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Knowledge Regarding Pubertal Changes among Adolescents in Selected Schools of Jumla

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Abstract

Adolescence (10-19 years) is a period of transition from childhood to adulthood. Rapid physical, cognitive, social, and emotional development occurs during the adolescent period. Puberty marks the development of primary and secondary sex characteristics and the attainment of the individual for reproduction is attained. To identify the associated factors related to knowledge regarding pubertal changes among adolescents in selected school of Jumla. A cross-sectional, quantitative study was conducted at two private school (Jaya Ratna Karnali Boarding School and Asia International Boarding School of Jumla). Simple random sampling technique was used to select the school and sample. Total 106 students were included in study. Structured questionnaire was developed. Data was collected by self-administered questionnaire and analyzed by using SPSS version 16. Descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (chi-square) were used to analyze the data. Majority (79.2%) of respondents had inadequate knowledge while one fifth (20.8%) had moderately adequate knowledge and none had adequate knowledge about pubertal change. A statistically significant association was found between level of knowledge with socio- demographic variables such as gender and source of information. Majority of respondents had inadequate knowledge. Therefore, there is need for health education, awareness campaign and inclusion of pubertal health content in school curricula to improve adolescents understanding to these changes.

Keywords: Adolescents, knowledge, pubertal changes.

Introduction

Adolescence is the period of life between 10–19 years old. It is a period of rapid physical, cognitive, and psychosocial growth. Ten to nineteen-year-olds make up 1 in 6 people in the world. It is a unique stage of human development and an important time for laying the foundations of good health. Adolescence experiences rapid development because, in this period, the boy prepares for manhood and the girl prepares for womanhood. Furthermore, adolescence means “to grow into maturity” and is generally regarded as the psychological, social, and maturational process initiated by the pubertal changes (World Health Organization [WHO], n.d.). There are 1.3 billion adolescents in the world, covering 16% of the total world population (UNICEF, n.d.). According to the National Population and Housing Census (2021), there are 58,762,69 adolescents in Nepal, which covers 20.14% of the total

population. In Jumla, there are 24.3% (28,641) adolescents, of which 12% (14,123) are male and 12.3% (14,518) are female (Central Bureau of Statistics [CBS], n.d.).

Puberty is the process of physical maturation when an adolescent reaches sexual maturity and the most intense changes occur, making them capable of reproduction (Breehl & Caban, 2024). Puberty actually begins when the pituitary gland secretes a hormone that signals the body to release estrogen and progesterone in girls between ages 8 to 13 and testosterone in boys between ages 9 to 14 (Srivastava & Singh, 2017). Sexual maturity (puberty) starts earlier in girls than in boys. Enlargement of the breast (thelarche) is the first sign of sexual maturation in females, and testicular enlargement is the first sign of sexual maturation in males (Ghai, n.d.). It is a process that usually happens between ages 10 and 14 for girls and ages 12 and 16 for boys. Girls and boys experience different hormonal changes in their bodies during puberty that affect them differently (Shanahan, 2003; National Academies of Sciences, Engineering, and Medicine [NASEM], 2019).

In girls, a major change that occurs during puberty is increased production of the female sex hormone, estrogen, causing breast budding as early as 8 years of age, breast changes like pigmentation of the areola and enlargement of the breast tissue and nipple, appearance of pubic as well as underarm and leg hair, the start of ovulation and changes in vaginal secretions, activation of axillary sweat glands, onset of menstruation, and an increase in weight and height (Kaur, 2018). In boys, major changes occur due to increased production of testosterone, the male sex hormone, causing an adolescent growth spurt (Kaur, 2018). The common physical changes include enlargement of the testicles, underarm, pubic, chest, axillary, and facial hair growth, penis enlargement and the beginning of erections, darkening of the scrotum, ejaculation, activation of axillary sweat glands, voice cracking, and an increase in weight and height (Breehl & Caban, 2024).

At the same time, adolescents go through psychological and emotional changes, including feelings of independence, identity formation, and attraction toward the opposite sex. They create some distance from their parents and expand their social circles among friends (United Nations Population Fund [UNFPA], n.d.). Adolescents might show intense emotions, and their moods might seem unpredictable; they may become sensitive to others, and their emotions may seem out of control. They commonly have no idea about the changes that take place during puberty, which may cause distress and lead to unfavorable attitudes toward these changes. Pubertal changes affect adolescents' self-image, mood, and interactions with parents and peers. The changes make them confused, vulnerable, and egocentric (Ghai, n.d.). As a result, mental disorders such as severe depression, anxiety disorders, eating disorders, and substance use disorders may become apparent during puberty (Methun et al., 2022).

A descriptive quantitative study was conducted on school-going girls aged 9–16 years in New Delhi. The majority of school-age girls (68.4%) had inadequate knowledge about menarche and pubertal changes, which caused them to experience numerous difficulties (Bala, 2019). Similarly, a descriptive study among 204 adolescents (100 boys and 104 girls) aged 12–14 years at government schools in Ambala district found that the majority of preadolescent girls (75%) and boys (74%) had below-average knowledge regarding pubertal changes (Rani et al., 2016). Likewise, a descriptive cross-sectional study on awareness and attitudes toward pubertal changes conducted among 205 adolescents in Bharatpur district, Nepal, showed that 16% of adolescents had very good knowledge (Sandhya & Bimala, 2017).

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Materials and Methods

Study design and Setting

The descriptive, cross-sectional study was conducted at Jaya Ratna Karnali Boarding School, and Asia International Boarding School among students studying in 6 and 7 grade to assess the knowledge regarding pubertal changes among adolescents in Jumla.

Participants, Sample size and Sampling Technique

Participants were adolescent students studying in 6 and 7 grade at Jaya Ratna Karnali Boarding School, and Asia International Boarding School. Students aged 10-14 years were included in the study; excluding those not willing to participate and parents who do not provide assent. Cochran's formula was used to calculate the sample size of the study. $n=z2pq/d2$. $z=1.96$, $p=51.4\%$ for knowledge regarding pubertal changes in the study conducted in Pokhara, $q=0.48.6\%$, $d=10\%$. $n=95.96$. Adding 10% non-response rate, a sample size of 106 was calculated for the study. Simple random sampling was used to select the schools and participants.

Data collection procedure and study variables

A structured self-administered questionnaire was used to collect data on knowledge regarding pubertal changes among adolescents after obtaining consent from the respondents. The questionnaire consists of 27 items and consists two parts according to variables. Part I: Questionnaire related to socio-demographic information. It consists of 12 questions. Part II: Questionnaire related to knowledge regarding pubertal changes. It consists of 15 questions which includes multiple choice questions and multiple response questions. The study variables included knowledge regarding pubertal changes, age,gender, grade, ethnicity, Presence of siblings of participants, number of siblings, relationship with siblings, educational status of father, educational status of mother, occupation of father, occupation of mother and source of information regarding pubertal changes.

Statistical analysis and data management

After completion of data collection, data was checked for its completeness and accuracy. The data was edited, coded and entered into EPI data manager and statistical package for social science (SPSS version 16) was used for data analysis. The data was analyzed and calculated according to the nature of variables in terms of descriptive statistics (frequency, percentage, mean and standard deviation) whereas inferential statistic (Chi-square test, Fisher exact test) was used to examine the association between the level of knowledge with selected socio-demographic variables. The findings of the study is presented by the use of tables and figures.

Ethical Consideration

Data was collected after obtaining ethical clearance letter from Institutional Review Committee of Karnali Academy of Health Sciences (Ref no 080/081.39.). written permission was taken from Chandanath municipality. Written informed consent was obtained from the parents of each student, and assent was collected from the students in the presence of their parents before collection of the data.

Results

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Table 1
Socio-demographic Variables of Respondents

(n=106)

Variables	Frequency (f)	Percentage (%)
Age(years)		
10-12	61	57.5
13-14	45	42.5
Mean±SD= 12.41±0.837		
Gender		
Female	54	50.9
Male	52	49.1
Grade		
6	64	60.4
7	42	39.6
Ethnicity		
Brahmin/ Chhetri	84	79.2
Janajati	5	4.7
Dalit	5	4.7
Thakuri	12	11.3
Family type		
Nuclear	46	43.4
Joint	60	56.6
Presence of siblings of respondents		
Yes	102	96.2
No	4	3.8
Number of siblings(n=102)		
<2	76	74.6
≥2	26	25.4
Relationship with siblings #		
Elder brother	31	23.7
Elder sister	34	26.0
Younger brother	40	30.5
Younger sister	26	19.8

Multiple response

Table 1 shows socio-demographic variables of respondents. Out of 106 respondents more than half (57.5%) of the respondents were aged 10-12 years, with a mean age of 12.41 ± 0.837 years. The minimum and maximum ages of the respondents in this study were 10 and 14 years respectively. More than half (50.9%) of the respondents were female. Regarding the educational status of respondents, (60.4%) were studying in grade 6, and (39.6%) were studying in grade 7. In terms of ethnicity, majority (79.2%) of respondents were Brahmin/Chhetri. More than half (56.6%) of respondents were living in joint families. majority (96.2%) of respondents had siblings. Nearly three fourth (74.6%) had fewer than two siblings, with less than half (30.5%) having a younger brother.

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Table 2

Socio-demographic Variables of Respondents

(n=106)

#Multiple response Others* include Foreign employment, Daily wages, News reporter, Security guard

Variables	Frequency (f)	Percentage (%)
Educational status of father (n=105)		
Illiterate	12	11.3
Primary	27	25.5
Secondary	42	39.6
Higher secondary and above	24	22.6
Educational status of mother		
Illiterate	30	28.3
Primary	27	25.5
Secondary	38	35.8
Higher secondary and above	11	10.4
Occupation of father(n=105)		
Farmer	22	21.0
Service	29	27.6
Business	31	29.5
Others*	23	21.9
Occupation of mother		
Homemaker	26	24.5
Farmer	39	36.8
Service	22	20.8
Others*	19	17.9
Income of family per month (in Rs)		
Below 5000	8	7.5
50001-10000	8	7.5
10001-15000	10	9.4
Above 15000	80	75.5
Source of information #		
Personal experience	33	16.9
Family member	67	34.4
Friends	47	24.1
Mass media	27	13.8
Health personnel	21	10.8

Table 2 shows socio-demographic variables of respondents. More than one third (39.6%) of fathers and (35.8%) of mothers had completed secondary education. Nearly one-third (27.4%) of fathers were engaged in business, while more than one-third (36.8%) of mothers were involved in farming. More than three fourth (75.5%) of families had an income above fifteen thousand. The sources of information regarding pubertal changes included personal experience (16.9%), family members (34.4%), friends (24.1%), mass media (13.8%), and health personnel (10.8%).

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Knowledge Regarding Pubertal Changes

Table 3
Knowledge Regarding Concept, Pubertal Changes among Girls

(n=106)

Variables	Correct responses	
	Frequency (f)	Percentage (%)
Concept of puberty		
Concept of puberty	36	34.0
Transit from child to adult after puberty	48	45.3
Cause of pubertal changes	33	31.1
Experience puberty first	53	50.0
Pubertal changes among girls		
Age of puberty begins in girls	16	15.1
First sign of puberty in girls	14	14.2
Menstruation meaning	45	42.5
Age of menarche	57	53.8
Common pubertal changes in girls#		
Rapid increase in height and weight	46	43.4
Pubic and axillary hair growth	55	51.9
Onset of menstruation	74	69.8
Pimples in face	70	66.0
Increase in hip size	23	21.7
Softening of voice	34	32.1

#Multiple response question

Table 3 shows knowledge regarding pubertal changes. Out of 106 respondents more than one third (34%) of the respondents correctly answered questions regarding the concept of puberty. Less than half (45.3%) of respondents correctly identified the transition from child to adult after puberty. Similarly, about one third (31.1%) knew the cause of pubertal changes. Half (50%) of the respondents correctly identified who girl experiences puberty first. Only limited (15.1%) of respondents knew the age at which puberty begins in girls. A minimal (14.2%) of respondents correctly identified the first sign of puberty in girls. Similarly, less than half (42.5%) of the respondents correctly answer the meaning of menstruation. More than half (53.8%) of the respondents correctly answer the age of menarche. More than two-thirds (69.8%) of respondents mentioned that the onset of menstruation is a common pubertal change, followed by pimples on the face (66.0%) and the growth of pubic and axillary hair (51.9%).

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Table 4

Knowledge Regarding Pubertal Changes among Boys, Psychological and Behavioral Changes

(n=106)

Variables	Correct responses	
	Frequency (f)	Percentage (%)
Pubertal changes in boys		
Age of puberty begins in boys	37	34.9
First sign of puberty in boys	35	33.0
Development of breast tissue	90	84.9
Common pubertal changes in boys#		
Pubic, axillary, facial hair growth	38	35.8
Penis enlarge and begin to have erection	65	61.3
Scrotum gradually becomes darker	41	38.7
Voice break	45	42.5
Wet dreams	46	43.4
Increase in height and weight gain	35	33.0
Positive psychological change	38	35.8
Behavioral changes#		
Attraction toward opposite sex	44	41.5
More interest toward friends	41	38.7
Distinct individual	53	50.0
Sometimes mood swing	52	49.1
Focus toward self-appearance	61	57.5

#Multiple response question

Table 4 shows knowledge regarding pubertal changes among boys**.** Out of 106 respondents, more than one third (34.9%) of respondents knew about the age of puberty begins in boys. One third (33.0%) of respondents correctly answered the first sign of puberty in boys. Similarly, more than half (61.3%) of respondents mentioned that penis enlarge and begin to have erection is a common pubertal change, followed by wet dreams (43.4%) and voice break (42.5%). Concerning development of breast tissue most (84.9%) of respondents gave correct answer**.** more than one third (35.8%) gave the correct answer of positive psychological changes. Similarly, more than half (57.5%) focus toward self-appearance, followed by distinct individual (50%) and Sometimes mood swing (49.1%).

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Table 5
Level of Knowledge Regarding Pubertal Changes among Respondents

(n=106)

Category	Frequency(f)	Percent (%)
Inadequate	84	79.2
Moderately adequate	22	20.8

Table 5 shows level of knowledge regarding pubertal changes among respondents, out of 106 respondents' majority (79.2%) of respondents had inadequate knowledge and one fifth (20.8%) of respondents had moderately adequate knowledge and none of respondents had adequate knowledge regarding pubertal changes among adolescents.

Table 6
Association between Level of Knowledge with Socio demographic Variables

(n=106)

Variables	Level of Knowledge		(x^2)	*p*-value
	Inadequate f (%)	Moderately adequate f (%)		
Age (years)				
10-12	48(78.7)	13(21.3)	0.02	0.869
13-14	36(34)	9(8.5)		
Gender				
Female	35(64.9)	19(35.1)	13.93	**0.003****
Male	49(46.2)	3(2.8)		
Grade				
6	54(84.3)	10(5.7)	2.58	0.108
7	30(71.4)	12(28.6)		
Ethnicity				
Brahmin/Chhetri	68(80.9)	16(19.1)	0.71	0.397
Others	16(72.7)	6(27.3)		
Family type				
Nuclear	36(78.2)	10(21.8)	0.04	0.827
Joint	48(80.0)	12(20.0)		
Presence of siblings of respondents				
Yes	82(80.3)	20(19.7)	2.16	0.190**f***
No	2(50.0)	2(50.0)		
Number of sibling (n=102)				
<2	64(84.2)	12(15.7)	4.02	0.094
≥2	18(69.2)	8(30.8)		
Relationship with siblings#				
Elder brother	23(74.1)	8(25.9)	7.82	0.098
Elder sister	23(67.7)	11(32.3)		
Younger brother	30(75.0)	10(25.0)		
Younger sister	20(77.0)	6(23.0)		

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*f** Fisher exact test, # Multiple response, **= Statistically significant association *p*=<0.05

Table 6 shows association between socio demographic variables and level of knowledge, there is significant association between gender, likewise, there is no significant association between the level of knowledge regarding pubertal changes with age, grade, ethnicity, family type, siblings and relationship with siblings.

Table 7

Association between Level of Knowledge with Socio-demographic Variables

(n=106)

Variables	**Level of Knowledge**		**Chi-square (x^2)**	***p*-value**
	Inadequate f (%)	**Moderately adequate f (%)**		
Education status of father(n=105)				
Illiterate	8 (66.7)	4(33.3)	1.30	0.254
Literate	75(80.7)	18(19.3)		
Education status of mother				
Illiterate	25(83.3)	5(16.7)	0.42	0.512
Literate	59(77.7)	17(22.3)		
Occupation of father(n=105)				
Unemployed	37(82.2)	8(17.8)	0.48	0.481
Employed	46(76.7)	14(23.3)		
Occupation of mother				
Unemployed	57(85.0)	10(15.0)	3.76	0.052
Employed	27(69.2)	12(30.8)		
Source of information#				
Personal experience	20(60.7)	13(39.3)	22.97	**0.001****
Family member	51(76.1)	16(23.9)		
Friends	32(68.0)	15(32.0)		
Mass media	20(74.0)	7(26.0)		
Health personnel	13(62.0)	8(38)		
Income of family per month (in Rs)				
<20000	22(84.7)	4(15.3)		
≥20000	62(77.5)	18(22.5)	0.60	0.437

*f** Fisher exact test, # Multiple response, **= Statistically significant association *p*=<0.05

Table 7 shows association between socio demographic variables and level of knowledge, there is significant association between source of information regarding pubertal changes. Likewise, there is no significant association between educational status of parents, occupation of parents and income per month of family.

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Discussion

In this study, the majority of respondents had inadequate knowledge, a minimum had moderately adequate knowledge, and none had adequate knowledge regarding pubertal changes. This finding is supported by a study conducted in Nellore, India, which showed that 83.3% of participants had inadequate knowledge, 16.6% had moderate knowledge, and none had adequate knowledge (C. M. et al., 2020). Similarly, a study conducted in India among preadolescents found that 74% had below-average knowledge, 24% had average knowledge, and none had good knowledge (Rani et al., 2016). However, this finding contrasts with a study conducted in Karaj, Iran, which found that 14.9% had low knowledge, 50.5% had medium knowledge, and 34.6% had good knowledge (Farid et al., 2019). Additionally, the results are inconsistent with a study in Honavar, India, where 24% had inadequate knowledge, 66% had moderately adequate knowledge, and 10% had adequate knowledge (Diana et al., 2022). Another study in Darjeeling found that 41% had inadequate knowledge, 58% had moderate knowledge, and 1% had adequate knowledge (Poojary et al., 2015). The variation in results may be due to the inclusion of reproductive health curricula in schools, which might have improved knowledge in some studies.

Association Between Level of Knowledge and Sociodemographic Variables

This study revealed that knowledge regarding pubertal changes among adolescents was statistically significant with gender (*p* = 0.003). This finding aligns with studies conducted in Pokhara and Dhulikhel, Nepal, where gender was significantly associated with knowledge of pubertal changes (*p* < 0.001 and *p* = 0.001, respectively; Bhatta & Lamichhane, 2023; Shrestha & Neupane, 2020). However, this finding is inconsistent with a study conducted in Bharatpur, Nepal, where no significant association was found between knowledge and gender (*p* = 0.74; Sandhya & Bimala, 2017).

Similarly, a statistically significant association was found between the level of knowledge and source of information regarding pubertal changes (*p* = 0.001). This finding is supported by studies conducted in Bharatpur and Pokhara, Nepal (*p* = 0.001 and *p* < 0.001, respectively; Bhatta & Lamichhane, 2023; Sandhya & Bimala, 2017). However, this finding is inconsistent with a study conducted in India, where no significant association was found between knowledge and source of information (*p* = 16.92; Rani et al., 2016).

No significant association was found between the level of knowledge and other sociodemographic variables, such as age, grade, presence of siblings, number of siblings, ethnicity, father's education status, mother's education status, father's occupation, mother's occupation, and family income. This finding is similar to studies conducted in Bharatpur, Nepal, which found no significant association between age and ethnic group but a significant association between grade and source of information (Sandhya & Bimala, 2017). The differences in results may be due to variations in study areas and population characteristics.

Conclusion

The majority of adolescents had an inadequate level of knowledge regarding pubertal changes, while a minimum had moderately adequate knowledge. None of the respondents had adequate

knowledge. A significant association was found between the level of knowledge and sociodemographic variables such as gender and source of information.

Recommendations

Integrate pubertal education into school health curriculum
Conduct awareness campaigns targeting both students and parents
Encourage involvement of health professionals in schools
Conduct further community-based research for generalization

Compliance with ethical standards

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