Puberty Health Status among Adolescent Girls: A Model- based Educational Program

Fatemeh Kheirollahi[1], Zahra Rahimi[1], Shahram Arsang- Jang[2], Gholamreza Sharifirad[3], Parisa Sarraf[1], *Zabihollah Gharlipour[4]

[1]Student of Research Commute, Faculty of Health, Qom University of Medical Sciences, Qom, Iran. [2]Instructor, Department of Epidemiology and Biostatistics, Faculty of Health, Qom University of Medical Sciences, Qom, Iran. [3]Faculty of Medicine, Islamic Azad University, Qom Branch, Iran. [4]Department of Health Education and Promotion, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.

Abstract

Background
Adolescence is the period of transition from childhood to adulthood and is one of the fastest stages of human development which is simultaneous to start of puberty. This study aimed to investigate the puberty health status among adolescent girls through a model- based educational program.

Materials and Methods
The current study was an interventional quasi-experimental research. It was conducted on 152 girls aged 13 to 15 years old on the city of Qom- Iran. To select the subjects, first an education zone was randomly selected. In that zone, two schools were randomly selected as the intervention and control groups (76 for interventional group and 76 for control group). After confirming the reliability and validity of a researcher-made questionnaire, it was used to collect the required data via self-reports. Data were analyzed using SPSS version 20.0 software.

Results
The mean age and menarche of the students were 13.59 ± 0.87 and 12.38 ± 0.99 years, respectively. There was a statistically significant difference between the mean scores of knowledge and behavior in intervention and control groups after educational intervention, so that the mean scores of knowledge and behavior about puberty health in the intervention group were higher than the control group ($P< 0.05$). However, there was no significant difference between the scores of Health Belief Model constructs ($P > 0.05$).

Conclusion
As the results showed, before the intervention the status of knowledge, attitude toward puberty health, and behavior about puberty health of the studied students was not favorable. Therefore, it is necessary to highlight the need for educational interventions and the role of health professionals in this field.

Key Words: Adolescent, Educational program, Health, Puberty.

Corresponding Author:

Dr. Zabihollah Gharlipour, Department of Health Education and Promotion, Faculty of Health, Qom University of Medical Sciences, Qom, Iran.

Email: gharlipourz@yahoo.com

1- INTRODUCTION

Adolescence is the period of transition from childhood to adulthood and is one of the fastest stages of human development which is associated with major hormonal and the biological changes including physical growth, maturation, and emergence of secondary sexual characteristics (1-4). Puberty in girls is characterized by a transfer from girlhood to womanhood which is concomitant with stressful events such as menarche (5). Menstruation is known as the most unpleasant event occurring in adolescence (6), because this physiological phenomenon in many women is associated with irregular menstruation, dysmenorrhea, and excessive bleeding (7).

The way an adolescent girl learns about menstruation and its hygiene could affect her response to the menarche event (7). In other words, a girl's response to the menstruation depends on her knowledge and information (5), and it is affected by several issues such as lack of knowledge, negative attitude, and cultural perspective (8). The principles of specific health care needs of women during the menstrual cycle, is called "menstrual hygiene" (3).

In many developing nations, many adolescents are influenced by the culture of silence and do not have appropriate information about this issue (9), for example, less than 50% of girls in Pakistan had received information about menstruation before the start of menarche (10). Given the mutational growth during adolescence, people at this stage of life face excessive nutritional needs, which may result in unpleasant outcome if the needs are not met (11). Regional studies in India, Bangladesh, and Indonesia showed that this age group had not a desirable condition which was attributed to several factors such as girls' lack of understanding of their nutritional needs (12).

A review of adolescents' health records and needs shows that in recent years less attention has been paid to the health needs of this group, as compared with the children and even adults. Puberty issues, including health and nutrition and how to spend this life stage, are very important because they have a significant effect on social and sexual behavior of people when they become adults; but the majority of studies have shown that people do not have enough knowledge in this area (13).

The significance of the issue can be more highlighted by statistical data, as according to the census 2011, 16.36% of the population in the country, i.e. about 12 million people, are aged 10-19 years old (14); moreover, the global rate is equal to 1.2 billion, meaning that one out of every six people are adolescents (4). In Iran in recent years, reproductive health services have been one of the main concerns of the Ministry of Health and Medical Education and the Ministry of Education. However, because of the cultural limitations, educations on menstrual hygiene and related issues have not been clearly presented; consequently, it has resulted in many incorrect behaviors in girls (6).

Health education stimulates people's motivation and participation and is used to increase the awareness and decrease high risk behaviors in people. Among adolescents, girls are especially vulnerable and more susceptible biologically to reproductive tract infections (1). The effectiveness of educational intervention has been proved by several studies, including studies by Koch (15); Premila et al. (16) and Abedi et al. (17).

The aim of health education is to create positive behavioral changes and help people to make decisions and maintain healthy behaviors (18). Accordingly, after choosing an appropriate education method in line with the education goals, the level of learning can be measured via evaluation of its effectiveness (13). The Health Belief

Model is a comprehensive model that mainly plays a role in preventing health problems; it evaluates people's perception of the susceptibility and severity of a health problem and considers the behavioral stimuli such as perceived benefits and perceived barriers to explain why people adopt or do not adopt preventative health behaviors (18).

This model underlines how an individual's perceptions and understanding and fear of disadvantages of health problems and their evaluation of the benefits and barriers leads to the adoption of preventive behaviors. So that, Valizade et al. showed that significance differences after educational intervention in the mean scores of knowledge, perceived susceptibility, perceived severity, perceived benefits, cues to action and behavior about puberty health among teen boys in the intervention group (18). Therefore, this study aimed to evaluate puberty health status among adolescent girls: a model- based educational program.

2- MATERIALS AND METHODS

2-1. Study design and population

This study was an educational intervention study which randomly assigned the subjects to intervention and control groups and studied a group of girls aged 13 to 15 years old living in the city of Qom- Iran.

2-2. Methods

After randomly selecting one of the Education zones, two schools were randomly selected for the study. Using random cluster sampling method, 76 students were assigned to the intervention group and 76 other students were assigned to the control group.

2-3. Measuring tools: validity and reliability

The questionnaire was consisted of demographic questions (10 items) and questions about the status of students' knowledge, Health Belief Model constructs, and behavior in terms of health and nutrition during adolescence. Students' knowledge was measured by 23 questions (about age and sings of puberty, normal and abnormal changes, and health and nutritional issues during puberty) which were answered using the three options of true, false, and I do not know. Accordingly, a correct response was scored 1 point and an incorrect or I do not know answer was scored 0 point (scores ranged from 0 to 23).

Questions on Health Belief Model constructs included items about perceived susceptibility (5 items), perceived severity (5 items), perceived benefits (5 items), and perceived barriers (6 items) which were answered using a five-point Likert scale. Accordingly, the options of strongly agree and strongly disagree were scored 5 points and 1 point, respectively. Health and nutritional behavior of students, respectively, were examined by eight and nine questions.

In order to check the validity of the content of the questionnaire, it was revised and modified based on the comments by several faculty members expert in health education and nutrition. The reliability of the questionnaire was assessed through testing the responses of 25 students to the questionnaire; as the results showed, Cronbach's alpha coefficient was 0.80 for knowledge, 0.71 for perceived susceptibility, 0.89 for perceived severity, 0.85 for perceived benefits, 0.83 for perceived barriers, and 0.89 for behavior.

2-4. Intervention

The most important issues and topics discussed in this intervention were puberty and its signs, differentiating between normal and abnormal signs of puberty, and the hygiene during puberty. These topics were trained through lectures, questions and answers, and poster designed by

Ministry of Health **(Table.1).** Before the intervention, the students in both groups have completed the questionnaire; two

months after the end of the training sessions, the students were asked to complete the questionnaire again.

Table-1: Steps of educational protocol in intervention group

Educational content	Time (minute)	Target group (year)	Educational method
Importance of puberty health and nutrition in puberty period	45 min	13 -15 years old Girls	lectures, questions and answers
The negative consequences of the lack of puberty health	45 min	13 -15 years old Girls	lectures, questions and answers
Benefits related to behaviors of puberty health status	45 min	13 -15 years old Girls	lectures, questions and answers

2-5. Ethical consideration

During the process of data collection, first the research goals were explained, students' consent was obtained, and they were assured about the confidentiality of the collected data. This study was conducted as a research projects approved by Qom University of Medical Sciences and it obtained a code of ethics.

2-6. Inclusion and exclusion criteria

The inclusion criteria were having at least three menstrual cycles and the willingness to participate in the study. The exclusion criteria was student being absent for more than one sessions during training, and students who questionnaires filled out incompletely.

2-7. Data Analyses

The analysis of covariance was used to control for differences between the two intervention and control groups in terms of pre-intervention values of knowledge, behavior, and other desired factors and the moderating effects of age, father's occupation, mother's education, relevant educational background, and the economic status. In addition, multiple linear regression was used to evaluate the factors affecting the behavior of the students before the intervention, at the significant level of 0.05. Data were analyzed by SPSS

version 20.0 using Chi-square, Fisher's exact test, ANOVA and Analysis of covariance were used to perform the above implemented analyses.

3- RESULTS

In this study, a total of 152 students (intervention group: 76 persons, control group: 76 persons) were studied; the mean age and menarche of the students were 13.59 ± 0.87 and 12.38 ± 0.99 years, respectively (**Table.2**). The majority of the parents had primary education and only 6% of fathers and 7% of mothers had academic education.

Moreover, 55.3% of the students were living in families with four to five members. There was a statistically significant difference between the intervention and control groups in terms of the frequency of previous education (**Table.3**), so that more girls had previous education in the control group than the intervention group. Based on the results of this study, the scores of knowledge and behavior of students in the intervention group were increased after the educational programs; however, we did not observe any change in the constructs of the education model (**Table.4**).

As shown in **Table.5**, based on the results of covariance test after adjusting for the effects of baseline values, there was a statistically significant difference between the two groups in terms of the mean score of knowledge after the intervention, so that the mean score of knowledge was higher in the intervention group than in the control group. Moreover, there was a statistically significant difference between the control and intervention groups in terms of the mean score of behavior (P = 0.019), so that the mean score of behavior was higher in the intervention group than in the control group. After adjusting for baseline values, the results of analysis of covariance showed no statistically significant difference between the control and intervention groups in terms of the mean scores of perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (P > 0.05). Finally, the educational program was increased knowledge and behavior of puberty health and nutrition in in puberty period.

Table-2: Mean and standard deviation of demographic profile of the students

Variables	Mean ± SD
Age (Year)	13.59 ± 0.87
Weight (Kg)	48.03 ± 9.58
Height (Cm)	157.04 ± 12.29
Menarche (Year)	12.38 ± 0.99
Number of family members (No)	5.5 ± 1.72

Table-3: Frequency distribution and comparison of demographic characteristics of students in the intervention and control groups

Variables		Intervention group Frequency (%)	Control group Frequency (%)	P-value
Grade	Seventh	52 (69.3)	41 (54.7)	0.0001
	Eighth	0 (0)	34 (44.7)	
	Ninth	23 (30.7)	0 (0)	
Mother's education	Illiterate and primary school	52 (68.4)	57 (75)	0.196
	Junior and senior high school	23 (30.3)	19 (25)	
	Academic	1 (1.3)	0 (0)	
Father's education	Illiterate and primary school	39 (52)	46 (61.3)	0.334
	Junior and senior high school	31 (41.3)	25 (33.3)	
	Academic	5 (6.7)	4 (5.3)	
Mother's occupation	Housewife	69 (90.8)	67 (89.3)	0.806
	Other	7 (9.2)	8 (10.7)	
Father's occupation	Self-employed	31 (40.8)	35 (46.7)	0.262
	Employee	4 (5.3)	8 (10.7)	
	Other	41 (53.9)	32 (42.7)	
Previous education	Yes	48 (63.2)	64 (86.5)	0.001
	No	28 (36.8)	10 (13.5)	
Economic status	Poor	51 (67.1)	39 (54.2)	
	Moderate	19 (25)	30 (41.7)	
	Good	6 (7.9)	3 (4.2)	

Table-4: Mean and standard deviation of Health Belief Model constructs before and after the educational program in the intervention and control groups

Variables	Group	Mean ± SD *	
		Before intervention	After intervention
Knowledge	Control	52.58 ± 6.58	52.77 ± 6.87
	Intervention	55.83 ± 6.77	86.36 ± 7.11
Perceived susceptibility	Control	79.24 ± 11.37	79.66 ± 11.04
	Intervention	78.93 ± 12.62	77.30 ± 12.78
Perceived severity	Control	73.99 ± 12.88	74.61 ± 11.64
	Intervention	73.86 ± 18.53	73.94 ± 11.39
Perceived benefits	Control	84.72 ± 11.77	86.79 ± 11.34
	Intervention	82.40 ± 11.26	86.62 ± 10.97
Perceived barriers	Control	64.41 ± 17.16	66.36 ± 18.04
	Intervention	72.71 ± 14.96	72.79 ± 17.81
Behavior	Control	53.06 ± 12.71	56.17 ± 11.06
	Intervention	54.06 ± 12.96	62.14 ± 12.60

SD: Standard deviation; * Scores are calculated on a 100 point scale.

Table-5: Differences in mean scores of Health Belief Model constructs in intervention and control groups after educational program

Variables	Mean ± SD*		Mean difference	P- value	Confidence interval
	Control	Intervention			
Knowledge	53.42 ± 2.02	60.84 ± 1.77	7.42	0.001	(3.33 – 11.50)
Perceived susceptibility	75.84 ± 1.89	77.78 ± 2.17	1.94	0.380	(-6.31 – 2.42)
Perceived severity	73.66 ± 2.09	74.30 ± 1.83	0.63	0.766	(-3.58 – 4.86)
Perceived benefits	87.73 ± 2.03	88.31 ± 1.77	0.57	0.780	(-3.52 – 4.67)
Perceived barriers	67.13 ± 2.60	65.88 ± 2.32	1.24	0.656	(6.77 – 4.27)
Behavior	51.36 ± 1.08	54.00 ± 0.94	2.64	0.019	(0.43 – 4.85)

SD: Standard deviation; * Scores are calculated on a 100 point scale.

4- DISCUSSION

This study aimed to evaluate the effect of an educational health program designed based on the Health Belief Model on promoting health and nutritional behavior of adolescent girls during puberty. According to the results of this study, training based on Health Belief Model effectively engaged students in one of the most important health issues of adolescents, as the knowledge and behavior of the subjects significantly after the intervention. Based on the results, the mean age of menarche in this group was 12.38 ± 0.99 years old, however it has been reported differently by various studies conducted in different parts of the world. For example, it was 13.31 ± 1.02 years old in India (5), 11.35 ± 0.84 in China (8), 11.97 ± 0.82 in Tehran (19), and 13 years in Ilam- Iran. The observed difference can be attributed to genetic factors, race, climate, and nutrition status. We examined the different fields of health knowledge, and we found that students'

knowledge of puberty and its signs, normal and abnormal signs of puberty, and hygiene was increased in adolescents in the intervention group. However, in the control group we observed only a small increase in students' knowledge of puberty and its signs. In a study by El-Lassy et al. in 2015 which investigated puberty hygiene of the Egyptian girls, the results showed that the subjects' knowledge significantly increased after education (21). This fining is consistent with the results of our study, as the mean score of knowledge of the intervention group had increased after the intervention and we observed a statistically significant difference in mean values. It demonstrates the impact of education on promoting the knowledge of this group of people.

The results of Haque's study on Bangladeshi girls showed that before intervention, the girls' knowledge of puberty hygiene was low and associated with false beliefs; however after the intervention, false beliefs about personal health were modified and replaced with true belief (9). In addition, El-Mowafy's et al. (22) and Moodi's et al. (23) studies were conducted to evaluate the impact of educational programs on promotion of health knowledge among adolescent girls and they reported the results which are in line with our findings. Having proper knowledge about a specific subject is considered as a prerequisite for developing a correct attitude toward a that particular issue and adopting appropriate behaviors, as knowledge and perceived susceptibility toward a health issue would act as a factor motivating the behavioral changes (24).

Concerning the behavior of students toward puberty hygiene, based on the results it can be stated that educational intervention designed based on the Health Belief Model was able to affect the behavior of students and improve it. In a similar study by Premila et al. which was conducted in one of the cities in India, it

was revealed the educational intervention had a positive effect on the improvement of adolescent girls' behavior (16). The impact of education intervention on improving the behavior is also reported in studies by Bhudhagaonkar and Shinde (25) and El-Lassy and Madian (21) which were conducted in India and Egypt, respectively. We did not observe a statistically significant difference in mean values of changes in perceived susceptibility and severity in the education group after the intervention. This finding is in line with the results of a study by Park et al. which investigated the effect of an educational intervention program on increasing women's participation in a cervical cancer screening program (26).

In a study by Tussing and Chapman-Novakofski which was conducted to assess the impact of educational interventions on prevention of osteoporosis, it was found that there was a statistically significant change in perceived susceptibility, however, the change in perceived severity was not significant (27). Inconsistent with our results, Shirzad et al., conducted a study to determine the effect of an education program designed based on the health belief model on adolescent girls health; based on the results of their study, after implementing the educational intervention, perceived susceptibility and severity of puberty hygiene had a statistically significant change, as compared with the time before the intervention (28).

To justify the observed difference, it might be said that the studied adolescent girls did not consider themselves to be at risk of a health problem when comparing themselves with others, thus they did not develop enough attitude and belief toward these changes. In this study, although the mean scores of perceived benefits and perceived barriers in the intervention group increased after the intervention, however the change in the mean difference

was not statistically significant. In line with this study, Hazavehei et al. conducted a study to investigate the effect of teaching on the prevention of osteoporosis in female high school students in Garmsar- Iran, and the results showed no significant differences in the mean scores of perceived barriers after the intervention (29).

Although the results of this study showed no significant change in the constructs of Health Belief Model, some studies such as a study by Abedi et al. (17) (with a title similar to ours) and by Koch (15) in the USA (which was conducted on diabetic patients) showed that these constructs had an impact on the promotion of people's knowledge and behavior after the intervention. It seems that the short time of education intervention prevented students from exact identification of the barriers and benefits of health behavior.

4-1. Limitations of the study

This study had some limitations. For instance, the questionnaire was completed via self-reports, students did not carefully pay attention to educational topics as they had received some trainings beforehand, and the school principals did not cooperate well in the process of intervention.

5- CONCLUSION

As the results showed, before the intervention the status of knowledge, attitude toward puberty health, and behavior about puberty health of the studied students was not favorable. The educational program based on Health Belief Model was increased knowledge and behavior of puberty health and nutrition in in puberty period.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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