 3 groups ($F=50.32$, $p=0.001$). Also there was no significant difference ($p=0.672$) between booklet and lecture groups before educational interventions, but three months after educational interventions, the mean knowledge score significantly increased in lecture groups in comparison with educational booklet and control group ($p=0.001$).

In conclusion, the test revealed that although there was no significant difference in control group regarding level of students' knowledge after 3 months, in other two groups, both methods of education caused significant increase in nutritional knowledge, which was more evident in lecture group. (Table1).

Table 1: Mean and standard deviation of knowledge scores before and after training course according to educational groups

	Before		After		P-Value
	Mean	SD	Mean	SD	
Control Group	7.49	2.09	7.50	2.07	P=0.969
Educational Leaflet	8.72	1.68	9.42	2.18	P=0.005
Lecture& Poster	8.51	1.97	10.47	2.41	P=0.000
P-Value	P=0.01		P=0.01		

In assessment of students attitude changes, ANOVA test revealed that there was no significant difference ($p=0.45$) between three groups before educational interventions regarding the mean attitude scores. But three

months after educational intervention, the mean nutritional attitude score increased significantly ($F=15.46$, $p=0.001$) in comparison to the first stage. Although there was no significant difference ($p=0.653$) between the

mean attitude scores in control group after three months, there was a significant increase in the mean attitude scores in educational booklet ($p=0.003$) and lecture group ($p=0.000$),

so that this difference in lecture group was more significant in comparison with control and booklet groups ($p=0.000$) (Table 2).

Table 2: Mean and standard deviation of attitude scores before and after training course according to educational group

	Before		After		P-Value
	Mean	SD	Mean	SD	
Control Group	35.40	6.63	35.74	5.46	P=0.653
Educational Leaflet	35.91	6.38	38.14	5.69	P=0.003
Lecture& Poster	36.49	6.39	39.84	5.31	P=0.001
P-Value	P=0.45		P=0.001		

ANOVA test demonstrated that there was no significant difference ($p=0.71$) between the mean behavior scores before educational interventions amongst three groups. Three months after educational interventions the mean behavior score in lecture group

significantly increased in comparison with the former level ($P=0.01$) and with control group ($P=0.01$) but this difference was not significant in comparison with booklet group ($P=0.965$) (table 3).

Table 3: Mean and standard deviation of practice scores before and after training course according to educational group

	Before		After		P-Value
	Mean	SD	Mean	SD	
Control group	33.47	6.27	34.15	4.8	P=0.361
Educational Leaflet	34.7	5.63	35.67	4.15	P=0.01
Lecture& Poster	33.94	4.89	35.70	4.85	P=0.01
P-Value	P=0.018		P=0.71		

Discussion

The results of this study showed that there was no significant difference in the level of student knowledge in control group after three months. Both educational methods led to a significant increase in the level of nutritional knowledge, attitude, and behavior of students in two other groups. The mean difference in knowledge scores in lecture and question and answer groups, was significantly more than educational booklet group ($p < 0.05$).

There was no significant difference in the mean attitude scores in control group after three months ($p = 0.653$). The mean attitude scores significantly increased in educational and lecture groups, so that this difference in lecture group was significantly more than educational booklet and control groups ($p < 0.05$).

Taslimi conducted a study in order to compare the effect of two nutritional educational methods on knowledge, attitude and behavior of first grade guidance school female students in Tehran. After 4 weeks of implementing 2 educational methods (educational booklet and group discussion), it was observed that attitude scores in educational booklet group intervention were significantly different before and after the intervention ($P = 0.001$)^[25].

In a study conducted by Mohammad Pour in order to determine the effect of educational booklet on attitude of groups after intervention, there was no significant difference ($P > 0.05$)^[26].

There was no significant difference in the mean behavior scores before educational intervention between three groups ($p = 0.71$) but in lecture group the mean behavior scores increased significantly three months after educational intervention in comparison with former intervention ($p = 0.01$) and with control group ($p = 0.01$), although this difference was not significant in comparison with booklet group ($p = 0.965$).

According to mentioned results, it can be concluded that in the current study, both methods of training were effective in increasing the level of nutritional knowledge, attitude, and behavior of students, but the question and answer and lecture methods (with poster) were more effective in increasing the level of knowledge and attitude, due to several advantages including mental activation and promotion of some skills such as innovative thinking and active participation in learning^[27].

The results of other studies regarding the level of nutritional knowledge and attitude of people before and after education and the difference in knowledge and attitude after education are congruent with the results of the current study. Also, in another study, to compare two nutritional training methods about breakfast on knowledge and behavior of female fourth-grade elementary school students of six regions in Tehran in 2002, there was a significant difference in the mean

difference scores between three groups, so that this increase in knowledge scores of educational lecture group ($p=0.001$) was more significant than control and booklet groups^[28].

In another study conducted to compare the effects of two health education methods (booklet and group discussion) for prevention behaviors of obesity on 280 governmental elementary students of first region in Tehran in 2006-2007, the results demonstrated that interventions caused significant increase in mean knowledge and attitude scores of both groups ($p=0.001$).

The mean difference of knowledge score in discussion group was significantly higher than educational booklet group ($p=0.001$). Both training methods caused significant increase in nutritional knowledge and attitude in their awareness of obesity in elementary students, which was more significant in discussion group^[29]. Byrd-benner et al conducted a study to determine the effect of nutritional education on nutritional knowledge and attitude of students and results revealed that interventional group significantly acquired more knowledge scores ($p=0.001$)^[30].

In a study in New Orleans, which was conducted to determine the effect of education on the level of knowledge, attitude and behavior about consumption of vegetables and fruits by implementing educational workshop for correction of schools nutrition habits, the level of knowledge and attitude in experimental group was significantly more

than control group ($p=0.001$)^[31]. Based on a study conducted by Kim et al on children, after implementation of nutritional education interventions, there existed a significant increase in the mean knowledge ($P<0.005$), perception ($P<0.005$), and behavior ($P<0.005$) scores in intervention group in comparison with control group^[32], which is congruent with the results of current study. Fahlman et al conducted a study on awareness of guidance school students and observed a significant increase in nutritional knowledge scores in intervention group in comparison with control group, which improved their behavior and increased self-efficacy of control group^[33] that is in congruent with current study. Other studies found similar results^[34-36]. The limitations of this study were lack of parents' (especially mothers') cooperation because of the problems with gathering them for simultaneous education of parents and children.

Conclusion

However, education in different aspects has significant effect on nutritional knowledge, attitude, and behavior of students, but based on the result of the current study and other similar studies, adding educational contents related to healthy nutrition to educational books, serious attention toward this issue in the class, practical cooperation of parents (specially mothers) in order to increase their knowledge and attitude, and correction of nutritional behaviors in students seems necessary due to

weakness of nutritional knowledge and attitude

of students.

Acknowledgmnt

Authors would like to appreciate the heads of research department of education in Qom

and the heads of the departments of education in fourth region and the heads of schools who were of great help in this study.

References

1. Sajjadi P, Foroozani M. Nutritional Status Assessment and Comparison of 14 - 18 year old girl students of governmental and non-profit high schools in Babol in 1373-74. The fifth Iranian nutrition congress articles abstract. 2000. P. 105 [in Persian].
2. Hoseini Poorabdollahi P. The nutrition problem of children in school ages. *zeitoon scientific and cultural journal*. 1998; 2(2): 24 [in Persian].
3. Fallah H, Keshavarz A, Hoseini M, et al. Survey of Nutritional Status of 11 - 14 year old students of governmental schools in Damghan. *Semnan Med-Sci University Magazine*. 2006; 7: 53-60 [in Persian].
4. Pour Aram H, Aminpour A, Kalantari N, et al. Anthropometric indices of weight, height, fat under the skin and body mass index (BMI) in girls' high school students in urban and rural AstanehAshrafieh in academic year 79-1378. *Med-Sci College Magazine of Gilan Med-Sci University*. 2003; 12: 52-60 [in Persian].
5. DoostMohamadian A, Keshavarz A, Dorosti A, et al. Evaluate the nutritional status and the relationship between physical activity and dietary attitudes with body mass index of 14-18 year old high school girls in Semnan. *Magazine of Semnan Med-Sci University*. 2005; 6(3):187-94 [in Persian].
6. Anderson JB. The status of adolescent nutrition. *NutrToday*. 1991; 26(2):7-10.
7. Dehghan M, Danesh N, MerchantAT. Childhood obesity prevalence and prevention. *Nutrition Journal*. 2005;24(4):1-8 [in Persian].
8. Morgan SL, Weinsier RL. *Fundamentals of Clinical Nutrition*. 2nd ed. Missouri: Mosby. 1998;17: 96-101.
9. Dadkhahpiraghaj M, Omidvar N, Mehrabi Y. Familial similarities in weekly food frequency consumption: comparison of adolescents girls (15-17 year) with their. 2009;14(2):21-8 [in Persian].
10. Story M, Neumark-Sztainer D, Frerch S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc*. 2002; 102 (3): 40-51.
11. Azadbakht L, Mirmiran P, Momenan A, Azizi F. Assessment of the knowledge, attitude and performance of high school students in district No.13 of Tehran about healthy nutrition. *IJEM*. 2004;5: 416-409 [in Persian].
12. Dehghan M, Akhtar-Danesh N, MerchantAT. Childhood obesity, prevalence and prevention. *Nutr J*. 2005; 4:24.[in Persian].

13. Salem Z, Vazirinejad R. Assessment of anthropometric indices in guidance and high school girls of Rafsanjan in 1386. *Hormozgan Med Magazine*. 2009; 13: 47-53 [in Persian].
14. Amani R. Survey of Lifestyle-related nutritional aspects of girl students in dormitories of Ahwaz Universities. *Ahwaz Med -Sci Magazine*. 2004; 42: 54-61 [in Persian].
15. Elvarianzade M, Hoseinzade S. Evaluation of Shahrood school students' nutritional status and its effective factors in 1383. *Scientific Magazine of Semnan Med- Sci University*. 2005;7: 34-7 [in Persian].
16. Ries CP, Kline K, Waver SO. Impact of commercial eating on nutrient adequacy. *JAmeriCDieteAssoc*. 1987;87:463-68.
17. Hoobine M A, NazarieHesari S, Hosein D, et al. Evaluation of Ahwaz high school girls' nutritional knowledge and education effect on it. *JournalofBirjand Med-Sci University*. 2008; 16: 23-31 [in Persian].
18. Afrooz Q. *Issues in psychology and education of children and adolescents*, 1st Edition. Tehran: Olia o Morabian Pub; 1992; 12-26 [in Persian].
19. Ghasemi H .Physical growth of school child in city and village.1984;4(6):222[in Persian].
20. Ooth M, Okely A, Denney Wilson E, et al. NSW Schools Physical Activity and Nutrition Survey (SPANS). Sydney: NSW Department of Health 2010;13:1-41.
21. Poorabdollahi A, GhaemmaghamsiSG. The evaluation of nutritional habits in Tabriz primary student .The Third congress of Iran Nutrition,Isfahan Med- Sci University1994.
22. Khalag M ,Mohammadizeidy E. The evaluation of nutrition education on the knowledge and practice of primary school students in ghazvin, *journal of Shahrekord Medical science*. 2006;8(1):41-9[in Persian].
23. Egger G, Pearson S, Pal S. Individualising weight loss prescription -a management tool for clinicians. *Clinical practice*. 2006; 8: 591-4.
24. Dorosti A, Tabatabaei M. Realation of nutritional factors and obesity in the primary students of ahwaz 82-83.*Tehran Med Magazine*. 2005;15(1):7-17[in Persian].
25. TaslimiM, Jazayeri A, Keshavarz A, et al. Comparison between the effect of two methods of health education (booklet and group discussion) on the guidance school girls nutritional knowledge,attitude and practice in Tehran. *Magazine of Tehran Med-sci University*. 2004 [in Persian].
26. MohammadpoorAhrangani B. Evaluation of the effect of booklet on the guidance school girls nutritional knowledge,attitude and practice in Tehran. *Magazine of Tehran Med-sci University*. 2000[in Persian].
27. Safari M ,ShogaeiZadeh D. Theories,models and methods of Health education and promotion . pub:sobhan. 1391: 23-4.
28. Angoorani P. Comparison between the effect of two methods of health education (booklet and lecture)aboutbreackfast on knowledge and behavior in primary school girls students in tehran82-83. (Dissertation for MA degree of Health Education), Med-sci University of Tehran. 2003;17(1):58-69 [in Persian].
29. Soleimanekhtiary Y, Shojaezadeh D, Zeraati H. Comparison between the effect of two methods of

- health education (booklet and group discussion)for prevention behaviors of obesity in primary school students in tehran2007. Magazine of Yazd Med- Sci University. 2008;13(6): 1-10 [in Persian].
30. Byrd- Bredbenner CO, Connell LH, Shannon B, et al. A nutrition curriculum for health education: Its effect on student's knowledge, attitude and behaviour. *J Sch. Health.* 1984; 54:385-8.
 31. Nicklas TA, Johnson CC, Farris R. Development of a schoolbased nutrition intervention for high school students: Gimme 5. 1997 ;11(5):315-22.
 32. Kim K, Chung M. Implementation and evaluation of nutrition education program for children. *J Sch Health* 2008 . (4) : 216-21.
 33. Fahlman MM, DakeJA, McCaughtry N, et al. A pilotstudy to examine the effects of a nutrition intervention on nutrition knowledge, behaviors, and efficacy expectations in middle school. *J Sch Health.*2008; 78(4):216-22.
 34. Sahota P, Rudolf MC, DixeyRHill AJ. Randomised controlled trial of primary school based intervention to reduce risk factors for obesity.*BMJ.* 2001; 323:1-5.
 35. Caballero B, Clay T, Davis SM, et al. Pathways:a school-based, randomized controlled trial for the prevention of obesity in American Indian school children. *Am. J. Clin Nutr.* 2003; 78:1030-8.
 36. Kanani S, Agarwal V, Daxini M. Nutrition communication alone can improve behaviours and nutritional status of school girls in early adolescence(8-13years). *Department of Foods and Nutrition* 2002;14(3):25-31.