



Impact of Puberty Health Education on Anxiety of Adolescents

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ABSTRACT

Adolescents, as a large group in the world, face many physical changes and psychological evolutions in their puberty period. If enough attention is not paid to such changes, negative effects on their health and knowledge may be induced. Thus, it is very important to hold health education appropriate for their needs using new educational methods and confident sources. The main goal of this study is to explore the impact of puberty health education on the anxiety of girls. It is a quasi-experimental study using clustered sampling which was done on 159 girls from two high schools in Tehran divided into two experimental (N=86) and control (N=73) groups. Then, using a systematic educational plan revised by the researcher and expert panel from Department of Midwifery, all the students and their parents in the experimental group were instructed. Data were gathered by demographic questionnaire and Spielberger Scale. Questionnaires were completed by students in three phases including before, after, and three months after the end of the educational program. Data analysis was performed by paired t-test, independent t-test, Chi square, and multivariate tests. Mean anxiety scores in the experimental and control groups were 90.45 and 85.36 before the education, 78.79 and 85.49 at the end of the education, and 78.46 and 87.33 3 months later, respectively. Anxiety scores were statistically different post-intervention ($p < 0.001$) and three months later ($p < 0.001$). Puberty health education programs could reduce anxiety in female adolescents.

Key words: anxiety, education, health education, puberty, adolescent.

INTRODUCTION

Anxiety is the most prevalent mental reaction to new changes and experiences and indicates an imminent hazard which leads people to take necessary measures for coping with or reducing its side effects[1]. This term has a special standpoint in the psychology of abnormal and clinical behaviors and has been frequently used[2]. Anxiety is a prevalent disorder among children and adolescents and can form background of disorders such as severe depression, drug abuse, and even committing suicide in the youth and adulthood[3].

A group of researchers believe that structural changes of puberty period are considered a crisis for adolescents, which may induce and continue adolescent problems such as increased anxiety[4]. In fact, anxiety is a response to a threat and puberty is a threatening factor for adolescents. In the study by Neisani Samani et al. [2012], 61.7% of female students experienced medium and severe degrees of anxiety during their puberty period[5]. Some studies have also reported 10 and 20% prevalence of anxiety disorders in adolescents[6]. In addition, anxiety at the beginning of adolescence may lead to sensitivity in interpersonal relations and reduced compatibility. Anxious adolescents experience more psychological problems than their peer groups [4]. Recognizing puberty health and health threatening risks during this period and awareness from the causes and reasons of special changes occurring in

this period can prevent many problems of adolescents and reduce their distress; moreover, even little investment in training girls and women will provide doubled achievement in all the dimensions of social development [7].

However, one of the important issues is receiving insufficient and improper training about issues related to puberty health via standard and soundly designed information sources [8]. Weak knowledge of students about AIDS, venereal diseases, and reproductive health was found in the study by Uddin and Choudhury in Bangladesh [9]. Similar results were obtained in Latif *et al.*'s work on Iranian adolescent girls in Mashhad and Ahwaz cities in 2012, which was conducted on the necessity of training sexual issues to girls [10]. Therefore, considering the importance of adolescence and its effect on the life of people, any training for proper interaction with the surrounding environment helps adolescents to safely pass this turbulent period and prepares themselves for entering another life stage [5].

There are different methods for training adolescents which include group discussion, simulation and playing roles. A trainer should apply the best method in special situations considering time, characteristics of learners, and educational content and goal [11]. Group consultation can be preferred over individual treatments for some reasons: first, a trainer can take advantage of his/her time, which should be considered in terms of cost as well. Second, group environment has other benefits such as equality of experience, modeling peers, and receiving peer support [12,13]. In a qualitative research which was conducted by Kamali Khah *et al.* [2012], students believed that the best method of puberty health education was question and answer in small groups and group consultation [14].

Considering the above materials, puberty health education seems necessary at this age due to special conditions and mental crises of the puberty period, increased preparedness of adolescents for these changes and reduction of its resulting fear, improvement of their mental and behavioral status, and prevention from acquiring improper information from unqualified people about puberty health. Numerous studies have been conducted on puberty and adolescence health; but, most of them have acted in traditional ways; teaching method was lecturing in most cases, the trainer and trainee have acted unilaterally, no dynamicity is observed in training methods, and students have not actively participated. Considering the present authors' experience in the fields of health training to female adolescents in city of Tehran and the available sources, they intended to design and execute a research beyond the ones which have been conducted in Iran in order to improve mental condition of female adolescents, promote their life quality, and provide mental health of female adolescents for promoting health of the population. The objectives of the current study were comparing students' anxiety score after puberty health education and the score three months after it in two intervention and control groups.

MATERIALS AND METHODS

This study was approved by Research Deputy of Tehran University of Medical Sciences. Informed written consent was obtained from all the participants (students and their parents) before starting the study. All the participants first accepted the research.

This investigation was a randomized quasi-experimental study. The researcher evaluated the impact of puberty health education on anxiety in adolescents. Thus, 159 students aged 14-16 years old participated in 6 sessions of puberty health education. Randomization was based on the studied environment which was done by selecting 1 out of 22 educational districts in city of Tehran, Iran, using a random number table; thus, all the public high schools including Moalem and Hadaf girls high school located in Region 4 of Tehran, Ministry of Education, were identified ($n=28$). Thereafter, each of the public high schools was given a special number and 2 high schools were randomly selected using the random number table. After the random selection of the two high schools, in order to prevent information pollution among the groups, participants of the experimental and control groups were selected from separate high schools. Thus, one high school was randomly allocated to the experimental and another was randomly allocated to the control groups. Finally, in each of the high schools, three classes were randomly selected. In this research, puberty health education to adolescents was done by one of the members of midwifery team along with parents in group discussion method and based on a formulated lesson plan in order to determine effect of puberty health education on the anxiety of female students.

The eligible participants with inclusion criteria were chosen from the selected high schools. Sampling was clustered selection method and sample size was identified by 90% of power and 10% df through this formula:

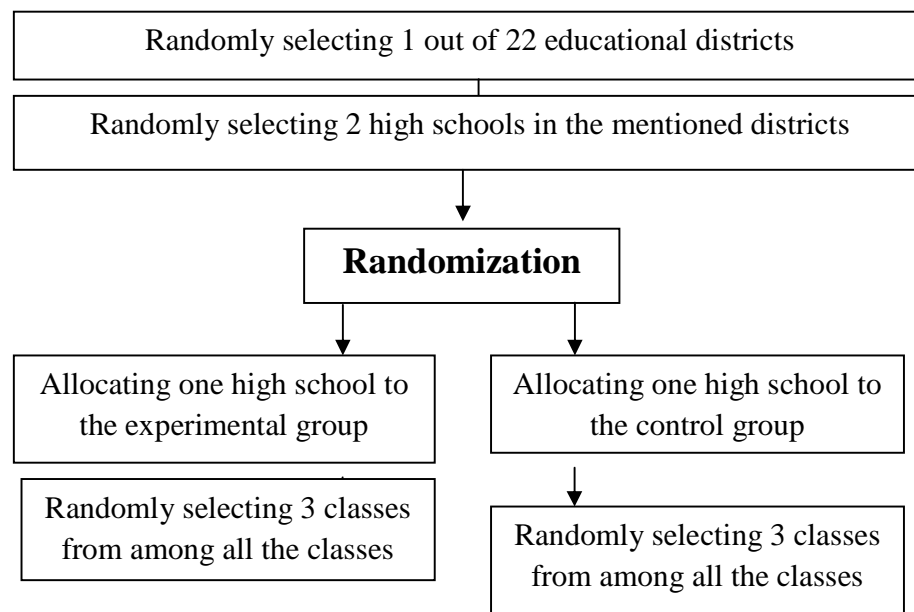
$$\frac{2\left(z_{1-\frac{\alpha}{2}}+z_{1-\beta}\right)^2 s^2}{(\mu_1-\mu_2)^2} \times n \geq \frac{1}{1-f}$$

The inclusion criteria of this study included physical and psychological health, living with their own parents, having menarche experience, no history of educational pass mutation or fail, no use of antidepressant drugs, parental agreement for participation in research, and no experience of specific puberty education and stressful events during three last months. The exclusion criteria were avoidance from continuing cooperation in the research and more than 2 sessions of absence and occurrence of stressful events during the research or three months after the end of the educational program. In general, 86 subjects in the intervention group and 73 in the control continued the study and there was no drop-out.

The questionnaire consisted of two parts: the first part included demographic information such as number of family members, parents' occupation, parents' education, and parents' age.

The second part also included 40 questions on anxiety among adolescents.

The State-Trait Anxiety Inventory was designed by Spielberger *et al.* (1970) and revised later in 1983. It was used in Iran after cultural adaptation with Iranian community. So, after determining validity of this questionnaire by Dehghan Nayeri *et al.*, its reliability was calculated with correlation .90(15). Of course, in this study, anxiety was considered a quantitative variable and the questionnaires were filled out as a self-report.



The researcher referred to high school director of the intervention group and explained the procedure. Among all the classes, three classes were randomly selected. Then, she attended all three classes and explained the research and its methodology. Also, the students and their mothers were invited to attend the briefing session. In the meeting, the researcher explained educational content, number of sessions, teaching style, date of starting classes, location of classes, and so on. In this session, all the inclusion criteria were checked. Then, the students and their mothers were voluntarily enrolled to participate in this training course. Also, confidentiality of their information and the point that they can freely exit the study were emphasized. At the end of this session, the students and their mothers endorsed a written informed consent. In the next step, using a systematic educational plan, all the students and their mothers were instructed. Content of the educational program included subjects like knowledge of reproductive anatomy and physiology, menstrual health, pre-menstrual syndrome, dysmenorrhea, nutrition in adolescence period, Islamic guidelines for approaching teenage problems, and Islamic laws for adolescents and sexual health (for mothers), which took six 60 min and one 90 min sessions. Teaching methods included focus group, questions and answers, lecture, and group discussion. Indeed, the dominant teaching method was focus group in more sessions, because this

method is one of the most effective teaching methods for adolescents(11). It should be noted that, concurrent with these activities, the researcher attended high schools of the control group and randomly selected 3 classes. All the students of these three classes voluntarily participated in this research. This group of students was not trained by the researcher. Then, the students of the control group completed a demographic questionnaire and Spielberger anxiety inventory in three phases which was simultaneous with the intervention group.

Statistical analysis

The data were analyzed in SPSS software (ver. 16). Anxiety scores were compared in three phases (before, after, and three months after the training) between the intervention and control groups using independent t-test. The process change on the anxiety variable was assessed by ANOVA test in each group.

Ethical considerations:

In this research, the following ethical considerations were considered by the researchers:

Receiving permission from ethical committee of the university (code 90/ص/130/1882), the concerned authorities, and Department of Education, District 4; Presenting necessary explanations about the goal of the research and its procedure for the concerned authorities; Receiving informed consent from adolescents and their parents; Ensuring the research units about the confidentiality of all the obtained information and notifying that research results could be given to the concerned authorities and participants upon their request; Ensuring the research units about their voluntary exclusion from the study in the case of reluctance to cooperation at each stage of the study; Presenting appropriate recommendations about severe anxiety to parents, school authorities, or students; Giving an instructional pamphlet with the content of puberty health to the control group after the study.

RESULTS

The results obtained from investigating demographic variables are shown in Table 1. The highest percentage of fathers in the research samples held Bachelor's degree (30.2%) and were employees (44.6%) in intervention group and held high school degree (42.5%) and were self-employed (52.2%) in control group. The highest percentage of mothers held high school degree in both groups (43% in intervention group and 54.9% in control group) and were housewives (84.7% in intervention group and 88.7% in control group).

Statistical tests demonstrated that two intervention and control groups were similar in terms of demographic variables such as age of students, number of family members, general average of previous year, father's age, mother's education, and mother's occupation and there was no significant difference between them ($p > 0.05$).

But, the intervention and control groups were not similar in terms of three variables of father's education, father's occupation, and mother's age and there were statistically significant differences between them ($P < 0.05$). Therefore, Mantel-Haenszel test was used for examining confounding effect of these three variables, the result of which showed that the variable of father's education had a confounding effect on the anxiety of two intervention and control groups.

To measure effect of puberty on the anxiety of adolescents, independent t-test was used. Results of this test showed that mean score of anxiety before education was not significantly different between the two intervention and control groups and both groups were homogenous in terms of anxiety rate at the pre-education stage; but, mean score of anxiety had statistically significant difference between two intervention and control groups immediately and three months after the education (Table 2).

Table 1: Demographic data of students and their parents in two intervention and control groups

Variable	intervention group (n=86)	control group (n=73)	P value
Age of students	14.98 ± 0.67	15.15 ± 0.75	0.16
Number of family members	4.59 ± 0.97	4.74 ± 1.04	0.361
General average of previous year	19.25 ± 0.71	19.03 ± 0.77	0.079
Father's age	44.44 ± 4.302	45.64 ± 8.15	0.273
Mother's age	39.45 ± 5.07	41.72 ± 5.90	0.010

To study the trend of changes in anxiety score in the intervention group, repeated measures ANOVA was used. Results of this test showed that trend of changes in anxiety was significantly descending in the intervention group (Table 2).

Table 2: Comparing statistical indices of anxiety score of students before, after, and 3 months after education in two intervention and control groups

Variable	Stage	Group	Mean	Standard deviation	Independent t-test
Anxiety	Before education	Intervention (n=86)	90.45	21.35	t=1.56
		Control (n=73)	85.36	19.35	P=0.121
	After education	Intervention (n=86)	78.79	20.005	t=-2.025
		Control (n=73)	85.49	21.701	P=0.045
	Three months after education	Intervention (n=86)	78.046	18.341	t=-2.682
		Control (n=73)	87.328	24.268	P=0.008

DISCUSSION

Considering the anxiety of students during puberty, especially girls, health education is important during this life time. In this study, findings represented that mean anxiety score of the students was 78.79 in the intervention and 85.49 in the control groups after education and, based on independent t-test, they were significantly different ($P=0.045$). Findings of this research were in line with the studies conducted inside and outside the country by Skre *et al.* (2013)(16), Tomaras *et al.* (2011)(17), Solhi, Sadeghi and Roodbari (2012)(18), as well as Yoo and Lee (2013)(19). In these works, effectiveness of education has been studied and specified in different health aspects, especially psychological health. Education has a positive effect on mental health. Results of the research by Prasko *et al.* on the treatment of generalized anxiety disorders showed that cognitive-behavioral therapeutic group reduced not only anxiety level but also unhealthy thoughts and attitudes, and improved interpersonal relations(20). Agha Yousefi *et al.* studied the efficacy of menstrual and puberty health education on general health of third-year junior high school girls. Results of their research indicated that puberty health education had a positive effect on general health of adolescent girls and also could reduce anxiety, sleep disorders, and depression as well as improving social function(21).

In the present research, the researchers allocated some sessions of their educational program to instructing religious teachings and Islamic attitudes toward adolescence and puberty and it seems that teaching these issues played an important role in reducing their anxiety. It is necessary to note that, although theorists introduce puberty and adolescence as a critical stage, in Islamic view, puberty is an auspicious phenomenon, through which humans will be qualified to be considered and addressed by God and approach God through performing religious duties. Religious teachings have high capacities to study and resolve human crises in life. As shown in other studies, humans' mental and physical health is related to their spiritual life. People who have stronger religious beliefs have better compatibility with different life situations and experience less anxiety(5)

In fact, results of the present research showed that the variable of father's education affected anxiety of both intervention and control groups. Regarding the comparison of anxiety score of students three months after puberty health education in both intervention and control groups, the findings demonstrated that mean anxiety score of the studied students was 78.046 in the intervention and 87.328 in the control group three months after education and there was a significant difference between the two groups in terms of mean anxiety score of the studied students three months after the education using independent t-test. Ahady studied separate effects of cognitive-behavioral, pharmacological, combined, and placebo methods on a group of patients with generalized anxiety, the results of which showed that cognitive-behavioral treatment in the follow-up studies was more effective than other methods and its effects were more stable(22).

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Learning is inducing a relatively stable change in behavior or potential behavior and results from experience; i.e. temporary changes which are made due to some emotional states and the like are not considered learning. Change in behavior should not be necessarily made just after learning experience; however, as a result of learning, the learner potentially acquires the capability of different actions, which may not be induced immediately(23). Learning process helps the person adapt him/herself to the changing environment, because fulfillment sources and risk sources are also changing. Therefore, if compatibility of the person with the environment is not dynamic, s/he will not be able to continue his/her life. Learning provides the necessary flexibility for people to continue his/her life in different

environmental conditions. Then, it is necessary to look at learning as a major means of personal adaptation to the environment(24).

Considering the above-mentioned definition of learning, the major goal of the researchers in three-month monitoring of students was to specify whether the trainings regarding puberty health could lead to learning process in students and induce necessary flexibility in them for coping with critical conditions of puberty or not. One of the most important reasons that cause learning process to occur in the best way among students is educational method. According to Sciner, one of the known theorists in learning, learning is best achieved when (1) the information which should be learnt is presented in small steps, (2) learners are given immediate feedback about their learning, and (3) learners can learn at their appropriate speed. Learning in the above-mentioned way is considered an effective educational strategy by all theorists. It is necessary to note that the most conventional educational method is lecturing, in which all the three above-mentioned principles are violated(24). In the present research, two educational methods of question and answer as well as group discussion were used to teach puberty health issues for students. According to the researchers, three principles considered by Sciner which are the secret of efficacy and durability of education were considered for the proper implementation of both educational methods in classrooms. In their work entitled "Efficacy of group consultation in cognitive-behavioral method on reducing anxiety symptoms of pre-university girl students in Shabestar City", Neisani Samani et al. (2012) found that group consultation method could be applied as an independent method or along with other therapeutic methods for controlling or reducing symptoms of anxiety among adolescents, especially students(5).

As far as the comparison of anxiety score of students before, immediately after, and three months after the puberty health education in the intervention group was concerned, the findings demonstrated that mean anxiety score of the students in the intervention group was 90.453 before education, 78.79 after education, and 78.046 three months after education. Also, repeated measures ANOVA demonstrated that trend of changes in anxiety was significantly descending in the intervention group.

Different studies have referred to imperfect information about health of female adolescents and its effect on increasing concerns at this age. The study by Banner et al. and Vanegmond et al. have emphasized the weak information of reproductive health and sexual relations among women(25,26). Hazarika referred to the necessity of promoting reproductive health services in Muslim societies(27). Some researchers believe that family, environmental, and social factors affect adolescents' concerns. Principally, content of people's concern is based on their living conditions. Considering this point, it seems that socio-environmental conditions in which girls grow up influence the intensity of their anxiety. Reaction to puberty changes is greatly affected by social attitudes related to these changes which are reflected by the media and other important factors such as parents, friends, and teachers. Moreover, there is evident correlation between type of natural feelings of girls toward puberty and their awareness from puberty transformations. Social norms play a main role in the formation of behavior and attitude of adolescents toward reproductive health activities and puberty(5).

Enriching educational programs in the field of puberty health education can be very helpful in terms of removing the mentioned concerns and preventing from diseases, since a high percent of students in the world, particularly girls, experience medium level of anxiety in adolescence and researchers believe that these disorders start in adolescence and are accompanied by mental damage and behavioral problems if sufficient attention is not paid to adolescents in this period. Nouri recommended peer-based puberty health educational approaches and stated that efficacy of educational approach of the peer group was based on the theory that sensitive information can be easily shared among peers and involvement of adolescents in designing plans for themselves is one of the advantages of peer group approach(7). In the present research, the researchers tried to include different subjects such as physical health, mental health and religious issues. In their lesson plan and utilized different teaching methods such as lecturing, question and answer, and group discussion in every educational session. In fact, the dominant method in most of the sessions was group discussion. Finally, it should be noted that making mental and behavioral changes were slow at first and required continuation, practice, and time for stabilization.

CONCLUSION

Since puberty health education could reduce anxiety scores of students and considering results of this research and different studies, the importance of puberty education by informed sources for increasing mental health of students has been manifested. Therefore, active participation of the people involved in this issue increases physical and

mental health during puberty of adolescents. Accordingly, a course called puberty and adolescence health is recommended to be added to the courses of junior high schools' educational system for girls and thus midwives and other people from Department of Medicine could attend schools at appropriate times and train adolescents based on the formulated lesson plan.

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