



Evaluating the effect of the child-to-child approach based on the Theory of Planned Behavior on the eating behaviors of elementary school students

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ABSTRACT

Children need adequate and healthy nutrition for sufficient mental development and physical growth. Children also need nutrition education to gain the required skills for correct food selection. This study aimed to evaluate the effect of the child-to-child approach based on the Theory of Planned Behavior (TPB) on the eating behaviors of elementary school students in Iran. In this quasi-experimental, interventional study with pretest/posttest design and a control group, 173 fourth grade female students of public elementary schools were selected using multistage random cluster sampling. Educational intervention was performed for the intervention group through the child-to-child approach. The research data were collected in the two groups using a 5-scale researcher-made questionnaire based on the constructs of TPB with a Cronbach's alpha of 0.86 before and one and six weeks after the intervention. Then, the data were analyzed using chi-square test, repeated measures ANOVA, and independent t-test. The results showed a significant difference between the two groups regarding the mean scores of attitude, perceived behavioral control, and behavioral intention before and one and six weeks after the intervention. However, no significant difference was found between the two groups concerning the mean score of subjective norms. Moreover, the educational intervention resulted in improvement of the intervention group's eating behaviors. The findings of this research suggested the child-to-child approach and the TPB as effective methods in improvement of correct eating behaviors in children.

Keywords: Child-to-child approach, Eating behavior, Theory of planned behavior

INTRODUCTION

Children's long-term growth and health are associated with their eating habits from the beginning of their lives.[1] Evidence has indicated that non-communicable diseases, such as diabetes, osteoporosis, and hypertension, are related to unhealthy eating habits formed during childhood.[2] Moreover, nutrition, as an important factor in determination of health, can be effective in educational accomplishment. Since eating habits are formed in pre-school and elementary school years, eating habits in this period affect well-being in the years to come.[3] Therefore, childhood is a period in which healthy eating education is fundamental for establishing healthy eating practices in the following years.[2] In fact, school education regarding nutrition and learning about health, attitudes, and behaviors based on well-approved theories in early lifetime are important in preventing chronic diseases.[4]

Theories can effectively help determine individuals' characteristics, beliefs, and values that are related to health behaviors and may be changeable. Theory of Planned Behavior [TPB], which was introduced by Ajzen and Fishbein, has been extensively used in various studies to determine attitudes and behaviors related to food selection.[5, 6] For instance, Hewitt et al. found out that the TPB could be used for evaluation of the eating behavior

of children from 10 to 13 years of age.[7] The TPB has also been used as a framework in various interventions to encourage children towards healthy eating.[8] In this theory, the most important factor determining an individual's behavior is one's intention, which is under the influence of three constructs, namely attitude, subjective norms, and perceived behavioral control.[9] This theory is able to explain about 40% of the relationship between health behavior and intention. Therefore, it can be claimed that this model has a potential capability for development of behavior change interventions.[10]

Schools have always been a popular setting for having contact with children, implementing preventive interventions, and promoting health.[2] Hence, school environment can help educate children regarding their eating behaviors.[11] Yet, elementary school students are more prone to accepting new opinions, changing their ideas, and modifying their habits.

Students' health education can take place through various methods of formal and informal education at school. The child-to-child program is a major health education approach applicable for school age students. In this approach, active teaching methods are used in which, learning happens through teamwork. Thus, students apply what they learn in classes to their daily lives at school and home.[12] The child-to-child approach is based on Paulo Freire's empowering education theory in which, problem posing is used. According to Freire's theory [1970], in problem-posing education, students are increasingly encountered with problems and the resultant challenges in their surrounding world and feel great for responding or reacting to these challenges.[13] The concept of child-to-child education, as an educational process, disseminates the knowledge taught by children to other children [child to child], families [child to family], and society [child to society].[14] The distinctive feature of the child-to-child approach is children's direct involvement in the process of health education and promotion.[15] Currently, this educational model is being used in various countries and has mostly been promoted in health education and prevention issues.[16] The results of many studies have shown that this type of education has positive effects on students' knowledge, skills, and attitude.[17]

Given the importance of students' nutrition, health, and participation in health education, the present study aims to determine whether the child-to-child approach using the TPB can be effective in promotion of children's correct eating behaviors.

MATERIALS AND METHODS

Design: This pretest/posttest, quasi-experimental study with a control group was carried out in February and March 2015.

Sample and Setting: This study was done in 4 public elementary schools in one of the south-west provinces of Iran. The study participants included 173 fourth grade (10-year-old) female students divided into an intervention (n=89) and a control group (n=84).

Measures: The study data were collected using a researcher-made questionnaire based on the constructs of TPB whose reliability and validity were reviewed and confirmed. The validity of the questionnaire was confirmed by a panel of 5 experts. Besides, in order to confirm its internal consistency, it was tested on 30 students and the scales were evaluated using Cronbach's alpha coefficient. Accordingly, Cronbach's alpha coefficient was obtained as 0.73 for attitude, 0.75 for subjective norms, 0.72 for perceived behavioral control, and 0.83 for intention. The questionnaire items were responded by a 5-point Likert scale with the following options: "I completely agree", "I agree", "I do not know", "I disagree", and "I completely disagree". These options were scored from 5 to 1 for positive questions (completely agree to completely disagree) and from 1 to 5 for negative ones (completely agree to completely disagree). Attitude towards healthy eating behaviors was measured by ten questions regarding the importance of eating healthy breakfast, snack, dairy, fruits, vegetables, noncarbonated beverages, and fast food (e.g., "it is important to me to eat breakfast every day"). Subjective norm was also measured by ten questions about whether parents, teachers, friends, classmates, and TV programs encouraged the students to eat healthy food (e.g., "My parents always encourage me to eat healthy snack"). Besides, perceived behavioral control was assessed through five questions about the students' perceived control over eating healthy breakfast, snack, noncarbonated beverages, and fast food (e.g., "if my friends eat snacks and chips, I will not be drawn to them"). Intention for healthy eating was also evaluated using five questions about the students' decision for eating breakfast, dairy, and fruits and not eating junk food and fast food in the next week (e.g., "for the next week, I plan to eat breakfast every day").

Moreover, the students were asked to record their frequency of healthy eating practices (e.g., eating breakfast) and unhealthy eating practices (e.g., eating fast food) every day for a week. It should be noted that healthy eating in this

study was defined as balanced consumption of three meals per day, consisting of enough fruits and vegetables and avoidance of junk food (fast food, chips, candies, desserts) as described in the study by Baker et al.(18)

Intervention method: First, 17 talented sixth grade students were selected with the purpose of educating the intervention group using the child-to-child approach. Then, six training sessions on specific topics, including understanding the food pyramid, importance of breakfast, healthy snacks, and risks of eating fast food and junk food, were held for these students by the researcher. Afterwards, the trained students were asked to teach the learned materials to the intervention group during six 1-hour sessions held twice a week. In doing so, every trained student trained five students through small group discussion technique, teamwork, and a training manual. On the other hand, the control group received no training regarding nutrition.

The study data were collected through self-report before and one and six weeks after the intervention. After all, the data were entered into the SPSS statistical software, version 19 and were analyzed using chi-square test, repeated measures ANOVA (rANOVA), and independent t-test. The level of significance was considered to be 0.05 in all the tests.

RESULTS

This study was conducted on 173 female students in the fourth grade (10-year-old) of elementary school. There were no falls during the study. According to the results, 39% of the students’ fathers had high school diplomas and 51% were employees. In addition, 48% of the mothers had below diploma degrees and 86% were homemakers. Besides, the mean household size was 4.9 and 95% of the students lived with their parents. The results showed no significant difference between the intervention and control groups in terms of these variables. Moreover, 70% of the students noted that they had acquired their health and nutrition knowledge through their school nurse.

Table 1. Within group and between group comparisons of the mean scores of attitude, subjective norms, perceived behavioral control, and behavioral intention before and one and six weeks after the intervention

| Variable | Group | Before the intervention Mean±SD | One week after the intervention Mean±SD | Six weeks after the intervention Mean±SD | Repeated measures ANOVA |
|------------------------------|--------------|------------------------------------|--|---|-------------------------|
| Attitude | Intervention | 5.56 ±06.42 | 4.37 ±44.47 | 5.13 ±44.77 | 0.001<p 0.895=p |
| | Control | 6.82 ±82.41 p=0.799* | 6.77 ±41.56 p=0/003 | 6.54 ±41.84 p=0/009 | |
| Subjective norm | Intervention | 9.0 ±33.70 | 7.83 ±35.63 | 9.24 ±35.78 | 0.053=p 0.611=p |
| | Control | 9.4 ±36.53 0.044p= | 9.08 ±35.85 0.066p= | 8.77 ±36.64 0.194p= | |
| Perceived behavioral control | Intervention | 3.51 ±20.77 | 2.86 ±21.89 | 3.68 ±22.12 | 0.002=p 0.159=p |
| | Control | 4.1 ±21.03 0.651p= | 4.22 ±20.76 0/015 p= | 4.17 ±20.23 p<0/001 | |
| Intention | Intervention | 4.20 ±21.30 | 3 ±22.22 | 3.30 ±22.48 | 0.010=p 0.467=p |
| | Control | 4.79 ± 21.30 0.994p= | 4.20 ±21.39 p=0.027 | 4.30 ±20.83 0.216p= | |

*Independent t-test**

According to Table 1, the results of independent t-test revealed no significant difference between the intervention and control groups regarding attitude towards eating behaviors before the intervention (p=0.799). However, a significant difference was found in this respect one (p=0.003) and six weeks (p=0.009) after the educational intervention using the child-to-child approach. Also, the results of rANOVA indicated a significant difference in the mean variation of the intervention group’s mean scores of attitude before and one and six weeks after the intervention (p<0.001). However, no significant difference was found in this regard in the control group (p=0.895).

Considering subjective norms, the results of independent t-test showed a significant difference between the two groups before the intervention (p=0.044), but not one (p=0.066) and six weeks (p=0.194) after that. On the other hand, the results of rANOVA showed no significant difference in the mean variation of the mean scores of subjective norms in the intervention (p=0.053) and the control group (p=0.611).

Based on the results of independent t-test, no significant difference was observed between the intervention and control groups concerning perceived behavioral control before the intervention (p=0.651). However, a significant difference was found in this regard one (p=0.015) and six (p<0.001) weeks after the child-to-child education on eating behaviors. The results of rANOVA also showed a significant difference in the mean variation of the mean scores of perceived behavioral control before and one and six weeks after the intervention in the intervention group (p=0.002), but not in the control group (p=0.159).

With respect to behavioral intention, the results of independent t-test demonstrated no significant difference between the intervention and control groups before the intervention (p=0.994). The results showed a significant difference between the two groups in this regard one week after the educational intervention (p=0.027), but not six weeks after that (p=0.216). The findings of rANOVA also indicated a significant difference in the mean variation of the mean scores of behavioral intention during the three stages in the intervention group (p=0.010), but not in the control group (p=0.467).

Regression analysis was performed to investigate the determinants of behavioral intention based on the TPB. According to the results presented in Table 2, all the constructs predicted behavioral intention, with the highest predictive power being related to perceived behavioral control ($\beta=0.601$) followed by attitude ($\beta=0.376$) and subjective norms ($\beta=0.238$) (Table 2).

Table 2. Linear regression analysis of the effect of the TPB constructs on behavioral Intention

| Variable | Unstandardized coefficients | | Standardized coefficients | t | P |
|------------------------------|-----------------------------|------------|---------------------------|-------|--------|
| | B | Std. Error | Beta | | |
| Attitude | 376.0 | 047.0 | 519.0 | 950.7 | 000.0* |
| Perceived behavioral control | 601.0 | 078.0 | 510.0 | 751.7 | 000.0* |
| Subjective norms | 238.0 | 032.0 | 491.0 | 379.7 | 000.0* |

* P<0.05

As Table 3 depicts, the results of rANOVA showed a significant difference in the mean variation of the mean scores of eating behaviors in the intervention group before and one and six weeks after the intervention (p=0.004 for eating breakfast, p=0.039 for healthy snack, p=0.001 for dairy, p=0.028 for fruits and vegetables, and p=0.001 for carbonated beverages and junk food). In the control group, on the other hand, no significant difference was observed in the mean variation of the mean scores of eating behaviors, except for eating breakfast (p=0.006).

Table 3. Comparison of variations in the mean scores of eating behaviors in the two groups before and one and six weeks after the intervention

| Eating behavior | Group | Before the intervention Mean±SD | One week after the intervention Mean±SD | Six weeks after the intervention Mean±SD | P - value |
|------------------------|--------------|---------------------------------|---|--|--------------------|
| Breakfast | Intervention | 2.31 ±4.06 | 1.83 ±5.50 | 1.76 ±5.76 | 0.004=p 006.0=p |
| | Control | 1.26 ±6.11 | 1.70 ±5.51 | 1.29 ±5.78 | |
| Healthy snack | Intervention | 3.05 ±9.93 | 2.57 ±9.95 | 2.55 ±10.62 | 0.039=p 293.0=p |
| | Control | 2.03 ±9.57 | 2.91 ±9.13 | 2.51 ±9.63 | |
| Milk and dairy | Intervention | 3.84 ±7.49 | 4.44 ±9.02 | 4.12 ±9.62 | 0.001=p 057.0=p |
| | Control | 2.83 ±7.08 | 2.84 ±7.73 | 2.54 ±7.92 | |
| Fruits and vegetable | Intervention | 4.94 ±4.97 | 4.34 ±5.33 | 4.17 ±6.44 | 0.028=p 391.0=p |
| | Control | 3.31 ±4.73 | 2.98 ±4.40 | 2.45 ±4.94 | |
| Junk food and soda pop | Intervention | 1.17 ±1.06 | 1.28 ±0.83 | 0.64 ±0.38 | 0.001=p 0.187=p |
| | Control | 1.04 ±0.71 | 1.62 ±1 | 1.04 ±0.78 | |

DISCUSSION

Child-to-child education is a type of peer education that became common since the 1970s and schools were considered to be the best place for its application. This type of education makes children responsible and prepares them for cooperation and problem solving.[19]

This study aimed to investigate the effect of the child-to-child approach using the TPB on eating behaviors. Given the fundamental role of attitude and intention in individuals’ motivation for adopting a behavior, the TPB can be a proper framework to study eating behaviors.[20]

In this research, the significant difference between the scores of attitude before and after the educational intervention signified fundamental changes in the students’ attitude. The students’ improved attitude after the education might be due to their increased awareness and the positive effect of the educational intervention. In the same line, the studies performed by Zhanq j. et al. and Kronesa et al. showed that attitude significantly increased in the intervention group after the intervention.[21, 22]

Subjective norms are the result of the belief that certain people may approve or not approve a certain behavior. In the present research, the high value of subjective norms in the control and intervention groups before the intervention implied that parents, teachers, friends, and classmates had a high expectation of the population under study in adopting eating behaviors, with parents having the greatest share.

Moreover, our study results showed that the mean score of perceived behavioral control increased in the intervention group, but remained unchanged in the control group after the intervention. These findings were similar to those obtained by Parrot *et al.* and Regar *et al.*[23, 24] Also, the results of the studies by Collins and Mullan [2011] and Blanchard and Fisher [2009] indicated that perceived behavioral control was a strong predictor of intention.[25, 26] In the current study, the mean score of behavioral intention increased significantly in the intervention group, but decreased in the control group after the educational intervention. As a general rule, the more optimal attitude, subjective norms, and perceived behavioral control are, the stronger an individual's intention for adopting a behavior will be.[27] In the study performed by Giles and Kothe, the mean score of behavioral intention increased significantly more in the intervention group compared to the control group, which is in agreement with the findings of the present study.[28, 29]

Considering the students' eating behaviors before and after the educational intervention, the results suggested that the educational intervention using the child-to-child approach caused a significant increase in the mean scores of eating breakfast, healthy snack, dairy, fruits, and vegetables and reducing the consumption of junk food and carbonated beverages. In general, students and children learn by looking at each other's eating behaviors. Studies have also disclosed that the consumption of fruits, vegetables, and milk increased in children after they observed the consumption of these foods by adults. Also, consumption of vegetables increased among children after observing their peers' eating behaviors.[11]

In the control group, no significant difference was observed in the mean variation of the mean scores of eating behaviors [eating healthy snack, dairy, fruits, and vegetables and reducing the consumption of junk food and carbonated beverages], except for eating breakfast. This might have resulted from the fact that breakfast eating habit was common among their families.

CONCLUSION

The results of this research showed that using the students' capabilities in education by appropriate educational approaches and increased emphasis on peer education and child-to-child assistance could be effective in solving many educational problems including health issues, such as eating behaviors. In other words, the child-to-child approach was highly effective, indicating the potential ability of these young trainers for many other health purposes. Given the limited number of school nurses in Iranian schools (in a way that one school nurse covers several schools), it is possible to fill the gap of health education in schools by correct planning and holding better and longer training courses for young trainers.

Limitations

Despite all the strong points of the present research, it had some limitations. First, the outcomes were evaluated only for one and a half months after the educational intervention. Thus, future studies with longer follow-up periods are recommended to be conducted for better evaluation. In addition, the final evaluation in this study was based on the students' self-reports, which could result in bias. Hence, future studies can use a combination of self-report, direct observation of the behavior, and report by parents.

Acknowledgement

This article was derived from MSc thesis and financially supported by the Research Vice-chancellor of Shiraz University of Medical Sciences (grant No. 93-7267). The authors would like to thank Ms. A. Keivanshekouh at the Research Improvement Center of Shiraz University of Medical Sciences for improving the use of English in the manuscript.

Funding

Funding for this study was provided the Research Vice-chancellor of Shiraz University of Medical Sciences Grant 93-7267

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