

Evaluating the Effectiveness of Mother's Education in Terms of Knowledge, Attitude, and Practice Regarding Pubertal Awareness among School-going Prepubertal Girls

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ABSTRACT

Aim: Evaluating the effectiveness of mother's education in terms of knowledge, attitude, and practice regarding pubertal awareness among school-going prepubertal girls.

Materials and methods: A descriptive cross-sectional study was conducted among prepubertal girls studying in the middle school (6th, 7th, and 8th standard). A predesigned questionnaire, which consists of questions to evaluate the knowledge, attitude, and practice on pubertal changes were used for data collection. Information on demographic variables, which include age, class, type of family, education of parents, and sources of information was collected from the participants. In total 450 prepubertal girls, 150 each from state board school, matriculation board school, and central board school, were included in the study.

Results: Study resulted that for 52.6% of state board school respondents, the major source of information was siblings, and for 64.6% of matriculation board and 68% of central board respondents, the major source of information was mothers. For state board participants, the mean average level of knowledge was 10%, attitude 23.5%, and practice 16.2%; for matriculation board participants, the mean average level of knowledge was 32.7%, attitude 58.3%, and practice 42.6%; and for central board participants, the mean average level of knowledge was 47.4%, attitude 59.6%, and practice 53.8%.

Conclusion: Most of the participants from central board school have good knowledge, attitude, and practice regarding pubertal changes when compared with the state board and matriculation board. The result demonstrated that based on parent's literacy, the knowledge of girls on puberty increases. Creating awareness regarding puberty through health education is very essential to help the adolescent girls to handle sexuality-related issues confidently.

Keywords: Attitude, Knowledge, Practice, Prepubertal girls.

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INTRODUCTION

Approximately one fifth of the world's population is constituted by adolescents (10–19 years) out of which more than four fifths residing in developing countries. According to United Nations Children's Fund, there are 243 million adolescents comprising 20% of the total population of India which clearly shows that India is truly "young."^{1,2}

The word "adolescence" was derived from a Latin word "adolescere" virtually suggests that "to grow into maturity." It involves three distinct subphases: early adolescents (preadolescence to age 11–14 years), middle adolescents (age 15–17 years), and late adolescents (age 18–20 years).³ The precise boundaries of adolescence are difficult to define, but this period is customarily viewed as beginning with the gradual appearance of secondary sexual characteristics at about 11 or 12 years of age and ending with cessation of body growth at 18 to 20 years.⁴

The foremost vital changes that ensue in adolescents may be physical changes that ensue as a time of puberty.⁵ Puberty may be a time of fast biological process where sexual and physical maturation occurs.^{6,7} Puberty includes biological process, secretion, and growth method that happens once organ begins to perform, and therefore, the secondary sexual characters start to develop.⁸ The onset of menstruation and appearance of secondary sexual characters are the important changes that occur in the adolescent girls.⁵

In today's world, the lifestyle changes, particularly consumption of more junk foods, lack of physical activity, and the amount of

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stress put up by the students in the school life, were considered to be some of the major factors for menstrual disturbances in the adolescent girls. The health status of adolescents even reflects the health and well-being of the next generation.⁹

When early adolescence experiences these physical, psychological, and emotional changes, to deal these early changes, adolescents require the information regarding the bodily changes

in order to prevent the problems like guilt and confusion.⁴ During the adolescence phase, girls require emotional support from their mothers and need to be educated regarding sexual development and hygienic practices.¹⁰ Due to restrictions imposed during menstruation along with the negative attitude of parents in discussing menstruation-related issues with girls has led to poor awareness regarding menstruation and menstrual hygiene among adolescent girls. Hence, girls grow up with limited knowledge of menstruation.¹¹

The awareness level about menstruation prior to menarche was found to be very much lower among the rural adolescents in the developing countries like India. Lack of menstrual hygiene is one of the major risk factors for the development of reproductive tract infections in the adolescent females.¹²

Sadly, the foremost of women do not have corrected and enough data regarding time of life and is expounded healthy behaviors.¹³ The higher outcome of adolescent health will be achieved by increasing their awareness on puberty-related issues. So, the girls need to be properly guided regarding these changes, in order to have a swish transition to adolescence, and their distress in handling with these changes is reduced.¹⁴

So, an educational intervention in order to provide accurate and authentic knowledge about pubertal changes and related crucial issues is needed to enable them to make right decisions in life.¹⁵ Other studies showed that a lot of health issues will be prevented by healthy behaviors in adolescents.^{16,17} Better knowledge and practices on menstrual hygiene reduce the risk of acquiring reproductive tract infections. Thus, healthy observe during this time of life is very important.¹⁸ Numerous studies concluded that the generative health is unnoticed and queries go unrequited.¹⁹ Adolescents possess some knowledge about reproductive health, but still effective educational intervention is required to encourage more sensible and healthy behavior, and the results of a study show health education sessions are very effective in increasing knowledge.²⁰ Thus, this study was conducted with the aim to assess the adolescent girls' knowledge, attitude, and practice regarding puberty and its relationship with sociodemographic characteristics and to provide awareness on pubertal process and self-hygienic practices.

MATERIALS AND METHODS

The study was a descriptive cross-sectional study conducted in three different curriculum board schools in and around Komarapalyam, Namakkal District, Tamil Nadu, India. Total study subjects were 450 prepubertal girls. Inclusion criteria for our study were prepubertal girls from VI to VIII standard (age group 11–14 years). We exclude who were attained menstruations and who were not willing to participate. Ethical consideration was obtained from the Institutional Ethical Committee.

Tools Used

A separate questionnaire was designed in Tamil and English language to incorporate the participant's details. The questionnaire form included the items which captured sociodemographic characteristics such as parent's education, types of family, and the main source of information about puberty. Knowledge, attitude, and practice questions were close-ended with yes or no responses. The knowledge on puberty questionnaire consists of 12 questions regarding the sign and precious age of puberty, order of pubertal developments, the hormones responsible for puberty, and the role

of pituitary gland in secondary sexual characters. Attitude toward puberty consists of 15 questions regarding the need of awareness camp on puberty, comfortable with their decisions, irritations, anxious, mood changes, and beauty conscious about their body. Hygienic practice toward puberty consists of five questions regarding the cleaning of the genital area, drying their underwear in sunlight, using the private toilet is good, bathing twice daily, and comfortable with their clothes.

STATISTICAL ANALYSIS

The collected data were entered into the Excel sheet. The data were analyzed by using graph pad prism. For assessing the level of awareness among schools, we use one-way analysis of variance according to the nature of data. A *p* value was set at <0.01. For intercomparison of knowledge, attitude, and practice between schools, Tukey's multiple comparisons was used. A *p* value was set at <0.01.

RESULTS

By getting a prior permission from consent school, a pilot study was conducted in one school with a sample size of 50. The data collection was done by explaining each question with a total study subjects, and their doubts were clearly explained. The result of this study showed various biases. Thus, we made some corrections in the questionnaire and planned to conduct a face-to-face interview.

We collected 150 samples from each school. Before handover the questionnaire to the study subjects, the purpose of the study was clearly explained. A face-to-face interview was conducted with each study participants, and their doubts were cleared along with the assurance of confidentiality in all schools. This session was followed by a health education session through seminars regarding pubertal awareness (introduction to puberty, stages of pubertal period, physical changes, secondary sexual characteristics, and emotional changes that occur during puberty) and self-hygienic practices.

Sociodemographic Characteristics (Table 1)

In our study, the majority of the study participants were aged 12 years on matriculation board (59, 39.3%) and central board (61, 40.6%) followed by 11 years in state board (53, 35.3%). Majority of study subjects in state board (88, 58.6%), matriculation board (78, 52%), and central board (106, 70.6%) belong to Hindu religion; 107 (71.3%) state board, 90 (60%) matriculation board, and 93 (62%) central board study subject belong to nuclear family; and majority of study subjects from state board (83, 55.3%), matriculation board (44, 29.3%), and central board (23, 15.3%) were sixth standard.

Maximum state board participant's father (81, 54%) and mother (74, 49.3%) had primary education, matriculation board participant's father (62, 41.3%) and mother (63, 42%) had a high school education, and central board participant's father (89, 59.3%) and mother (42, 28%) were degree graduates.

Mother was the major source of information for most of the study subjects in matriculation board (97, 64.6%) and central board (103, 68.6%), but siblings were the major source for state board (79, 52.6%) participants. Because the mother is being close to children, she is the prime source of information regarding the menstruation among adolescent girls. The majority of state board (76, 50.6%) and central board (96, 64%) study subjects were second child and matriculation board (65, 43.3%) were first child. Based on their birth

Table 1: Sociodemographic details

S. no	Categorization		SB	MB	CB
			n = 150 (%)	n = 150 (%)	n = 150 (%)
1	Age	11	53 (35.3)	48 (32)	58 (38.6)
		12	47 (31.3)	59 (39)	61 (40.6)
		13	29 (19.3)	23 (15)	18 (12)
		14	21 (14)	20 (13)	13 (8.6)
2	Class	6th	83 (55.3)	58 (38.6)	57 (38)
		7th	44 (29.3)	56 (37.3)	54 (36)
		8th	23 (15.3)	36 (24)	39 (26)
3	Family	Joint	88 (58.6)	78 (52)	106 (70.6)
		Nuclear	25 (16.6)	28 (18.6)	25 (16)
4	Religion	Hindu	37 (24.6)	44 (29.3)	19 (12)
		Christian	43 (28.6)	60 (40)	57 (38)
		Muslim	107 (71.3)	90 (60)	93 (62)
5	Educational status of father	Primary	4 (2.6)	49 (32.6)	4 (2.6)
		Secondary	114 (76)	15 (10)	3 (2)
		High school	25 (16.6)	52 (34)	51 (34)
		Degree	7 (4.6)	34 (22.6)	92 (61.3)
6	Educational status of mother	Primary	20 (13.3)	21 (14)	93 (62)
		Secondary	97 (64.6)	32 (21.3)	10 (6.6)
		High school	26 (17.3)	63 (42)	30 (20)
		Degree	7 (4)	34 (22.6)	17 (11.3)
7	Birth order	1	67 (44.6)	65 (43.3)	51 (34)
		2	76 (50.6)	60 (40)	96 (64)
		3	6 (4)	21 (14)	3 (2)
		4	1 (0.6)	4 (2.6)	0
8	Source of information	Mother	59 (39.3)	97 (64.6)	103 (68)
		Siblings	79 (52.6)	23 (15.3)	18 (12)
		Media	0	14 (9.3)	29 (19.3)
		Others	12 (8)	16 (10.6)	0

SB, state board; MB, matriculation board; CB, central board

order, the source of information may vary. Thus, the main source of information for the first child was a mother and for the second child was mother followed by sisters or friends.

Knowledge Level on Puberty

The knowledge of puberty for the entire study population in each curriculum board school showed that 181 (10%) for state board, 589 (32.7%) for matriculation board, and 854 (47.4%) for central board school (Table 2) which was statistically significant [$F(2,447) = 195.3$ (p value < 0.0001)].

The intercomparison of knowledge between schools based on Tukey's multiple comparison (Table 3) results that state board vs matriculation board, state board vs central board, and matriculation board vs central board are highly significant with p value < 0.0001.

Attitude Level toward Puberty

The attitude toward puberty for the entire study population was 493 (23.5%) in state board, 1,225 (58.3%) for matriculation board, and 1,253 (59.6%) for central board school (Table 4), which was statistically significant [$F(2,447) = 204.1$ (p value < 0.0001)].

The intercomparison of attitudes between schools based on Tukey's multiple comparison (Table 3) results that state board vs matriculation board and state board vs central board are highly

significant with p value < 0.0001 and matriculation board vs central board is nonsignificant with p value 0.7889.

Practice on Puberty

The practice on puberty for the entire study population was 122 (16.2%) in state board, 320 (42.6%) for matriculation board, and 404 (53.8%) for central board school (Table 5), which was statistically significant [$F(2,447) = 114.8$ (p value < 0.0001)]. This is because lack of knowledge of respondents about the importance of hygiene to their reproductive organs.

The intercomparison of practice between schools based on Tukey's multiple comparison (Table 3) results that state board vs matriculation board, state board vs central board, and matriculation board vs central board are highly significant with p value < 0.0001.

The comparison of prepubertal girl's negative responses for knowledge questions with maternal education of state board, matriculation board, and central board participants represents that based on mother's education, the knowledge level of girls may differ.

DISCUSSION

The result of this study shows that knowledge, attitude, and practice regarding pubertal changes may vary between prepubertal girls.

Table 2: Frequency of various responses to knowledge questions on pubertal changes among school students

S. no	Knowledge questions	State board (n = 150) (%)	Matriculation board (n = 150) (%)	Central board (n = 150) (%)
1	The first sign of puberty for girls is usually breast budding and growth of pubic hair	43 (28.6)	78 (52)	99 (66)
2	Precocious puberty for girls is 8–13 years	16 (10.6)	55 (36.6)	38 (25.3)
3	The order of pubertal development in girls is thelarche–pubarche–adrenarche–menarche	8 (5.3)	22 (14.6)	41 (27.3)
4	Being aware of changes in their bodies	46 (30.6)	92 (61.3)	116 (77.3)
5	The primary function of estrogen is development of female secondary sexual characteristics	2 (1.3)	19 (12.6)	60 (40)
6	A late development in the pubertal sequence of female is menarche	2 (1.3)	38 (25.3)	76 (50)
7	Puberty lasts for a set period of time	16 (10.6)	66 (44)	68 (45.3)
8	Pituitary gland is responsible for releasing the hormone that begins puberty	4 (2.6)	20 (13.3)	75 (50)
9	In puberty, one side of our body can develop faster than the other	8 (5.3)	34 (22.6)	74 (49.3)
10	Menarche signals a dramatic transition from girlhood to womanhood	27 (18)	81 (54)	68 (45.3)
11	Are you aware about menstruation	7 (4.6)	44 (29.3)	74 (49.3)
12	Napkins should be changed in a time interval of 4–5 hours	2 (1.3)	40 (26.6)	65 (43.3)

Table 3: Comparison of knowledge, attitude, and practice regarding puberty between schools

Tukey's multiple comparison test	Mean difference	95% of CI of difference	Significant level	Adjusted p value
Knowledge				
SB vs MB	–2.74	–3.278 to –2.202	Significant	<0.0001
SB vs CB	–4.487	–5.025 to –3.948	Significant	<0.0001
MB vs CB	–1.747	–2.285 to 1.208	Significant	<0.0001
Attitude				
SB vs MB	–4.88	–5.549 to –4.211	Significant	<0.0001
SB vs CB	–5.067	–5.735 to –4.398	Significant	<0.0001
MB vs CB	–0.1867	–0.8555 to 0.4821	Nonsignificant	0.7889
Practice				
SB vs MB	–1.32	–1.62 to –1.02	Significant	<0.0001
SB vs CB	–1.88	–2.18 to –1.58	Significant	<0.0001
MB vs CB	–0.56	–0.8595 to 0.2605	Significant	<0.0001

p value: < 0.01 SB, state board; MB, matriculation board; CB, central board

Table 4: Frequency of various responses to attitude questions on pubertal changes among school students

S. no	Attitude questions	State board (n = 150) (%)	Matriculation board (n = 150) (%)	Central board (n = 150) (%)
1	Awareness camps should be organized regarding pubertal changes	36 (24)	127 (84.6)	115 (76.6)
2	Pubertal changes are a must to attain maturity	20 (13.3)	137 (91.3)	116 (77.3)
3	Prior knowledge about pubertal changes is necessary before their onset	40 (26.6)	114 (76)	117 (78)
4	Peer understands my feeling better when compared with parents	33 (22)	33 (22)	87 (58)
5	Menstruation is shameful and embarrassing situation for girls	34 (22.6)	122 (81.3)	73 (48.6)
6	Mood changes are not normal part of pubertal process	41 (27.3)	121 (80.6)	77 (49.3)
7	Menstruation makes me unclean to perform religious activities	45 (30)	117 (78)	94 (62.6)
8	Growth of hair on body area will spoil my beauty	40 (26.6)	49 (32.6)	79 (52.6)
9	Friends and Internet alone do not provide complete information	43 (28.6)	42 (28)	103 (68.6)
10	Everyone has focus to attention and concern on my changes	45 (30)	116 (77.3)	69 (48)
11	You may get irritable often	43 (28.6)	93 (62)	64 (42.6)
12	You may be worried/anxious most of the time	44 (29.3)	82 (54.6)	92 (61.3)
13	Are you comfortable with your own decision	8 (5.3)	63 (42)	60 (40)
14	If any displeasure sense I feel, I consult with my family or educator	21 (14)	8 (5.3)	107 (71.3)

Table 5: Frequency of various responses to practice questions on pubertal changes among school students

S. no	Practice questions	State board (n = 150)	Matriculation board (n = 150)	Central board (n = 150)
1	In toilet, I first wash perineum then anal, i.e., wash front part and then back	16 (10.6)	9 (6)	63 (42)
2	I dry underwear in the sunlight	5 (3.3)	9 (6)	39 (26)
3	Using private toilets is good	47 (31.3)	112 (74.6)	110 (73.3)
4	I wear comfortable and cotton clothes	16 (10.6)	103 (68.6)	93 (82)
5	During menstruation we should take bath twice daily	38 (25.3)	87 (58)	99 (74)

Variables in parent’s education, source of information, and birth order have a beneficial effect on better knowledge, attitude, and practice among prepubertal girls.

The age of the study subjects in the current study ranged from 10 to 14 years. The majority of the study subjects who were in the age group of 12 years were following Hindu religion and belong to nuclear family. A similar result was obtained from the study conducted by Chethana et al.,²¹ who showed that maximum percentage (49%) of the participants were in the age group of 12 years following the Hindu religion and belong to nuclear family.

In the study, more number of father from central board participants were found to be degree graduates. A similarly international study of practice regarding menstrual hygiene found that maximum respondent’s father (35%) and mother (32%) had completed high school or diploma degree. We found that educational status plays an important role in adolescent girl’s knowledge, attitude, and practice regarding puberty. Thus, the educational status of the parents has also been suggested as one of the effective factors for practice and health behavior.²² This indicates that the adolescence practice could be improved by promoting the parent’s literacy.⁴

We determined that in terms of sharing between mother and child about the changes in puberty, in this study girls prefer mother or sister as a major source of information. Our results were consistent with the study done by Agrawal et al.,²³ which showed that the main source of information was the mother, then followed by sisters. Hockenberry et al.,³ concluded that the main source of information was from the mother, then followed by friends.

Maternal education played an important role in awareness about puberty reproductive health. This signifies the importance of mothers, as an important medium for health education regarding pubertal changes and openly discussing this topic with their daughters as a well-informed adolescent can further transfer her knowledge to her children when she becomes a mother. Some other study showed that the main source of information regarding reproductive health was peer,²⁴ and fewer earlier studies resulted media was the main source.^{25,26}

Knowledge Level on Puberty

When the level of puberty knowledge of the study subjects was considered, it established that majority of the central board participant’s schools were aware of the changes when compared with state and matriculation board study participants. Similar findings showed that majority of prepubertal girls (75%) have below average knowledge regarding pubertal changes followed by 25% girls with an average level of knowledge. None of the girls had good and very good knowledge regarding pubertal changes.²⁷ Rakhi et al.,²⁸ concluded that 50% urban and 25% tribal adolescents girls were aware about secondary sexual changes during puberty. The difference in the knowledge level of the students about changes

during puberty is associated with their socioeconomic status, education level of parents, and source of information.

Attitude Level toward Puberty

When attitude regarding puberty changes on study subjects was established, the majority of the central board participant’s schools have good attitude toward puberty changes when compared with state and matriculation board study participants. Our study has compared with the study conducted by Manisha et al.,²⁷ which revealed that nearly 41% girls reported feeling anxious, other behavioral aspects such as feeling emotionally labile and crying easily 47%, irritable 47%, getting angry often 52%, and 80% felt their parents were supportive and most relied on their family members for discussing problems.

Practice on Puberty

Practice toward puberty changes on study subjects was found that the majority of the central board participant’s schools have good practice toward puberty changes when compared with state and matriculation board study participants. Self-hygiene is very important for adolescent girls, and it can help to prevent from various reproductive tract infections. Our study was consistent with Sakineh et al.,²² which found that the student self-hygiene practice was moderate. Variables of age at menarche, education grade, father’s education, family economic status, and the main source of information about puberty were found to be predictors of practice in adolescents. Alavi et al.,²⁹ in their research reported that most of the participants do not have proper practice regarding puberty.

Limitations of our study were the participants in the study might have answered some questions differently in order to satisfy the enquirer. There might have been some over reporting as these observations are based on self-reported outcomes.

CONCLUSION

Overall, most of the participants from central board school have good knowledge, attitude, and practice regarding pubertal changes when compared with matriculation board and state board. Our study resulted that based on parent’s literacy, the knowledge, attitude, and practice of the adolescent’s girls increase. Although mother may be a prime source of information, probably because social inhibitions and lack of awareness among mothers, only a few girls were attentive to these changes. Early awareness of puberty will prevent adolescent girl’s suffering from the infection to reproductive organ. Creating awareness concerning to puberty through health education is incredibly essential to assist the adolescent girls to handle sexuality-related problems with confidence. By providing correct information in school throughout their formal education period will be a valuable resource for adolescents and for their future kids.

REFERENCES

- World Health Organization, Programming for adolescent health and development report of WHO/UNFPA/UNICEF/study group on programming for adolescent health. [Online] <http://apps.who.int/iris/handle/10665/42149>. January 1, 1999. Accessed on July 10, 2018.
- Ghai OP. *Essential Paediatrics*. 6th ed., CBS publishers; 2000. p. 66.
- Hockenberry J, Wilson D. *Wong's Essentials of pediatric nursing*. Elsevier Publication; 2013. pp. 477–478.
- Chandramouli C. Release of social and cultural tables-Age Data highlights slide player. [online] <https://slideplayer.com/slide/12096432>. August 2013. Accessed on July 20, 2018.
- Yazic S, Dolgun G, Ozturk Y, et al. The level of knowledge and behaviour of adolescent male and female students in turkey on the matter of reproductive health. *Sex Disabil*. 2011;29(3):217–227. DOI: 10.1007/s11195-011-9204-x.
- Singh BP, Singh G, Singh KK. Pubertal changes in teenagers of Varanasi-the spiritual city of india. *Indian J Youth and Adolescence Health* 2014;1(4):1–5.
- Anusha L, Radhika M, Indira S. Effectiveness of structured teaching programme on knowledge regarding pubertal changes among preadolescent girls. *IJAR* 2015;1(12):679–682.
- Igras SM, Macieira M, Murphy E, et al. Investing in very young adolescents' sexual and reproductive health. *Glob Public Health* 2014;9(5):555–569. DOI: 10.1080/17441692.2014.908230.
- Sunderlal, Adarsh, Pankaj. *Textbook of Community Medicine*. 3rd ed., CBS publishers; 2011. pp. 154–160.
- Thakre SB, Thakre SS, Reddy M, et al. Menstrual hygiene: knowledge, and practices among adolescent school girls of Saoner, Nagpur district. *J Clin Diagn Res* 2011;5(5):1027–1033.
- Sharma N. A study of social and psychological problems related to puberty among high school students. *JIOM* 1999;21(4):1–50.
- Joshi B, Chauhan S, Donde U, et al. Reproductive health problems and help seeking behaviour among adolescents in urban India. *Indian JPediatr* 2006;73(6):509–513. DOI: 10.1007/BF02759896.
- Afghari A, Eghtedari S, Pashmi R, et al. Effects of pubertal health education on 10-14-year-old girls' knowledge, attitude and behaviour. *IJNMR* 2008;13(1):38–41.
- Young DR, Haskell WL, Taylor CB, et al. Effect of community health education on physical activity knowledge, attitudes, and behaviour. *AJE* 1996;144(3):264–274. DOI: 10.1093/oxfordjournals.aje.a008921.
- Ray K, Bhattacharjee S, Biswas R, et al. Awareness regarding pubertal changes and reproductive health in school going adolescent girls of a border area of Darjeeling district: a cross sectional study. *IJMCH* 2011;13(3):1–8.
- Grunbaum JA, Kann L, Kinchen SA, et al. Youth risk behavior surveillance national alternative high school youth risk behaviour survey, United States. *J Sch Health* 2000;70(1):5–17. DOI: 10.1111/j.1746-1561.2000.tb06439.x.
- Ozer EM, Park MJ, Paul T, et al. *America's adolescents: are they healthy?* San Francisco, California: National Adolescent Health Information Center Publication; 2003. pp. 29–33.
- Lowdermilk DL, Perry SH, Bobak I. *Maternity and woman's health care*. 9th ed., Elsevier Publication; 2007. 1024.
- Mudey A, Kesherwani N, Mudey G, et al. A cross sectional study on awareness regarding safe and hygienic practices amongst school going adolescent girls in rural area of Wardha District India. *Golb Jof Health Sci* 2010;2(2):222–231. DOI: 10.5539/gjhs.v2n2p225.
- Qidwai W, Ishaque S, Shah S, et al. Adolescent lifestyle and behaviour: a survey from a developing country. *PLoSOne* 2010;5(9):e12914. DOI: 10.1371/journal.pone.0012914.
- Chethana DP, Delna J, Christy B, et al. Pubertal changes knowledge among school aged girls. *AJRHASS* 2015;12(1):51–53.
- Sakineh M, Mojgan M, Sima S. Practice of Iranian adolescent girls regarding puberty and menstrual hygiene and its predictors. *IJWHR* 2014;2(3):195–204. DOI: 10.15296/ijwhr.2014.28.
- Agrawal S, Fatma A, Singh CM. A study of knowledge and attitude of adolescent girls towards reproductive health and related problems. *Indian J Prev Soc Med* 2007;38(2):36–41.
- Chitra N, Kavitha S. Effect of health education on awareness and practices related to menstruation among rural adolescent school girls in Bengaluru Karnataka. *IJPPHS* 2016;2(1):18–21.
- Nirankar S, Shailendra K, Sujit K, et al. A study of HIV awareness in school adolescents in a rural area of Punjab. *JARBS* 2011;3(2):142–146.
- Lal P, Nath A, Badhan S, et al. A study of awareness about HIV/AIDS among senior secondary school children of Delhi. *Indian J Community Med* 2008;33(3):190–192. DOI: 10.4103/0970-0218.42063.
- Manisha R, Poonam S, Yogesh K, et al. Evaluating the effectiveness of pubertal preparedness program in terms of knowledge and attitude regarding pubertal changes among pre-adolescent girls. *J Family and Reprod Health* 2016;10(3):122–128.
- Rakhi J, Puneet A. Awareness of pubertal changes and reproductive health in adolescent girls: a comparative study. *IJCMPH* 2016;3(12):3313–3319.
- Alavi M, Poushaneh K, Khosravi AA. Puberty health: knowledge, attitude and practice of the adolescent girls in Tehran. *Payesh* 2009;8(3):59–65.