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Effectiveness of Snack-centered Nutrition Education on Promoting Knowledge, Attitude, and Nutritional Behaviors in Elementary Students

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Abstract

Background: Unhealthy nutrition at early years of life causes some diseases such as cardiovascular diseases, cancers, diabetes, gastrointestinal disorders, and bone and joint diseases during adulthood. In other words, many of wrong health behaviors are rooted in childhood experiences. This study was conducted to examine effect of interventional programs on knowledge, attitude and nutritional behavior of students at 5th grade of elementary schools.

Materials and Methods: This is an experimental study in which, 168 elementary female students (in Paveh city, Iran) were assigned randomly to two experimental (n=84) and control (n=84) groups. A valid questionnaire was used as data collection tool. Pretest was done in both groups. According to results obtained from pretest, educational intervention was implemented in 2 sessions holding health food festival and classes for intervention group. Each session continued for 30-45 minutes. Two months after intervention, questionnaires were redistributed among two experimental and control groups to evaluate knowledge, attitude, and performance of participants. The obtained data were analyzed through SPSS 16.0 software.

Results: Results showed a significant increase between means of knowledge scores and attitude level of students toward snack in experimental and control groups (p=0.008). Also, compared with control group, there was a significant improve between mean scores of snack-related behaviors in experimental group after educational intervention (p=0.04).

Conclusion: Since, this study confirmed effectiveness of snack-centered nutritional education on increasing knowledge, attitude, and nutritional behaviors of students, it is recommended to design and implement suitable interventional programs to improve nutritional awareness, attitudes, and behaviors of students.

Key Words: Attitude, Education, Knowledge, Performance, Nutrition, Snack, Student.

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1- INTRODUCTION

Plenty of behavioral patterns of adults and their eating habits are formed in childhood and cannot be changed simply during adulthood. Since quality and quantity of eating pattern plays a vital role in health or outbreak of diseases, it is required to consider formation of eating patterns and habits among children (1). Eating passions of children are just influenced by family environment before entering to school, but their eating habits change gradually when they are at school several hours of day far away home besides peers (2). In this case, children are exposure to risk of cardiovascular diseases, cancer, and diabetes (3). Quality of favorite feeds of children is debatable since they are full of sugar, fat, and salt and have no valuable substances such as vitamins and minerals (4). Such snacks and feeds are the beginning points of disagreement between eating pattern of parents and children (5, 6).

Necessary foodstuffs should be given to children at middle years of childhood (8, 11-15) for their growth; hence, importance of child nutrition is more considerable during these years (7). Health nutritional patterns in these years prevent from some problems such as anemia, obesity, digestive, disorders tooth decay in the short term and chronic and dangerous diseases in the long term (8-10). Unhealthy nutrition has 35% contribution in death because of cancer; on the other hand, unhealthy snacks may lead to obesity among children due to their high level of energy accumulation in body. According to various studies, prevalence of obesity in increasing among children and adolescences living in developed and developing countries (11), so that this is one of significant factors in advent of this problem, quality and quality of snacks, and daily consumed snacks; however, health snack can increased learning capacity and ability among students (12). Also, researches indicate that those children who do not eat breakfast have not a suitable health status and behavior. Early years of school is an underlying period of life since basis educations form at these years in which, nutrition and health are important elements to use maximum level of educational opportunities (13). Undoubtedly, if children are involved in health education and play an active role, they will better understand these concepts (14). Involvement of children and students in modification of health status is one of aspects of public participation in such trend. This study was conducted to examine effect of snack-centered nutrition education on nutritional awareness, attitude, and behaviors of elementary students in Paveh city, Iran.

2- MATERIALS AND METHODS

2-1. Study design and Sampling

This is an experimental study (before-after design) with statistical population consisting of all female students at fifth grade of elementary schools in Paveh city, Kermanshah province, North West of Iran; number of these students was equal to 168 during academic year of 2016. Research environment was all female schools (7 schools) in Paveh city. Sample selection was not required due to limited number of samples. In fact, census sampling was applied and all female students at 5^{th} grade of elementary schools were chosen as sample size. Samples assigned to two experimental (n=84, 5 schools), and control (n=84, 2 schools) groups randomly. There were 168 students in 7 classes in 7 schools of Paveh city that all of them participated in research based on their consent.

2-2. Instrument

Data were collected through questionnaire that its scientific validity and reliability was confirmed in previous study (5). It

consists of knowledge (25 items), attitude (9 items), and nutritional behaviors (6 items). To obtained validity of questionnaire, face and content validity methods were employed using 6 experts in nutrition and health education; then, questionnaire was revised after collecting corrective opinions and its validity was confirmed. Results of reliability estimation indicated acceptable alpha coefficient for total of questionnaire (α=0.71).

Also, alpha coefficient for all variables of study was acceptable indicating standard form of questionnaire. To collect data, required licenses were obtained and there was a meeting with teachers to explain objectives of plan then experimental and control groups were selected randomly and relevant questionnaires were distributed among female elementary students based on a predetermined program.

2-3. Intervention

Educational content including nutritional program of students were presented as lecture, question and answer using leaflet and pamphlet within ten 30-45 minutes sessions (2 sessions per class) for experimental group. Content of distributed leaflets and pamphlets included nutritional advices for students, healthy food, and hints to what we should eat and what we shouldn't eat. Moreover, a one-day festival for healthy snack was hold with participation of students, teachers, and principles then three awards were given to students. Students of control group received no any education. Two months after intervention, questionnaires were redistributed among experimental and control groups to compare snack-related knowledge, attitude and nutritional behaviors of students in two groups.

2-4. Inclusion and exclusion criteria

Inclusion criteria consisted of being female elementary student and having propensity participate in study. Exclusion criteria were no participation in intervention or post-test that there was no excluded student.

2-5. Ethical consideration

In this study, participants entered to the research voluntary and based on their consent and they were sure about confidentiality. Coding was used in questionnaire instead of name of people. After the end of study, the educational content used for experimental group was given to control group.

2-6. Data analysis

To analyze data, descriptive and analytical statistics were used through SPSS software version 16.0; all collected data were analyzed using frequency distribution tables, Chi-square, independent t- test, and paired t-test.

3- RESULTS

Students on two experimental and control groups were compared to each other considering demographic features. There was not any significant difference between 2 groups (**Table.1**). Majority of students' fathers had university degree (51.2% in experimental group, and 42.9% in control group); while, in mothers' literacy this situation was for guidance school (48.8% in experimental group and 32.1% in control group). Also, the majority of mothers were housewife (85.7% and 82.1% in experimental and control groups, respectively).

Table-1: Demographic properties of studied elementary students in two experimental and control groups

Variables		Experimental Group	Control Group	P- value*
		Mean ± SD	Mean ± SD	
Mother Age		37.24 ± 5.171	36.71 ±5.542	0.527
Number of Family Children		2.35 ± 0.938	2.11 ±0.836	0.084
		Number (%)	Number (%)	P- value**
Father's Literacy	Illiterate	0 (0)	0 (0)	0.174
	Primary	1 (1.2)	6(7.1)	
	Guidance School	18 (21.4)	15 (17.9)	
	High School and Diploma	22 (26.2)	27 (32.1)	
	University	43 (51.2)	36 (42.9)	
Mother's Literacy	Illiterate	4 (4.8)	11 (13.1)	0.117
	Primary	12 (14.3)	18 (21.4)	
	Guidance School	41 (48.8)	27 (32.1)	
	High School and Diploma	20 (23.8)	21 (25)	
	University	7 (8.3)	7 (8.3)	
Father's Job	Worker	18 (21.4)	24 (28.6)	0.127
	Employee	24 (28.6)	31 (36.9)	
	Self employed	42 (50)	29 (34.5)	
Mother's Job	Housewife	72 (85.7)	69 (82.1)	0.181
	Employee	8 (9.5)	14 (16.7)	
	Self employed	4 (4.8)	1 (1.2)	

* Chi-square, ** Independent t- test

According to findings, there was a significant difference between two experimental and control groups in terms of mean and standard deviation (SD) of scores of knowledge, attitude, and nutritional behavior of students, 2 months after educational intervention. According to scores of knowledge, attitude, and nutritional behavior of students in experimental and control groups before and 2 months after intervention, there was a significant increase in experimental students, while there was not any change among students of control group (**Table.2**). Results related to comparison between scores of snack-centered scores of students in control and experimental groups before and 2 months after intervention are indicated in **Table.3**.

Table-2: Mean scores of awareness, attitude, and nutritional behavior of elementary students in control and experimental groups before and 2 months after educational intervention

Variables		Before intervention	Two months after intervention	P- value (paired t test)
		Mean± SD	Mean± SD	
Knowledge	Experimental	23.96+10.139	25.523+4.744	0.036
	Control	24.93+2.979	25.12+4.077	0.787
P- value (t-test)		0.638	0.034	
Attitude	Experimental	20.90+4.199	22.19+3.228	0.008
	Control	21.24+3.346	21.86+3.723	0.761
P- value (t-test)		0.638	0.034	
Behavior	Experimental	21.98+6.594	26.95+5.516	0.040
	Control	23.67+6.989	23.88+7.135	0.759
P- value (t-test)		0.132	0.000	

Table-3: Mean scores of nutritional behavior of students in control and experimental groups before and 2 months after educational intervention

Variables		Before intervention Mean + SD	Two months after intervention Mean + SD	P- value (paired t test)
Junk food consumption	Experimental	5.59+1.844	6.44+1.856	0.033
	Control	6.02+1.921	6.35+1.869	0.473
P. value (t-test)		0.262	0.037	
Diary consumption	Experimental	2.12+1.600	3.91+1.986	0.037
	Control	2.44+1.666	2.59+1.717	0.585
P. value (t-test)		0.698	0.031	
Consumption of meat and substitutions	Experimental	3.76+1.220	4.28+1.031	0.029
	Control	3.88+1.187	4.91+1.258	0.447
P. value (t-test)		0.483	0.037	
Consumption fruits and vegetables	Experimental	3.85+2.877	5.19+2.566	0.038
	Control	4.17+2.747	4.28+2.693	0.609
P. value (t-test)		P=0.856	P=0.028	
Dehydrated consumption	Experimental	3.49+1.705	4.26+1.432	0.035
	Control	3.76+1.593	3.48+1.661	0.568
P. value (t-test)		0.820	0.028	
Consumption of bread and cereals	Experimental	3.17+1.687	3.88+1.451	0.033
	Control	3.21+1.536	3.46+1.583	0.766
P. value (t-test)		0.457	0.041	

4- DISCUSSION

This study was conducted to examine effect of nutritional education on knowledge, attitude, and nutritional behavior of female students at fifth degree of elementary school educating in Paveh city, Iran, during 2016 and 2017. According to the obtained results, there was a significant difference between mean score of knowledge, attitude, and nutritional behavior among students in experimental group before and after intervention; while there was no significant difference in control group. These findings are in line with results conducted by Khalaj and Mohammadi Zeidi (2006) which indicated increased knowledge and nutritional functioning of students after educational program; hence educational program had a positive effect on change in behavior of eating breakfast (2). Also, results of present study are matched with findings of Kohri and Kaba (Japan), they reported that educational intervention about snack among elementary schools contributed to improved quality and quantity of snack selection and these effects continued for more than one year and 6 months (15). Bordbar (1996) conducted a study at district 2 of Tehran, Iran entitled effect of education on eating habits and awareness level of students at fourth and fifth elementary schools indicating effect of such nutritional education on eating habits and awareness of students about nutrition (16). Also, Alizadeh Sivakil et al. (2011) conducted a study in Torbat Heidarieh, Iran, obtained very similar findings with findings of present study; they showed that knowledge level and functioning increased significantly after intervention (17). Results of present study are similar with results obtained from study conducted by Fathi et al. in which, effect of nutritional education on reducing unhealthy snack consumption among elementary students in Qom based health belief model; according to their results, nutritional education program based on health belief model could reduce consumption of unhealthy snacks (18). A study was conducted by Ismaili et al. entitled effect

of nutritional education on awareness, attitude and performance of junk food consumption among female elementary students in Shahr-e-Kord, Iran during 2017; they indicated a significant difference between knowledge levels, attitude, and performance after intervention in students (19). Colizza and Colvin (1995) reported same results after studying 127 students (10-12 years old) about their food choices, knowledge level, and nutritional functioning (20). One of causes for behavioral disorders toward snack-centered nutrition among students is lack of required awareness of the matter. Nutritional education can effectively correct wrong nutritional behaviors and increase knowledge of students; this result has been obtained by many of studies. All of conducted studies emphasize that education has a positive role in increasing knowledge of students about snack nutrition. For example, in Joseph Laura et al. research children who had higher nutrition knowledge scores were more likely to select the healthy snack after the intervention (21).

There was a significant difference between means of nutritional attitude of students in experimental group compared to control group and this result is in line with results obtained from studies conducted by Hezavei et al. in 2012 (22). Also, results of this study are matched with results of study conducted by Jalili et al. that examined effect of planned theory-based educational intervention on reducing unhealthy snack consumption among elementary students educating in Kermanshah during 2015-2016. Results indicated positive effect of planned theory-based educational intervention on increase in propensity of students toward healthy snack consumption (23). It can be stated about attitudes that educations should be designed in a way to make person sensitive to the matter leading optimal attitudes of individuals toward the considered behavior. In this regard, researches introduce teachers and parents as effective agents in attitude of students toward snack-centered nutrition. Results of present study are similar with results conducted by Khalaj and Zaidi (2006) in Qazvin, Iran (2). Moreover, results of this study is in line with results of study conducted by Ansari (2004) entitled effect of snack-centered nutritional education for mothers on changing behavior of their children; there was a significant difference in consumption of total food groups after intervention (4). Hosseini et al. examined effect of planned theory-based educational interventions on promotion of breakfast consumption among guidance school students in Bandar Abbas, Iran, during 2011; results showed that breakfast consumption was increased after intervention (24).

Also, Fernandes and colleagues in their research reported that the intervention group significantly reduced its intake of artificial juice and in the no-intervention group; there was a significant increase in intake of prohibited foods, such as mass-produced snacks and soda. Furthermore, the intake of breakfast cereal, which is appropriate for eating at school, decreased. They concluded that after attending the nutritional education program, there were improvements in the quality of the food the schoolchildren were eating (25). Silveira et al. (2011) studied systematic effect of school-based nutritional intervention on reducing obesity among children and adolescences; they indicated effectiveness of interventions implemented in schools to reduce obesity and increase fruit and vegetable consumption studying 4089 references and 24 articles (26).

5- CONCLUSION

Since, this study confirmed effectiveness of snack-centered nutritional education on increasing knowledge, attitude, and nutritional behaviors of

students, suitable interventional programs should be implemented to increase awareness level and improve attitude and nutritional function of children. In addition, it is recommended to underpin required plans and programs to correct these patterns giving nutritional awareness to children and parents and promoting knowledge, attitude, and nutritional behavior of school staffs. The strength of this study was direct evaluation (observation) of nutritional behavior of students. However, there were some constraints in this research such as self-report of knowledge and attitude also lack of male population.

6- CONFLICT OF INTEREST: None.

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8- REFERENCES

1. Hagh Veisi AA, Farshid Moghadam M. Breakfast effect on improving the performance of students in schools. Health Outcomes and Health Journal 2003; 2(1): 21-7.

2. Khalaj M, Mohammadi Zeidi I. Health education effects on nutritional behavior modification in primary school students in Qazvin University of medical sciences 2006; 8(1): 41-9.

3. L Kathleen Mahan, Janice L Raymond. Krause's Food and the Nutrition Care Process. Krause's Food & Nutrition Therapy. 14th Edition, 2006.

4. Shaykhol-Islam R. Nutrition education at school age. 6th edition, Tehran: Ravij Pub; 2006.

5. Ansari N. Evaluation of the effect of nutrition education among mothers on changing children's behavior, MSc Thesis, Tarbiat Modarres University, Department of Health Education, 2004.

6. Saeidi M, Vakili R, Khakshour A, Taghizade Moghaddam H, Kiani MA, Zarif B, et al. Iron and multivitamin supplements in children and its association with growth rate. International Journal of Pediatrics. 2013; 1(1):13-17.

7. Just DR, Lund J, Price J. The role of variety in increasing the consumption of fruits and vegetables among children. Agricultural and Resource Economics Review 2012; 41(1):72-81.

8. Wandner LD, Hair E. Research-based recommendations to improve child nutrition in schools and out of school time programs. Supported by: The Atlantic Philanthropies© May 2009 Child Trends. Available at; http://www.childtrends.org.

9. Saeidi Z, Vakili R, Ghazizadeh Hashemi A, Saeidi M. The Effect of Diet on Learning of Junior High School Students in Mashhad, North-east of Iran. Int J Pediatr 2015; 3(2.2): 517-26.

10. Taghizadeh Moghaddam H, Bahreini A, Ajilian Abbasi M, Fazli F, Saeidi M. Adolescence Health: the Needs, Problems and Attention. Int J Pediatr 2016; 4(2): 1423-38.

11. Dietary Guidelines of Iran. Ministry of Health and Medical Education, Department of Health, Bureau of Nutrition Society, 1996.

12. Nutrition during pregnancy and lactation. Department of Health, Bureau of Nutrition Society of Maternal Health Bureau, 2013.

13. Abdollahi Z. Guidelines for nutrition education at school age. Ardebil: Bagh-e-Rezvan, 2014

14. Sheykholeslam R, Abdollahi Z, Ezzoddin Zanjani N, Mofid V, Safavi SM, et al. Micro-nutrients and strategies to prevent deficiency with emphasis on food fortification. Tehran: Health Deputy (Nutrition Improvement Office), 2007.

15. Kohri T, Kaba N. Study of the effects of snack-centered dietary education on first-grade elementary students and duration of these effects. American Journal of Public Health Research 2015; 3(1): 1-7.

16. Bordbar L. The effect of education on eating habits and awareness of fourth and fifth grade students about nutrition, District 2 of

Tehran. MSc Thesis, University of Medical Sciences, 1996.

17. Alizadeh Sivaki H, Jadgal Kh, Shamaeian Razavi N, Zareban I, Heshmati H, Nahid S. The effect of health belief model-based education on dietary behaviors of elementary school students in the city of Torbat Heidarieyeh, Iran 2012; 5 (4): 289-99.

18. Fathi A, Sharifirad Gh, Gharlipour Z, Hakimelahi J, Mohebi S. Effects of a nutrition education intervention designed based on the Health Belief Model (HBM) on reducing the consumption of unhealthy snacks in the sixth grade primary school girls. Int J Pediatr 2017; 5(2): 4361-70. (Serial No.38).

19. Vardanjani AE, Reisi M, Javadzade H, Pour ZG, Tavassoli E. The effect of nutrition education on knowledge, attitude, and performance about junk food consumption among students of female primary schools. J Educ Health Promot 2015; 4: 53.

20. Colizza DF, Colvin SP. Food choices of healthy school-age children. J Sch Nurs 1995; 11(4):8-17.

21. Joseph Laura S, Gorin Amy A, Mobley Stacey L, and Mobley Amy R. Impact of a short-term nutrition education child care pilot intervention on preschool children's intention to choose healthy snacks and actual snack choices. Childhood Obesity October 2015; 11(5): 513-20.

22. Hezavei, M, Pirzadeh A. Entezari MH, Hasanzadeh A. Impact of BASNEF-based educational program on nutritional functioning of students. Journal of Research in Medical Sciences 2010; (1): 23-9.

23. Jalili Zahra, Nazari1 Arezoo, Tavakoli Reza. The evaluation of effects of educational intervention based on planned behavior theory on reduction of unhealthy snack consumption among Kermanshah elementary school students, 2015-2016. International Journal of Medical Research and Health Sciences 2016; 5(6):67.

24. Hosseini Z, Aghamolaei T, Gharilpour Gharghani Z, Ghanbarnejad A. Effect of educational interventions based on theory of planned behavior to promote breakfast consumption behavior in students. Hormozgan Medical Journal 2015; 19(1):31-9.

25. Fernandes PS, Bernardo Cde O, Campos RM, Vasconcelos FA. Evaluating the effect of nutritional education on the prevalence of overweight/obesity and on foods eaten at primary schools. J Pediatr (Rio J) 2009; 85(4): 315-21.

26. Silveira JA, Taddei JA, Guerra PH, Nobre MR. Effectiveness of school-based nutrition education interventions to prevent and reduce excessive weight gain in children and adolescents: a systematic review. J Pediatr Rio.J 2011; 87(5):382-92.