JRH
www.jrh.gmu.ac.ir

The effect of intervention based on the theory of planned behavior on improving nutritional behaviors of students

Hamid Reza Zendehtalab[1]

Journal of Research & Health
Social Development & Health Promotion Research Center
Vol. 4, No.4, Winter 2014
Pages: 903-910
Original Article

1. **Correspondence to**: Lecturer of Community Health Nursing, Department, School of Nursing and Midwifery, University of Medical Sciences Mashhad, Mashhad, Iran
Tel/Fax: +98
Email: zendehtalabhr@mums.ac.ir

Received: 2 Jun 2013
Accepted: 14 Oct 2013

How to cite this article: Zendehtalab HR. The effect of intervention based on the theory of planned behavior on improving nutritional behaviors of students . *J Research Health*2014; 4(4): 903-910.

Abstract

Proper nutritional behavior plays an important role in promotion of physical, mental health of students. The present study aimed to investigate an intervention program based on the "theory of planned behavior" to enhance students' nutritional behavior.This quasi-experimental controlled randomized study with before and after design was conducted on 67 elementary school students from two schools. Subjects were randomly divided into experimental (32 students) and control (35 students). The intervention program was performed for the trial group students over 4 weeks. Two weeks later, data were collected using a questionnaire based on the constructs of theory of planned behavior, and were analyzed using SPSS-13 software, independent and paired t-tests, and Chi-square at significant level of 95%. Before intervention, no significant differences were found in theory constructs between the two groups but, after intervention, significant differences were observed between the two groups for attitude toward the behavior, subjective norms, and perceived behavioral control.Given the results obtained, it can be concluded that health promotion programs based on the theory of planned behavior have an effective role in enhancing students' nutritional behavior.

Keywords: Behavior, Nutrition, Student, Theory of planned behavior

Introduction

Proper nutrition plays an important role in children's health and malnutrition has damaging effects on their physical, mental, and psychological health. Normally, child's nutritional models and behaviors change at entry to school [1]. Many of these models lead to formation of undesirable nutritional behaviors in students. Wrong nutritional behaviors are one of the most important aspects of unhealthy life, and among main factors in increased cardiovascular diseases, diabetes, cancers, obesity, etc in societies [2]. Currently these behaviors are considered among important risk factors in non-contagious diseases, and annually, impose billions of Dollars in costs and losses onto healthcare systems in various countries [3]. Malnutrition and disproportionate height and weight to age, shortage of a variety of micronutrients (calcium, iron, and vitamins), high levels of blood sugar and lipid, and obesity are obvious manifestations of wrong nutritional behaviors among Iranian students [4]. The period 7-11 years, elementary school years, is a period that proper food stuffs should be available to children for rapid growth [5]. Thus, proper and healthy nutritional behavior in this period is highly important.

There are around 13 million students in Iran,

and approximately 6 million are elementary school children. Imperatively, training this group of people, who offer little resistance to learning, can have an important role in providing their future health. Attention to school-oriented health promotion programs has always been emphasized by health officials because 1) a child' mind is more predisposed to learning, 2) educational factors are adequately available, 3) diversity of students enlarges dimensions of education, and 4) student's attachment to the family leads to extension of health educations [5]. Thus, methods with highest efficiency must be used to implement health education programs in schools. Efficacy of health education programs is largely dependent on correct use of health education theories and models. One of these is the theory of planned behavior (TPB) that was proposed by Fishbin & Ajzen in the 1970's and 1980's [6, 7]. In this theory, behavioral intention is considered the most important behavioral determinant, which emphasizes on the role of thinking in deciding to conduct a particular behavior, or not [8]. Behavioral intention is influenced by 3 constructs of attitude toward behavior, subjective norms of behavior, and perceived behavioral control [9].

Attitude is people's general feeling about desirability or otherwise of a particular behavior [10]. Mental norm points to a person's perception of significant others' opinions (such as: parents, teacher, friends, and peers) to conduct a behavior or not [8]. Perceived behavioral control shows a person's perception of skills, resources and opportunities needed for conducting a behavior; or, it is the person's perception of difficulty or ease of conducting a behavior [11]. To affect behavior change, TPB, in addition to attention to personal beliefs, considers social factors such as social norms and incentive to follow important people. And thus, many studies consider it an important factor in accepting desirable behaviors to promote health [6].

Attention to students' nutritional health is considered among the most important aspects of school-oriented health education programs; amid, education of nutritional behaviors plays an important role in improving students' nutritional behaviors [12].

Many studies have investigated the effect of educational programs on nutritional practice of students so far, including a study by Pirzadeh et al. (2009) on the effect of educational program on nutritional knowledge and practice of high school female students in Isfahan, which showed students' knowledge and practice improved after intervention compared to before [1]. Also, a study by Davarianzadeh et al. (2010) showed the majority of high school girls in Tehran had moderate knowledge and practice in relation to nutritional behaviors [12]. A study by Amin-Shokravi et al. (2009) also confirmed the point that before educational intervention, students' knowledge, attitude, and practice were very low in relation to nutritional behaviors [5]. These studies emphasized the need for interventional programs to enhance students' nutritional knowledge, attitude, and practice. Obviously, design and implementation of such programs using the framework of models and theories of health education can be more effective than programs that preclude these bases [13].

In the definition of promotion of health, terms like control and enabling are emphasized and central, which is indicative of one of the most important aspects of health promotion; that is enabling [14]. Enabling different social groups, including students, through active participation in health programs, is a concern of health education officials in every society [15]. Thus, this study was conducted to determine the effect of interventional program based on TPB to improve students' nutritional behaviors in the city of Mashhad.

Method

This quasi-experimental controlled random study with before-after design was conducted on two groups of experimetal and control, in 2012 in two boy schools of education borough 4, in of Mashhad, Iran. A multistage sampling method was used, so that, initially, the 6 education boroughs in Mashhad were clustered, and borough 4 was randomly selected from the cluster. Next, out of public elementary schools in borough 4, two were selected using convenient

non-probability sampling. Then, by visiting these schools, two fifth grade classes were purposively selected, and, the two classes were randomly divided into two groups of experimetal and control. Finally, to avoid sample size reduction, all students of two classes were selected as study subjects. The sampling process took two weeks to finalize. Study inclusion criterion was lack of physical or psychological illness that required a specific diet and exclusion criterion was absence from one education session. Two students from the experimetal group were excluded for being absent in training sessions, and 1 from control group was excluded due to heart disease and eventually, study was conducted with 32 students in experimetal group and 35 in control. For data collection, the following tools were used:

1. Demographics questionnaire
2. Researcher-made questionnaire to measure constructs of TBP (attitude, subjective norms, behavioral intention, perceived behavioral control, and behavior): this questionnaire was prepared using review of literature and scientific references, and to determine content and form validity, it was issued to 10 expert professors in the field and modifications were made according to their comments. To assess reliability of the tool, retest method was used, and the test was performed for a group of 10 students (other than study subjects) and repeated after 7 days, producing correlation coefficient of 85%. This questionnaire contained 35 items; 8 to assess attitude, 8 for subjective norms, 6 for behavioral intention, 5 for perceived behavioral control, and 8 for intended behavior. Likert 5-point bipolar style (from totally agreed to totally disagreed) was used for scoring the items.
3. Researcher-made questionnaire to assess students' knowledge of proper nutritional behaviors: this questionnaire containing 10 items was designed in the form of "right, wrong, don't know", with scoring from 0 to 2 marks. To determine scientific validity of this tool, content validity method was used, and the questionnaire was made available to 10 specialist professors, and their views were implemented. To assess reliability of the tool, retest method was used, so that, the test was performed for a group of 10 students twice, with 14 days interval, and correlation coefficient between scores of these tests was found 81%.

At first, study objectives and methods, confidentiality of information, benefits of and optional participation were explained to subjects. Then, the subjects' knowledge of proper nutritional behavior was assessed, and the knowledge assessment questionnaire was completed by students in 15 minutes. Next, questionnaire of constructs of TPB was made available to both groups, and they were requested to complete the questionnaire in 20 minutes. The timing of filling the questionnaires was chosen in a way that it did not interfere with their exams and that they did not have major subjects like math and science, so the students could answer the questions in peace and concentration. Moreover, during answering the questionnaire, the researcher was present to resolve any potential problems in relation to how to answer. After collecting the initial data, and based on the results obtained, necessary modifications in educational intervention were implemented, and then, intervention program was performed for the experimetal group. The program was carried out in 4 one-hour sessions over two weeks (Sundays and Wednesdays, every week) in Nov 2012 in a school classroom. Intervention program involved group discussion, lectures, questions and answers, film, and role play. Over these two weeks, the school was adorned with posters, educational messages, and two banners related to proper nutritional behaviors, which were visually accessible to students at entry to school. As a key factor in forming child's mental norm, the teacher was requested to speak to students about the importance of nutrition in health in the first session. In one of the sessions, a film was played about obesity and its consequences for children and adolescents. Three enthusiast students acted out a play during the presentation of obesity complications to make it more attractive. The central focus of all educational sessions was group discussion and maximum participation of all students. In every session, educational subjects were presented by the researcher in 20-25 minutes,

and then students were requested to express their opinions and experiences about each issue. The curriculum generally contained subjects about the importance of healthy diet during different periods of life, especially during childhood and adolescence, introduction of food pyramid, importance of breakfast and snacks, role of fruits and vegetables in health, complications of high calorie foods, soft drinks, chips and puffs, fast food …. In addition to presenting these subjects in the classroom as PowerPoint presentation, they were also made available to students in the form of an educational booklet. According to prior agreement with the school head, school snack shop manager was requested to take part in educational sessions, and to express his views on issues discussed.

Two weeks after completion of intervention, students were asked to complete the questionnaires again, and results obtained were compared with previous ones. Data were analyzed using SPSS-13 software and paired and independent t-tests.

Results

Sixty-seven fifth grade elementary school students (32 students in experimetal group and 35 students in control) participated in this study. Mean age of students was 10.8±0.6 years in the experimetal group and 10.9±0.4 years in the control group, with no statistically significant difference between the two groups. 29.85% of students were an only child, and 44.78% were the first child of the family. Therefore, the majority of students had siblings and ranked second child downwards. Control and experimetal groups were selected from two different schools. Both schools were close to each other, and that there was no particular socio-cultural difference between students, thus this cannot affect the results. Independent t-test and Chi-square test revealed there was no significant difference between the two groups in terms of some demographic variables in relation to students' parents such as age, education, and occupation ($P>0.05$).

The independent t-test revealed an insignificant difference between the two groups in terms of students' knowledge score before intervention. However, the experimetal group's knowledge score significantly increased after intervention compared to control group (Table 1). Moreover, the experimetal group's knowledge score rose after intervention, compared to before (table 1), and according to paired t-test, this increase was significant ($P<0.05$).

According to independent t-test, no significant difference was observed between the two groups before intervention in constructs of TPB (attitude, subjective norms, behavioral intention, perceived behavioral control, and behavior) ($P>0.05$). Yet, this difference was significant after intervention ($P<0.05$) (Table 2).

Table 1 *Mean and standard deviation of students' knowledge score before and after intervention*

	Control group	experimetal group	Independent T-test Df=65
Before intervention	11.7±1.6	11.5±1.9	P=0.845
After intervention	11.9±1.8	17.4±2.1	P=0.002

Table 2 *Mean and standard deviation of scores of constructs of TPB in both groups, before and after intervention*

Variable	Range of scores	Before intervention		Independent T-test	After intervention		Independent T-test
		Control	experimetal		Control	experimetal	
Attitude	8-40	24.5±2.7	23.95±3.2	P=0.821	24.25±2.2	35.6±3.7	P=0.003
Subjective norms	8-40	24.90±2.2	25.15±2.8	P=0.627	24.1±2.5	37.2±2.5	P=0.022
Behavioral intention	6-30	15.6±1.4	16.1±1.7	P=0.07	16.2±1.8	25.4±2.6	P=0.014
Perceived control	5-25	13.9±1.65	13.6±1.1	P=0.875	14.5±2.2	21.5±2.8	P=0.001
Behavior	8-40	21.6±1.85	21.85±2.1	P=0.756	21.8±2.4	36.9±2.7	P=0.026

Discussion

This study aimed to investigate an intervention based on the "Theory of Planned Behavior" to enhance Mashhad city's elementary school students' nutritional behavior. Results of the study before implementation of intervention showed no significant difference between experimetal and control groups in terms of mean scores of knowledge and of all constructs of the theory of planned behavior, including: attitude, subjective norms, behavioral intention, perceived behavioral control, and behavior. However, after intervention, scores obtained for these variables in the experimetal group significantly increased compared to control group (Tables 1 and 2). Results of other studies also indicate that implementation of health education program had positive effects on nutritional behaviors of children and adolescents, and other age groups, and led to their improved knowledge, attitude, and practice, including a study by Rasoli et al. in 2009 in Bojnourd, and a study by Pirzadeh et al. in 2009 in Isfahan that showed positive effects of health education programs in enhancing nutritional knowledge, attitude, and practice of junior high school girls [1, 5]. Results of these two studies were in agreement with those of the present study in terms of positive effects of health education interventions on students' nutritional behaviors. However, there were two main differences in study methods: first, no health education program was used in the above studies; second, their study population was junior high school girls. One of the most important variables in designing health education programs is attention to the age range of the target group [16]. It seems providing health-oriented education at younger ages can have more lasting effects on people's health behavior [17]. Furthermore, junior high is the onset of adolescence, and usually most bad nutritional habits are formed during this period, and adolescents tend to follow their peers, while, elementary school age students are more responsive to education.

Regarding the framework of the study, it should be asserted that present study was in fact a health education intervention program, which was performed in accordance with the theory of planned behavior. In health-oriented interventional programs, it is helpful to use a theoretical framework [15] because models and theories of health education lead to more efficient interventional programs and provide an organizational approach for the study [18]. So far, no study in the country has investigated students' nutritional behavior using theory of planned behavior. But, there are many studies on efficacy of other models, such as health beliefs in nutritional and food behaviors in diabetes and stomach cancer, and prenatal and menopausal diets, including: a study by Khazaeepour et al. (2008) that investigated the effect of education based on health belief model on nutritional perceptions of high school girls, which showed positive results of using the model [19]. Khazaeepour's study was in agreement with the present study in terms of using a specific theoretical framework in development, design and implementation of health education program. Keshavarz et al. (2010) also studied factors influencing nutritional behaviors of female workers using a combination of theory of planned behavior and self-efficacy [3]. This was a qualitative study, but since theory of planned behavior was used as the main framework of the study, it was in agreement with the present study.

There are other studies that have used theory of planned behavior, but their dependent variable is different from that in the present study, including a study by Niknami et al. (2008), which confirms positive effect of education based on theory of planned behavior in working women performing mammography [6]. Also, a study by Besharati et al. (2010), which showed positive effects of intervention based on theory of planned behavior in choosing childbirth method in pregnant women in Rasht city [7].

Results of the present study in relation to the effect of educational intervention to enhance knowledge showed that firstly, mean score of knowledge in the experimetal group significantly increased after intervention

compared to before. But, in the control group, level of their knowledge did not significantly differ before and after (table 1). This result is in agreement with results in previous studies, which cite increased level of knowledge after intervention [1,5]. Generally, prerequisite of behavior change in all health education programs is improved level of knowledge [20], and results of this study and others confirm that. Another finding in this study was a significant improvement in attitude of the experimetal group after intervention, compared to before. Rahimi et al. (2009) showed that proper implementation of a health education program is effective in creating positive attitudes in people [21]. According to the theory of planned behavior, positive attitude toward behavior is the prerequisite in performing that behavior, which should happen in the person prior to the event of behavior [8]. A study by zendehtalab (2011) in line with the present study confirmed role of positive attitude in enhancing health behaviors [15].

Results of this study in relation to subjective norms (person's perception of significant others' support, such as: parents, teachers, friends, and peers) showed the score obtained for this construct significantly increased after intervention, compared to before (table 2). Theory of planned behavior strongly emphasizes the role of this construct in people's behavior change [9]. In the study by Keshavarz et al. (2010), the most important subjective norm in study subjects was view of spouse and children on nutrition. In the present study, students' important subjective norm about nutrition was opinion of parents, teachers, and friends and peers. As can be seen, compared to adults, children's subjective norms are influenced by many more factors and sources. This is an excellent opportunity for health educators, so that by affecting this extensive subjective norms, implement more effective interventional program.

Another finding of this study was the significant difference in perceived behavioral control before and after intervention (table 2). Behavioral control points to individual's perception of hardness or simplicity of performing a job, which is an important factor in performing a behavior or otherwise [8]. These results were in line with those found in a study by Niknami et al. (2008), which showed increased perceived behavioral control effective in performing health behaviors [6]. Other results obtained in this study included a significant increase in score of intention to perform proper nutritional behavior after intervention compared to before (table 2). Also, analysis of data showed that before the program, 52.6% of students had proper nutritional behavior intentions, while after intervention, this rose to 96.7%, indicating a significant difference. Results of other studies also agreed with this finding including the study by Basharati et al. (2010), which showed education based on theory of planned behavior led to a significant increase in choosing natural birth in pregnant women [7]. The last finding of this study showed that proper nutritional behavior in the experimetal group compared to control after intervention, compared to before, had significantly increased. In other studies with intervention programs based on theory of planned behavior, it was reported that these interventions eventually led to change of behavior, including the study by Niknami et al. In which intervention program led to enhancing practice of mammography in study subjects [6]. Clearly, the ultimate aim in all health-based interventions is to achieve behavior change, despite not being noticeable initially due to the gradual change.

Due to scarcity of time, resources, and facilities, main limitation of the study was associated to number of study subjects and selection of schools from one education borough. Thus, it is recommended that another study be conducted with larger sample size, using schools in all areas in Mashahd.

Conclusion

According to the findings in this study, it can be concluded that providing education based on theory of planned behavior is effective in enhancing proper nutritional behaviors

in students. Thus, it is recommended that this model be used when planning health-oriented interventions based on empowerment of study subjects to perform a health activity.

Acknowledgements
The authors wish to express their gratitude to school heads, teachers, and students for their cooperation in this study. There was no conflict of interest among authors in this study.

Contributions
Study design: HRZ
Data collection and analysis: HRZ
Manuscript preparation: HRZ

Conflict of interest
"The authors declare that they have no competing interests."

References

1. Pirzadeh A, Hazavei MM, Entezari MH, Hasanzadeh A. The effect of educational program on nutritional knowledge and behavior of middle school female second graders in Isfahan in 2009. *Iranian Journal of Medical Education*2011; 11(2): 94-102. [In Persian]
2. Davari S, Dolatian M, MaracyMR, Sharifirad Gh, Safavi SM. The effect of a health belief model (HBM)-based educational program on the nutritional behavior of menopausal women in Isfahan. *Iranian Journal of Medical Education*2010; 5(10): 1263-72. [In Persian]
3. Keshavarz Z, Simbar M, Ramezankhani A. Effective factors on nutritional behavior of female workers based on "Integrated Model of Planned Behavior and Self-efficacy": a qualitative approach. *Hakim Research Journal*2010; 13(3): 199-209. [In Persian]
4. Vakili M, Baghiani Moghadam MH, Pirzadeh A, Dehghani M. Assessing the effect of education on knowledge, attitude and practice of guidance school students about milk and dairy products. *Knowledge and health J*2008; 2(4): 39-43. [In Persian]
5. Rasouli A, Tavafian SS, Amin Shakourei F. Effect of health education program on knowledge compilation, attitude and nutrition students Bojnourd city schools. *Journal of North Khorasan University of Medical Sciences*2010; 2(2-3): 73-7.
6. SH. Niknami E. Hatefnia M. Mahmudi M. Lamyian. The effects of "theory of planned behavior" based education on the promotion of mammography performance in employed women. *Journal of Birjand University of Medical Sciences*2010;17(1): 50-58. [In Persian]
7. Besharati F, Hazavehei SMM, Moeini B, Moghimbeigi A. Effect of educational interventions based on theory of planned behavior (TPB) in selecting delivery mode among pregnant women referred to Rasht health centers. *Journal of Zanjan University of Medical Sciences*2012;19(77):94-106. [In Persian]
8. Saffari M, Shojaizadeh D, Gofranipour F, Heidarnia A, Pakpour A. Health education and promotion; theories, models and method. Tehran: Sobhan 2008. [In Persian]
9. McConnon A, Raats M, Astrup A, et al. Application of the theory of planned behaviour to weight control in an overweight cohort. Results from a pan-european dietary intervention trial. Appetite 2012; 58: 313–18
10. Kortteisto T, Kaila M, Komulainen J, Mantyranta T , Rissanen P. Healthrcare professionals' intentions to use clinical guidelines: a survey using the theory of planned behavior. *Implemen Science*2010, 5:51.
11. Giles M, Connor S, McClenahan C, Mallett J, Stewart-Knox B, Wright M. Measuring young people's attitudes to breastfeeding using the Theory of Planned Behavior. *J Public Health*2007;29(1): 17-26.
12. Delvarian-Zadeh M, Khosravi A, Razavian-Zadeh N, Bolbol-Haghighi N, Abbasian M. Nutritional knowledge, attitude and practice of female junior high school students in two regions of Iran. *Journal of knowledge & health*2011;6(1): 19-26. [In Persian]
13. Carmack C C, Lewis-Moss R K. Examining the theory of planned behavior applied to condom use: the effect-indicator vs. Causal-Indicator Models. *J Prim Prev*2009; 30(6): 659–76.
14. Swanson V, Power K G, Crombie I K, et al. Maternal feeding behavior and young children's dietary quality: a cross-sectional study of socially disadvantaged mothers of two-year old children using the Theory of Planned Behavior. *Int J of Behav Nutr Phys Act*2011, 8:65.
15. Zendehtalab HR. Effect of program designed based on PRECEDE-PROCEED model on mental health of adolescents and parent participation. *Journal of Evidence Based Care*2012; 2(1): 45-54.
16. Lin W, Yang HC, Hang CM, Pan WH. Nutrition knowledge, attitude, and behavior of Taiwanese elementary schoolchildren. *Asia Pac J Clin Nutr*2007; 16 (l-2): S534-46.

17. Turconi G, Guarcello M, Maccarini L, et al. Eating habits and behaviors, physical activity, nutritional and food safety knowledge and beliefs in an adolescent Italian population. *J Am Coll Nutr*2008; 27(1): 31-43.
18. Alidosti1 M, Sharifirad Gh, Hemate Z, et al. The effect of education based on health belief model of nutritional behaviors associated with gastric cancer in housewives of Isfahan city. *Daneshvar Medicine Scientific-Research Journal of Shahed University*2011; 94: 1-11. [In Persian]
19. Khazaie pool M, Ebadi azar F, Solhi M , Asadi lari M , Abdi N A. Study in the efect of education through health belief model on the perceptions of girl students in primary school about breakfast and snack in Noshahr. *Journal of Tolooe behdasht*2007:23,24(1,2): 51-65. [In Persian]
20. Ahmadi Tabatabaei S V, Taghdisi M H, Nakheei N, Balali F. Effect of educational intervention based on the theory of planned behaviour on the physical activities of kerman health center's staff. *Journal of Zanjan University of Medical Sciences*2010; 12(2): 62-69. [In Persian]
21. Ostad Rahimei AR, Safaian AR, Modares ZH, Pour Abdolah P, Mahdavei R. Effect of nutrition education on knowledge, attitude and practice of women working in Tabriz University of Medical Sciences. *Medical Journal of Tabriz University of Medical Sciences*2009; 31(4): 12-7.