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The Examination of the Effectiveness of an Educational Intervention based on the Planned Behavior Theory on Improving Pubertal Health Behavior in Female High School Students

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Abstract

Background: Puberty is a period of psychological, physical, mental, emotional and social growth that stability and development of personality occurs in this period. This study aimed to determine the effect of planned behavior theory on improving pubertal health behavior in female first grade high school students.

Materials and Methods: A quasi-experimental intervention was conducted in female high school in Khamir city, Iran in 2015. One of the schools were randomly assigned to the control group and other to the experimental group. Using the formula sample, 60 students were selected from each school. Samples were evaluated in two stages through pre-test and two months later via post-test by administered questionnaire including questions about demographic characteristics and structures of planned behavior theory. The content of training was presented through lecture group discussion with teaching aids such as booklet and pamphlet. The collected data were analyzed using SPSS version 22.

***Results*:** The intervention group mean age at first menstrual period was 12.30 ± 0.84 years old and for control group was 12.25 ± 0.79 years old. The results showed that two months after the intervention, health behaviors, subjective norms, behavioral intention, perceived behavioral control, and attitude, were significantly higher than pre- intervention ($P<0.05$). Linear regression analysis showed that the behavioral intention has the greatest impact on pubertal health behaviors ($P<0.05$, $\beta = 0.447$). The distribution of information sources analysis revealed, the greatest source of information were: mother and family members, school health teachers, books, school friends, teachers, TV, pamphlets, websites, health workers, newspapers and magazines, school counselors and radio were next in ranking.

***Conclusion*:** According to the results, the theory of planned behavior-based training can improve pubertal health behaviors in students. Therefore, it is suggested the training programs should focus on these structures to improve pubertal health behaviors.

Key Words: Planned Behavior Theory, Pubertal Health, Student.

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1- INTRODUCTION

Dramatic changes such as emotional, cognitive, social and physical occur during adolescence (1, 2). The maturation is a process in which the physical changes happen in the shape of a child's body, becomes an adult capable of reproduction and at the end achieves enough physical and psychological ability to be young man or woman (3). Adolescents between the ages of 10 and 19 years are considered as a healthy group. Nevertheless, many adolescents may die because of suicide, accidents, violence, complications dealing with pregnancy and other diseases that are either preventable or treatable. Additionally, many diseases in adulthood have root in adolescence. For example, smoking, sexually transmitted infections such as HIV, malnutrition and poor exercise habits, lead to illness or premature death in life (4).

In Iran, according to the 2011 census, 16.34 percent of the populations, about 12 million people are 10-19 years old and girls comprise 50 percent of it (5). Our country is having such a huge resource of teenagers, requires careful planning and attention to their healthy growth (6). The first menstruation, called menarche and shows reproduction system is working (7). Dysmenorrhea is a common gynecologic disorder and at least 50% of women experience it in their reproductive period and 10% of them have such severe symptoms that prevent them from attending school and work (8). In teenage girls starting menstruation, the amount of iron is lost. Iron deficiency leads to anemia (9). A study in the field of beliefs and health behaviors during menstruation was conducted female high school students in the North and South of Tehran, the results indicate that both groups of girls in the North and South do not have comprehensive information on health behaviors during menstruation, and therefore no significant difference between them was showed (10). A study done in Nigeria showed that the interpretation of menstruation was poor and often inaccurate (11). In another study in the field of knowledge about menstruation, emotional response to menarche, menstrual attitude and behavior showed that knowledge of menstruation significantly was associated with the positive emotional response and positive attitudes toward menstruation menarche. There were also significant differences in knowledge of menstruation, reaction to menarche and menstrual attitudes among female students with positive behavior and those who have positive behavior (12). A conducted study by Chan et al., entitled menstrual problems and health behaviors in Chinese girls in Hong Kong (2009) showed that the prevalence of menstrual problem in Hong Kong Chinese girls is high and causes significant impairment in school and their daily activities (13). According to the culture and traditions prevailing in our country, shame of parents for teaching the issues related to puberty and adolescence is outstanding and the parents are not knowledgeable enough to make comprehensive information about this issue accessible for their children (14).

School as a place for health education seems to be a suitable place for the fastest access to a level of maturity and health prevention in the field of sex and puberty, but for some reasons, these trainings are not done. According to the above mentioned specific circumstances and spiritual crises of pubertal health training for adolescents seems necessary to reduce the fear of these conditions and prevent false information given by incompetent people in the age of puberty (15). The value of health education programs depends on the effectiveness of these programs and the effectiveness of these programs depends on the correct use of theories and models in health training (16). The theory of planned behavior, which has

been proposed by Ajzen, is based on the theory of reasoned action. This theory predicts the occurrence of a specific behavior that a person tends to do it. According to this theory, intention to carry out an action is predicted by three factors: attitude toward behavior, subjective norms, and perceived behavioral control (17). The theory of planned behavior is one of the theories that is widely considered regarding prediction of the health behavior (18). The results of this study can identify the most effective factors in behavior change and provide a model for training pubertal health behavior. This study aimed to determine the effect of planned behavior theory on improving pubertal health behavior in female first grade high school students.

2- MATERIALS AND METHODS

Puberty health is consisting of care and principles that leads to promotion and maintenance of mental and physical health in individual in this period **(**19**)**.

2-1. Study Design and Population

One of the schools was randomly assigned to the control group and another school to the experimental group. Eighth grade students formed the target sample, 60 people in each group were determined. Due to the distance between schools in the study educational intervention in the experimental group had no effect on the control group. The self-made questionnaire was designed based on the subject and the theory of planned behavior which was completed by students.

2-2. Methods

This quasi-experimental study was conducted in 2015 that lasted 10 months. The study population included first grade students of secondary school in Khamir city, Hormozgan province, Iran. There are 2 secondary school for girls.

2-3. Measuring tests

The questionnaire includes two parts of demographic questions and the structures of planned behavior theory questions about puberty and menstruation. Demographic questions such as age, age of menarche, education level and occupation of parents, economic status, number of children, older sisters, age difference between teenage girl and older sister, previous training on puberty health.

Ten attitude questions of planned behavior theory structure (cleansing, taking iron pills, taking a bath, doing light exercise during menstrual periods, being ashamed of asking questions about puberty and menstruation, the fear of getting anemia and iron deficiency and concerning about sterility as a result of failure to comply with hygiene), 7 subjective norms questions (hiding from family members, mother's reminding to take iron pills, support and understanding of the people around), 6 perceived behavioral control questions (iron intake and eating more fruit and vegetables, bathing as standing and participation in training programs), 8-intention questions (using sanitary pads, light-colored and cotton underwear, daily underwear change, daily activities and exercise, pain control method, seeing a doctor if there is severe pain), and one question from the source information was formed about puberty and health behaviors of this period.

Sixteen questions of behavioral questions were formed including nutrition, iron supplementation, bathing and cleansing and how to do each one, using sanitary pads, light-colored cotton underwear, daily activities and exercises, methods of pain control, visiting a doctor if there is severe pain, and how to replace sanitary napkin and how to throw it out). For scoring the structure of Planned Behavior Theory the 5-point Likert scale was used so that the wrong answer and the correct answer

subsequently were scored 1 and 5. In behavioral questions the answer "always" was scored two, "sometimes" scored 1 and "never" given a score of zero. The validity of questionnaire was through the content validity, so that the questionnaire was obtained based on the theory of planned and health behaviors during puberty and menstruation and according to sources and books, then evaluated by experts and their views was applied on the questionnaire. Finally, after fixing some bugs and ambiguities its validity was confirmed.

The reliability of questionnaire was confirmed through retest with 0.77 reliability factor and with 0.76 Intra Class Correlation Coefficient (ICC) factor. Education based on the theory of planned behavior is the independent variable of the study. The dependent variable includes the structure of the planned behavior theory (attitude, subjective norms, perceived behavioral control, intention), and behavior. After analyzing preliminary data, based on the theory of planned behavior, the needed educational materials, equipment and facilities were provided. Training was conducted through Lecture, group discussion and question-and-answer. Booklet, pamphlets and pubertal health education messages were placed at the disposal of everyone.

Educational intervention was conducted by the researcher in four 45-minute sessions that lasted 1 month. In the training program designed based on the theory of planned behavior general information about puberty and the changes of this period were provided, then sessions about the attitudes, subjective norms, and perceived behavioral control were held that their outlines were the health consequences of inappropriate behavior, the importance of prevention of disease in an individual's life, barriers to adequate health behaviors, ways to overcome barriers to good health behaviors, health behaviors during adolescence, importance of the role of parents and family members and finally, in order to improve the intention and behavior of students in pubertal health behaviors, procedures and appropriate health behaviors in Menstruation periods were described. Two months after completion of education, secondary test was conducted.

2-4. Inclusion Criteria

Inclusion criteria included, leaving behind at least two menstruations and consent to participate in the study.

2-5. Exclusion Criteria

Exclusion criteria included parents who were refused their child to participate.

2-6. Ethical Considerations

This study was approved by the Ethics Committee (with ID code: 6727). The objectives of the study were explained to all participants and their parents, all of them accepted to participate and were assured of the confidentiality of their individual information as well as the voluntary nature of participating in the study.

2-7. Data Analyses

In order to analyze the effects of the intervention, in intervening and control groups paired t-test was separately used. Multiple linear regression were used to determine the relationship between structural change in planned behavior theory and students' behavior change considering the role of potential confounding variables. All analyzes were performed by SPSS version 22.0 software. The level of significance in all tests was included $P < 0.05$.

3-RESULTS

In this study, a total of 120 students participated in the study and there was no attrition in the number of people. The mean age in case group and control were

subsequently 13.76 ± 0.72 and 13.70 ± 0.59 years old; of 120 surveyed students, 45 of them (37.5%) 13 years and 63 of the them (52.5%) 14 years and 12 of them (10%) were 15 years old. The experimental group mean age at first menstrual period was 12.30 ± 0.84 years old and for control group was 12.25 ± 0.79 years old, of 120 surveyed students 2 (1.6%) at 10 , 16 (13.3%) at 11, 55 patients (45.8%) at 12, 41 patients (34.1%) at 13 and 6 patients (5%) at age 14 experienced menarche.

Ninety-five percent (114) patients were trained in pubertal health before the intervention, 5% (n = 6) in this case had not received any training. In relation with the descriptive indicators of planned behavior theory structure, after educational intervention the average score of attitude, subjective norms, perceived behavioral control, intention and behavior significantly increased rather than before. In the control group, after the intervention, there was no significant change in other structure of planned behavior theory except in behavior variable (**Table.1**). The distribution of information sources analysis revealed, the greatest source of information is mother and family members, school health teachers, books, school friends, teachers, TV, pamphlets, websites, health workers, newspapers and magazines, school counselors and radio were next in ranking (people could have more than one choice) (**Fig.1**). Multivariate regression analysis showed that intention (P- <0.001, β = 0.447) and perceived behavioral control (P = 0.054, β = 0.208) are the predictors of health behaviors during puberty.

Students who tend to have more and higher perceived behavioral control, it was more likely to have pubertal health behaviors. Behavioral intention rather than perceived behavioral control is a stronger predictor of pubertal health behaviors. For every one unit increase in the behavioral intention, the likelihood of positive health behaviors increases 0.36. For every one unit increase in the perceived behavioral control, the likelihood of positive health behaviors increases 0.26 (**Table.2**) (*Please see the end of paper*).

Table-1: The comparison of mean score of the theory of planned before and two months after intervention

Structure	Mean ±SD		P-value	Mean ±SD		P-value
	Case before intervention	Case after intervention		Control before intervention	Control after intervention	
Attitude	5.20±34.76	5.02±40.83	<0.001	4.63±34.58	5.41±34.76	0.807
Subjective norms	3.74±26.01	4.66±28.18	<0.001	3.90±26.80	4.09±26.85	0.923
Perceived behavioral control	4.27±23.60	2.73±27.46	<0.001	3.61±23.10	4.13±22.40	0.209
Behavioral Intention	2.90±26.96	4.33±34.01	<0.001	3.38±26.81	3.22±27.41	0.193
Behavior	2.688±19.93	3.53±25.26	<0.001	2.67±20.06	3.17±20.78	0.034

SD: Standard deviation.

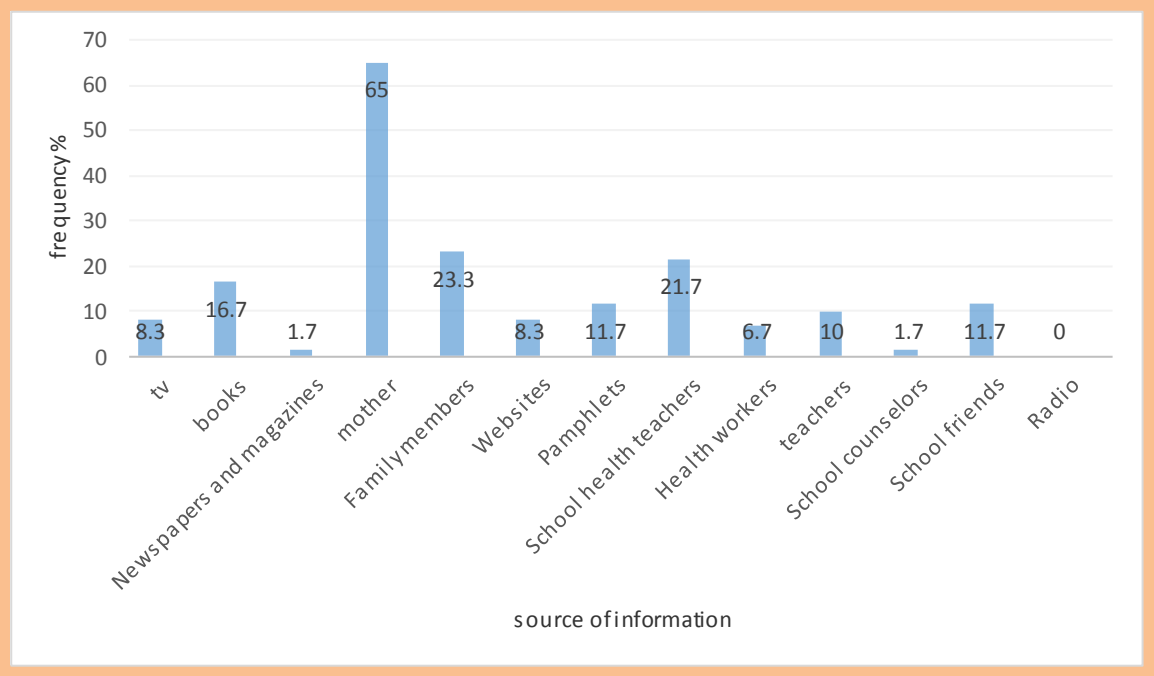

Fig.1: Frequency of information sources about puberty health in female first grade high school students.

4- DISCUSSION

The theoretical basis of this study is the theory of planned behavior. It is used to maintain and change health behaviors (20). Regarding the effective application of the planned behavior theory on various studies, for the first time in this research planned behavior theory was used to promote girls' pubertal health; the test results confirmed the effectiveness of it on promoting their physical maturity health (Table.1). After educational intervention students attitude on pubertal health has statistically significant changes rather than per- intervention period (Table.1). In line with our findings, other studies also showed the effect of education on attitude (21-24). Attitude as a determinant mental process for potential and actual actions is a predictor of behavior. It means that people always and examine before make a decision about doing an action (25). In this study, mental norms regarding pubertal health after the intervention compared with pre-intervention has statistically significant changes (Table.1). Another studies was conducted to examine the efficacy of educational interventions on the basis of the planned behavior theory on AIDS preventive behaviors in healthy volunteers in Sirjan and Mashhad, Iran, and there were significant changes after the intervention in the intervening group in subjective norms regarding HIV preventive behaviors in healthy volunteers compared with before training (26, 27).

A study was conducted to evaluate the impact of applying the planned behavior theory on prevention of permanent teeth decay in fifth grade students in Khaf city-Iran, after the educational intervention, subjective norms of the prevention of permanent teeth decay increased, this change was statistically significant (28). Also, a study was conducted to determine the effect of educational intervention on fruit and vegetable consumption increase by using the planned behavior theory, after the intervention subjective norms increased, and it was statistically significant (23). On the other hand, in a study by Peyman and Nasehnezhad,

education programs had little impact on subjective norms (29) Subjective norms as second effective factor on intention includes "a person's perceived social pressure to do or not to do the desired behavior", or in other words, reflecting the impact of social influence on person (20). At current study, after the intervention, perceived behavioral control about puberty health compared with pre-intervention has statistically significant changes (Table.1). The results of the study of Jalali et al. and Gholipour-Baboli were showed that after the educational programs there was a significant increase in the mean score of perceived behavioral control in the interventional group (22, 30).

If the behavior is not under control considering strong influence by attitudes and subjective norms, it is possible to not do the behavior of interest. When there is no limitation to admit a particular behavior, every behavior can be under full control (25), so that in the study of Mohammadi et al. (31), the results were consistent in this field and showed that the attitude was the one of the best predictor of behavior as well as some other studies confirmed these results (32-34). In this study behavioral intention regarding pubertal health has statistically significant changes compared with pre-intervention (Table.1). Another study was conducted to investigate the effect of training intervention based on the theory of planned behavior on promoting safe behaviors in crossing the street in fourth-grade students in Tehran. A randomized controlled trial was conducted on 160 fourth-grade students (80 girls and 80 boys) who were randomly selected from district 4 of Tehran, in two experimental and control groups. After the intervention in the experimental group, there were significant changes in behavioral intentions regarding the promotion of safe behaviors in students' crossing the street compared with before training (35). As well as the findings of Mohammadi Zeidi et al. and Kothe et al. (23, 36) confirmed the present study. The theory of planned behavior suggests that people's intention to do a particular behavior is the best predictor of their actual behavior. Except behaviors that are largely beyond the control of the person, intention to do a specific behavior shown to predict actual behavior (37). Pubertal health behaviors have been improved after intervention compared with before which was statistically significant change (Table.1).

Studies on the effectiveness of training on the performance of students are different from pubertal health studies. In a study conducted by Nouri Sistani et al., there was a significant behavioral changes in female students after education in the intervening group. The importance of using educational approach of peer groups was one of the reasons for the effectiveness of education in the study of Nouri Sistani et al. (38). In a study conducted by Dongre et al., there was a significant change in the performance of girls in menstrual health management (39). Also, a study conducted by Zabihi et al., showed that there was a significant relationship between the performance of student in pubertal health care before and after education (40).

The results of this study showed the main sources of information were mothers, family members and school health teachers were next in the ranking (Figure.1). In other studies that have been conducted in the field of pubertal health the most important sources of information were mothers (41). In another conducted study in Karachi- Pakistan, the Internet was expressed as the source of information about menstrual health (42). Regarding mothers as the important source of information, it is needed to pay more attention to their training through education system.

The results showed behavioral intention is the predictor of pubertal health behaviors (Table.2), and the more behavioral intention the students have (such as using sanitary pads, light-colored and cotton underwear, underwear daily change, daily activities and exercise, and pain control methods, visiting doctor if there is severe pain) the more health behaviors show. Milne et al. also showed where the relations between intention and behavior is stronger, Milne et al., showed that when there is a relationship between intention to treat and behavior, we can observe the behavior of interest and also suggested that the intention of positive health behavior is significantly associated with the behavior of individuals in the future (43).

This study showed, perceived behavioral control predict health behaviors during adolescence (Table.2). Ajzen stated perceived behavioral control is an important factor affecting behavior; when people are unsure about their ability to perform specific behaviors, perceived behavioral control assessment can help to predict these behaviors (44). According to the results of this study, 51.9% health behavior change theory is explained by planned behavior variables. In line with the results of the present study, the research conducted by Ismail et al., showed that constructs of theory of planned behavior predicted 51% of changes in the exclusive breastfeeding behavior (45). But not conform to the findings of study of Peyman et al. (29) and Jamei et al. (46).

4-1. Limitation of study

The limitations of this study can be the sensitivity to the issues of puberty and the problems of this period. For this reason, it was difficult to communicate with them and more time and meetings are required.

5- CONCLUSIONS

According to the research, it can be concluded that educational interventions has impact on improving structures (attitudes, subjective norms, perceived behavioral control and intention), and physical function of the under study population; thus, it is better to use this theory in educational programs of puberty in adolescent girls. According to the results of this study it is suggested to enhance interventions in order to strengthen pubertal health behavior, the intention and perceived behavioral control in female students .regarding intention in this study as the most important determinant of pubertal health behaviors it is recommended the researchers more emphasis on this structures for the preparation of texts according to their needs and model structures. Classes about the adult girls' needs should be held in schools for parents, especially mothers, to be familiar with these issues.

6- AUTHORS CONTRIBUTIONS

- Study design: FE, FR.
- Data Collection and Analysis: ARK, and SK.
- Manuscript Writing: FE, FR.
- Critical Revision: FR, SK.

7- CONFLICT OF INTEREST

All the authors declare that they have no conflict of interest.

8- ACKNOWLEDGMENTS

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Table-2: Multiple linear regression to predict health behaviors by the structure of the theory of planned behavior in the intervention group and control group

Structure	P-value		Beta		S.E		B		Adjusted R Square	
	Control	Case	Control	Case	Control	Case	Control	Case	Control	Case
Attitude	0.029	0.295	0.305	0.11	0.080	0.07	0.179	0.08	0.109	0.519
Subjective norms	0.403	0.540	0.110	0.06	0.102	0.09	0.086	0.06		
Perceived behavioral control	0.211	0.054	0.160	0.20	0.095	0.13	0.121	0.26		
Behavioral intention	0.281	<0.001	0.140	0.44	0.126	0.08	0.137	0.36		

SE: Standard Error; BETA: Beta coefficient; P: The significance level.