

Determinants of puberty health among female adolescents residing in boarding welfare centers in Tehran: An application of health belief model

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Abstract

Background: Adolescence is a critical stage of growth and development. That is associated with changes in body shape and appearance. Issues such as irregular menstrual periods, amenorrhea, and menstrual cycle are major issues in women's health. The purpose of this study was to examine the determinants of physical puberty health based on the Health Belief Model (HBM) among female adolescents.

Methods: This analytical cross sectional study was conducted in welfare boarding centers in Tehran, Iran. Data were collected in 2011 by a structured and valid questionnaire. Total 61 female adolescents (age range: 12-19 yrs) participated in this study from welfare boarding centers in Iran, Tehran, by using convenience sampling method. The questionnaire consisted of demographic characteristics, health belief model constructs and physical puberty health behaviors gathered by using interview. A series of univariate general linear models were used to assess the relationship between puberty health and health belief model constructs.

Results: According to the results of this study there were positive significant relationships between perceived susceptibility, perceived benefits, perceived barriers, cues to action and increased puberty health in female adolescents ($p < 0.05$). Perceived benefits, perceived barriers and cues to action were predictors of physical puberty health behaviors.

Conclusion: Based on the results of the study to improve the physical Puberty health behaviors of female adolescents should make them aware of the benefits of health behaviors, and remove or reform the perceived barriers of health behaviors. Also, the appropriate information resources should be introduced for obtaining information about puberty health.

Keywords: Boarding Welfare Centers, Female adolescent, Health belief model, Puberty.

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Introduction

Adolescence is a period of transition from childhood to adulthood and is associated with biological, cognitive, social and emotional changes (1). Adolescence is always accompanied with physical changes of puberty and unexpected reactions of others in social relations (2). Adolescence is a critical stage of growth and development (3)

and associated with changes in body shape and appearance (4). Issues such as irregular menstrual periods, amenorrhea, and menstrual cycle are major issues in women's health (5). 20-95% of women suffer from menstrual pain, 40% of them are facing difficulties in performing daily activities and 10% are experiencing severe pain (6). Menstrual pain is a major cause of short-

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term absences in school (7). The prevalence of severe bleeding in women of reproductive age is estimated at 35-52% (8). According to the latest population and housing census in 2011, 16.34% of the population aged 10-19 years (9). Evidence show age of puberty from the 19th and early 20th centuries has significantly decreased (10). 50-80% age of puberty is determined by genetic factors. Environmental and physiological factors also influence on age of puberty (11). There is relationship between parental marital quality and daughters' maturity, father absence in childhood and lower age menarche (12). In as much as the number of derelict and vulnerable children in world is rising, the issue of how to address them becomes more important (13).

According to the Statistical Center of Iran, there are more than 4,000 children in boarding centers in Tehran Province (14). A comparative study of hygienic practices during menstruation of girls in welfare boarding centers with girls living with their family showed strong significant differences between the two groups in term of health behaviors during the menstruation so that the girls in welfare boarding centers had lower scores (15). Another comparative study of health behaviors (nutrition, resting, exercise, personal hygiene) of girls in welfare boarding centers with girls living with their family showed similar results (16). In a study performed in Karachi it was revealed that about 50% of the participants were unaware of the origin of menstrual bleeding (17). In a study conducted in Tehran, only 17.1% of girls had enough information for appropriate action during menstruation (18). Other studies also indicated low awareness and poor performance of girls about the puberty and menstruation (19,20). Based on World Health Organization, educational needs of women and girls should be considered as a priority (21). Accordingly, there is a need to study on puberty health and in this regard girls residing in welfare boarding centers due to loss of mother experiences need particular atten-

tion. In addition, the dissemination of false information and misconceptions among these girls can cause serious problems.

Some researchers have examined the issue in a specific model that is Health Belief Model (HBM). For the first time in Iran, we used this model to examine the determinants of physical puberty health. This model shows the relationship between health belief and behavior and provides conceptual framework for perception and appraise health-related behavior. The model assumes that people make decisions about health behaviors according to risk perceptions and personal cost of engaging in the health behavior.

The basic principle of this model is predisposing factors including perceived susceptibility, perceived severity, benefits and barriers to act, and cues to action. All of these factors influence on person's preparedness to act. Perceived susceptibility including individual's belief about the probability of contracting a health condition, perceived severity means individual's belief in relation to the severity of a condition and its consequences, perceived benefits means individual's belief in the efficacy of the recommended action to reduce health risk, perceived barriers means belief regarding the tangible and psychological costs of the recommended action, and cues to action means the strategies employed to activate one's preparedness to take health action. Therefore, if people believe to be susceptible to a condition, to serious outcomes and benefits of taking action and barriers to (or costs of) action, they likely take the action (22). This study was performed to examine determinants of physical puberty health based on HBM among female adolescents residing in welfare boarding centers in Tehran, Iran.

Methods

Design and Participants

This analytical cross sectional study was conducted in 2011. The study population was female adolescents dwelling in governmental welfare boarding centers in Teh-

ran. We selected all of governmental welfare boarding centers (9 centers) at which female 12 to 19 years old adolescents were residing in them throughout the year. Persons eligible to participate in the study included 71 people but 10 people disagreed to participate and therefore 61 people were enrolled by convenience sampling. Inclusion criteria were: girls aged between 12 and 19 years, lack of physical or mental disability, and having at least three menstrual periods. Informed consent was obtained from all study participants.

Instrument

The questionnaire consisted of three parts:

Demographics: This included measurement of socio-demographic factors including age, level of education (primary school, secondary school, high school & higher), entry age to welfare boarding centers, and age at menarche.

Data were collected by personal interviews, using a structured questionnaire which had been approved by Ethical Committee, Tehran University of Medical Sciences, Tehran, Iran.

Content validity and face validity were used to verify the validity of questionnaire. For this purpose the questionnaire was sent to 10 health education and promotion professionals in order to gather their views about the content of the questionnaire. After gathering the professionals, points of view, necessary changes were applied in the content of questionnaire. Since that performing construct validity and factor analysis requires large sample size, because of the rarity of samples in this study, validity was limited only to content validity and face validity. Reliability was calculated with internal consistency (Cronbach's Alpha).

Constructs of Health Belief Model

Perceived susceptibility: consists of at risk of iron deficiency anemia, the effect of diet on the occurrence of acne, the effect of cosmetics in the development of acne, at

risk of infection due to lack of replacement underwear, and risk of infection due to sitting in a bath. This scale included 5 items with scores ranging from 5 to 25; items were rated according to a five-point Likert Scale from 1 for strongly agree to 5 for strongly disagree (Cronbach's Alpha: 0.68). Some of the questions included: 1. I am at risk of iron deficiency anemia like the other female adolescents, 2. my body is strong so I am not at risk of the Genital tract infections during the menstruation.

Perceived severity: consists of serious iron deficiency anemia, the effect of iron deficiency anemia on reducing learning ability, the effect of iron deficiency anemia on decreasing resistance to infection, dangerous genital infection, and risk of infertility due to lack of hygiene. This scale included 5 items with scores ranging from 5 to 25; items were rated according to a five-point Likert Scale from 1 for strongly agree to 5 for strongly disagree (Cronbach's Alpha: 0.81). Some of the questions included: 1. Genital tract infections are dangerous, 2. Anemia can reduce learning ability.

Perceived benefits: consists of reducing interest to flatulent foods during menstruation, benefits of cleanliness in toilets, benefits of iron supplementation, benefits of cotton and light-colored underwear, benefits of bathing during menstruation, and benefits of light exercise during menstruation. This scale included 6 items with scores ranging from 6 to 30; items were rated according to a five-point Likert Scale from 1 for strongly agree to 5 for strongly disagree (Cronbach's Alpha: 0.73). Some of the questions included: 1. I believe that bathing during menstruation reduce the risk of infection, 2. I think using of iron supplementation during menstruation can prevent anemia.

Perceived barriers: consists of barriers associated with bathing during menstruation, barriers associated with light exercise during menstruation, barriers associated with iron supplementation, barriers associated with access to sanitary pads, related barriers to asking questions about puberty and

menstrual issues, lack of awareness of the normal menstrual cycle characteristics, and unfamiliarity with experts for asking questions about puberty and menstruation. This scale included 7 items with scores ranging from 7 to 35; items were rated according to a five-point Likert Scale from 1 for strongly agree to 5 for strongly disagree (Cronbach's Alpha: 0.87). Some of the questions were as follows: 1. I am ashamed to ask my questions about puberty health issues, 2. I do not know to ask from who my questions about puberty health issues.

Cues to action: This dimension consists of participants' information sources about pubertal and menstrual hygiene (radio, television, book, newspaper and magazine, booklet, school health educator, health care workers, school counselor, teachers, school friends, roommates, welfare boarding centers' friends, classes held at welfare boarding centers, visiting people and others). This scale included 1 item (yes/no question) with scores ranging from 0 to 1.

Self- Report Checklist: The checklist used to investigate the behaviors consisted of 21 items with scores ranging from 0 to 21. The checklist consists of healthy behaviors during puberty, nutrition, using iron supplements, bathing, cleanliness, bathing and cleanliness and how to do them, using sanitary pads, using cotton underwear with bright colors, perform daily activities, perform light exercise, pain control ways, go to the doctor with severe pain during menstruation, skin care and acne control, public health, replacement pads, and disposal of sanitary pads (Cronbach's Alpha: 0.79). Some of the questions included: 1 Do you

bathe during menstruation? 2. Do you wash your face daily with soap and water to prevent acne?

Data analysis

All data analyzed through SPSS 12 (IBM SPSS Statistics, Meadville, USA) and offered with frequency and mean (SD) for variables. Data were analyzed using one-sample Kolmogorov-Smirnov test for determine of normality. A series of univariate general linear models were used to assess the relationship between puberty health and health belief model constructs. In these analyses unadjusted (univariate) and adjusted (multivariate) linear regression coefficients and 95% confidence intervals (95% CI) were presented as effect size of interest. In addition, a multiple general linear model was used to assess the relationship. A $p < 0.05$ were considered statistically significant.

Results

The mean (SD) age of participants was 16.08 (1.9) years. Demographic characteristics of participants are presented in Table 1. About 52% (n=32) participants were in high school and higher. Entry age to welfare boarding centers for 22 (36.1%) participants was 6-10 years. The mean (SD) age of menarche was 12.67 (1.41) years.

The results of univariate and multivariate and analyses for the relationship between puberty health in adolescent girls and HBM constructs are presented in Table 2. There were positive significant relationships between perceived susceptibility, perceived benefits, perceived barriers, cues to action

Table 1. Demographic variables

Variable	Category	n	%
Age (yrs)	11-15	27	44.3
	16-19	34	55.7
level of education	Primary school	3	4.9
	Secondary school	26	42.6
	High school & higher	32	52.5
Entry age to welfare boarding centers (yrs)	1-5	19	31.1
	6-10	22	36.1
	11-15	20	32.8
	12-13	12	19.7
Age of first menstruation (yrs)	12-13	33	54.1
	14-16	16	26.2

Table 2. Univariate and Multivariate linear regression analysis for relationship between puberty

Variable	Unadjusted (Univariate)			Adjusted (Multiple)		
	B(SE)	Beta	p	B(SE)	Beta	p
Perceived Susceptibility	0.297 (0.121)	0.29	0.017	0.299 (0.13)	0.293	0.016
Perceived Severity	0.089 (0.093)	0.107	0.338	0.087 (0.108)	0.105	0.347
Perceived Benefits	0.315 (0.099)	0.361	0.002	0.316 (0.11)	0.362	0.002
Perceived Barriers	0.193 (0.066)	0.328	0.005	0.186 (0.071)	0.316	0.007
Cues to Action	0.327 (0.136)	0.262	0.019	0.367 (0.156)	0.276	0.014

Health in adolescent girls and HBM construct

and increased puberty health in adolescent girls ($p < 0.05$). Cues to action (0.367), perceived benefits (0.316), perceived susceptibility (0.299) and perceived barriers (0.186) were the most important predictors of physical puberty health, respectively.

Discussion

Identifying predictors of health behavior can be helpful in improving the health (23). HBM in many cases is used to explain and predict health behavior (24). Our findings indicated that perceived benefits, perceived barriers and cues to action predict physical puberty health behaviors so that girls who had more score in constructions of perceived benefits and cues to action and low perceived barriers score had better physical puberty health behaviors.

As stated, perceived benefits were one of the predictors of physical puberty health behaviors. This finding was in agreement with previous studies indicating perceived benefits as strong predictor of some health behaviors (24) such as oral hygiene (25), parental delay or refusal of vaccine doses, and childhood vaccination coverage (24, 26).

According to the HBM, participation in healthy behaviors is affected by beliefs about the probability of an action's role in a perceived benefit (27), and to create incentives for emphasis should be placed on the positive aspects of maintaining health behavior (25). Thus, the benefits of physical puberty health behaviors should be introduced to female adolescents. While designing an educational program, emphasizing on the benefits of healthy behaviors should be considered.

According to results of this study, per-

ceived barrier construct was another predictor of physical puberty health behaviors that was used to examine predictors of self-reported seat belt use. More benefits and fewer barriers were more likely to use their seat belts (28). This result is also parallel to some previous results that indicating perceived barriers as predictors of some health behaviors such as undergoing genetic testing for the colorectal carcinoma (CRC) gene (29) and health-promoting behavior among people with, or at high risk of, MS (30). The researchers identified the roots and false beliefs associated with unhealthy behaviors and then tried to modify and correct unhealthy behaviors. Elimination of barriers is prerequisite for behavior change and expecting behavior change without it is illogical. Moreover, individuals may be aware of the benefits of a healthy behavior but due to some barriers may not be able to perform. So, identifying the behavior change barriers before designing behavior change programs seems necessary.

The current findings support the hypothesis that perceptions of high benefit and low barrier in relation to puberty health will influence to health behaviors. The perceived benefits of healthy behaviors minus the perceived barriers to the healthy behavior determine the probability of an individual's engaging preventative action (27). In a critical review, evaluating the HBM, that was about mammographic and pap screening, the result of the study showed strongest support for the HBM's perceived benefit and barrier constructs, compared to other constructs (31).

Based on our study there was no significant relationships between perceived severity and physical puberty health behaviors.

This may be because of unawareness of consequences of poor hygiene during the puberty and menstruation. In addition adolescents usually feel they are less susceptible to disease. In the present study a significant level of perceived susceptibility was also lower than other predictors. Thus, it can effect on perceived severity of individuals.

HBM also includes cues to action as an important component in keeping patterns of behavior (32). In our study cues to action was also predictive of physical puberty health behaviors. Those who used more resources to obtain information had better physical puberty health behaviors. The result of the present investigation is congruent with this finding of Cyr et al, at which cues to action variables was found to be significant predictors for undergoing genetic testing for CRC gene (29).

The value of a model in clarifications of behavior is related to designing health-promoting interventions, and in transferring research into practice (32). "Based on HBM if people believe the anticipated benefits of taking action outweigh the barriers to action, they are likely to take the action that they believe will reduce their risks. Cues to action can trigger actions and readiness to take action (perceived susceptibility and perceived benefits) could only be potentiated by other factors, particularly by cues to instigate action (22).

Limitations

We can note to particular circumstances of individuals, sensitivity to maturity and specific issues of adolescence as limitation of this study. Moreover this study was carried out based on a sample girls of Tehran Welfare Centers and this issue might reduce the generalizability of findings to the other parts of Iran and other groups of girls.

Conclusion

For the first time in Iran, we used the HBM in order to examine determinants of physical puberty health behaviors. Studied female adolescents due to Lack of family

and parental teachings need special attention that should be considered by the authorities in the every community. The present investigation indicated that construct of perceived benefits and perceived barriers also cues to action were predictors of physical puberty health behaviors. Regression analysis of the HBM showed that to improve the physical puberty health behaviors we should make adolescents aware of the benefits of health behaviors, and remove or reform the perceived barriers of health behaviors. Then, appropriate information about puberty health issues should be delivered to them. Finally, use of the HBM to guide future investigations is necessary in that the constructs derived from the model would help the present researchers identify specific items predicting health behaviors.

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Conflict of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

References

1. Rhee H, Wenzel J, Steeves RH. Adolescents' psychosocial experiences living with asthma: A focus group study. *JPedHC* 2007;21:99-107
2. O'Sullivan LF, Meyer-Balshurg HF, Watkins BX. Social cognitions associated with pubertal development in a sample of urban, low-income, african-american and latina girls and mothers. *JAH* 2000;27:227-235
3. Christensen KY, Maisonet M, Rubin C, Holmes A, Flanders WD, Heron J, et al. Progression through puberty in girls enrolled in a contemporary British cohort. *JAH* 2010;47:282-289
4. Davison KK, Werder JL, Trost SG, Baker BL,

- Birch LL. Why are early maturing girls less active? Links between pubertal development, psychological well-being, and physical activity among girls at ages 11 and 13. *Soc. Sci. Med* 2007;64:2391-2404.
5. Allsworth JE, Clarke J, Peipert JF, Hebert MR, Cooper A, Boardman LA. The influence of stress on the menstrual cycle among newly incarcerated women. *Women's Health Issues* 2007;17:202-209.
6. Jun EM, Chang S, Kang DH, Kim S. Effects of acupuncture on dysmenorrhea and skin temperature changes in college students: A non-randomized controlled trial. *IJNS* 2007;44:973-981.
7. Wong LP, Khoo EM. Dysmenorrhea in a multi-ethnic population of adolescent asian girls. *IJGO* 2010;108:139-142.
8. Santer M, Wyke S, Warner P. Women's management of menstrual symptoms: Findings from a postal survey and qualitative interviews. *Soc. Sci. Med* 2008;66:276-288.
9. Iran Sco. Selected results of population and housing census 2011.
10. Walvoord EC. The timing of puberty: Is it changing? Does it matter? *JAH* 2010;47:433-439.
11. Gajdos ZK, Henderson KD, Hirschhorn JN, Palmert MR. Genetic determinants of pubertal timing in the general population. *Mol. Cell. Endocrinol* 2010;324:21-29.
12. Saxbe DE, Repetti RL. Brief report: Fathers' and mothers' marital relationship predicts daughters' pubertal development two years later. *J. Adolesc* 2009;32:415-423.
13. Wanat S, Whisnant J, Reicherter D, Solvason B, Juul S, Penrose B, et al. Coping with the challenges of living in an Indonesian residential institution. *Health policy* 2010;96:45-50.
14. Bayat M, Akbari Sharifi T, Nazari Jayrani M, Shahrivar Z, Haghani H. Behavioral problems of children at age of 7-11 years old in foster care centers. *IJN* 2006;2006:19:53-60.
15. Radfar M. A comparative study of health behaviors in adolescent girls 11-18 years old during the period under welfare boarding facilities with female – headed households in the Tehran households in 1997.
16. Nejat N, Kashani neya Z, Memaryan R. A comparative study of health behaviors among adolescent girls under the welfare boarding centers with female-headed households. *HAYAT, Tehran University of Medical Sciences (Hayat)* 2008;14:49-59.
17. Ali TS, Rizvi SN. Menstrual knowledge and practices of female adolescents in urban Karachi, Pakistan. *J. Adolesc* 2010;33:531-541.
18. Alavi M, Pooshneh K, KHosravi A. Knowledge, attitude and practice of secondary school students about puberty health in Tehran Payesh Journal 2008;8:59-68.
19. Maleki A, Delkhoush M, Ebadi A, Kh A, Ajali A. Effect of puberty health education through reliable sources on health behaviors of girls. *IJBS* 2010;4:155-161.
20. Noori Sistani M, Merghati Khoi E. The impact of peer-based educational approaches on girls' physical practice of pubertal health. *AMUJ* 2010;12:129-135.
21. Maleki A, Delkhoush M, Haji Amini Z, Ebadi A, Ahmadi Kh, Ajali A. Effect of puberty health education through reliable sources on health behaviors of girls. *JBS* 2010;4:23-24.
22. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: Theory, research, and practice. John Wiley & Sons; 2008.
23. Lo SWS, Chair SY, Lee FK. Factors associated with health-promoting behavior of people with or at high risk of metabolic syndrome: Based on the health belief model. *ANR* 2014.
24. Carpenter CJ. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Commun* 2010;25:661-669.
25. Walker K, Jackson R. The health belief model and determinants of oral hygiene practices and beliefs in preteen children: A pilot study. *Pediatr Dent* 2015;37:40-45.
26. Smith PJ, Humiston SG, Marcuse EK, Zhao Z, Dorell CG, Howes C, et al. Parental delay or refusal of vaccine doses, childhood vaccination coverage at 24 months of age, and the health belief model. *PHR* 2011;126:135.
27. Kim HS, Ahn J, No JK. Applying the health belief model to college students' health behavior. *NRP* 2012;6:551-558.
28. Tavafian SS, Aghamolaei T, Gregory D, Madani A. Prediction of seat belt use among Iranian automobile drivers: Application of the theory of planned behavior and the health belief model. *Traffic Inj Prev.* 2011;12:48-53
29. Cyr A, Dunnagan TA, Haynes G. Efficacy of the health belief model for predicting intention to pursue genetic testing for colorectal cancer. *J Genet Couns* 2010;19:174-186.
30. Lo SW, Chair SY, Lee FK. Factors associated with health-promoting behavior of people with or at high risk of metabolic syndrome: Based on the health belief model. *ANR* 2015;28:197-201.
31. Tanner-Smith EE, Brown TN. Evaluating the health belief model: A critical review of studies predicting mammographic and pap screening. *STH* 2010;8:95-125.
32. Cyr A, Dunnagan TA, Haynes G. Application of health behavior theories to breast cancer screening among Asian women. *J Genet Couns* 2010; 19:174-186.