

Awareness of Puberty Changes among Adolescent Girls at Preparatory Schools in Abnub District, Assiut, Egypt

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Abstract:

Background: Puberty is a major milestone that marks the most significant changes in a teenager's life. In Egypt, girls often face limited access to sexual and reproductive health services, and puberty education is largely absent from school curricula.

Objective: This study aimed to assess the level of knowledge regarding pubertal changes among adolescent girls in rural and urban areas and to identify various factors influencing awareness of these changes among adolescent girls.

Participants and Methods: A descriptive cross-sectional study was conducted among 392 adolescent girls in Abnub district. A self-administered questionnaire, including sociodemographics, awareness, and sources of information regarding puberty changes, was applied.

Results: Most urban and half of the rural girls knew the correct definition of puberty, 61% of urban and rural girls correctly reported the cause of puberty changes, and 77.7% of the urban and 51.6% mentioned the correct answer, with a significant difference. Most urban and rural girls knew about menstruation before menarche, and more than half of urban and rural girls mentioned receiving health education about menstruation. Most girls cited their mothers as the main source of information. A good knowledge score was found among 53.8%, while poor knowledge was reported among 46.2% of the girls. Good knowledge was more common among rural (57.8%) than urban (42.2%) girls, with a statistically significant difference.

Conclusion: Awareness of urban and rural girls regarding puberty and menstruation was comparable to the overall accepted level of knowledge. It is essential to raise awareness about puberty changes among this vulnerable population group.

Keywords: Awareness; Puberty; Girls; Adolescents; Preparatory schools.

Introduction

Adolescence is a particularly intriguing and complex phase of human development. According to the World Health Organization (WHO), this stage includes individuals between the ages of 10 and 19. The attitudes and behaviors developed during this period of physical and emotional growth play a vital role in shaping both present and future Reproductive Health, influencing not only the individual but also the health and well-being of their families and communities (1).

Egypt's youth population is expanding quickly, with adolescents aged 10 to 19 making up about 17 million individuals, roughly 19% of the country's total population (2). This phase of life is significant, as it marks the beginning of puberty and the transition from childhood to adulthood (3).

Adolescents are often considered the healthiest segment of the population, with lower rates of illness and death compared to other age groups. Reproductive health encompasses a wide range of issues related

to adolescent well-being. To live healthy, responsible, and satisfying lives and to safeguard themselves against reproductive health issues, young people need to understand their own bodies and have access to accurate information about the physical and emotional changes that occur during puberty, menstruation, pregnancy, and childbirth (4,5).

Puberty is often a difficult period and can be linked to early sexual activity, school dropout, substance use, troubled marriages, unintended pregnancies, sexually transmitted infections (STIs), as well as emotional and social challenges (3). Adolescent girls represent a vulnerable group, facing risks not only to their social standing but also to their overall health (6).

Puberty refers to the transition from childhood to adolescence. In girls, it typically begins between the ages of 8 and 13 and is first signaled by the appearance of breast buds beneath the areola, a stage known as thelarche. Following this, pubic and underarm hair begins to grow, a stage called pubarche. The growth rate accelerates during this time, reaching its peak, often when menstruation, or menarche, first occurs (7).

Although menstruation is a natural biological process, misconceptions often surround it, and a girl's initial experience and understanding of it can shape either a positive or a negative perception. Providing accurate information about menstruation from an early age can promote healthier practices and potentially reduce the discomfort and challenges faced by millions of women (6).

Adolescence is marked by significant physical, emotional, and behavioral changes, and girls may respond to these changes in various ways. Providing accurate and timely information can help them navigate this phase less stressfully. Adolescent girls must receive proper guidance to understand and cope with the complex changes of puberty (8). The onset of puberty is triggered by hormonal changes, leading to rapid physical growth and the development of secondary sexual characteristics (9).

Psychologically, adolescents often experience emotional instability; they may feel excited one moment and then suddenly become withdrawn or downcast. Socially, this stage is marked by a search for identity, a desire for independence, and the beginning of intimate relationships. These transitions can leave adolescents feeling confused, vulnerable, and self-focused (9). This period is also linked to various challenges, including depression, eating disorders, substance abuse, risky sexual behavior, delinquency, and dropping out of school (8).

A lack of adequate knowledge can result in negative perceptions of pubertal changes and lead to emotional issues such as anxiety and low self-esteem. Furthermore, illiteracy and unfavorable attitudes toward puberty may cause adolescents to adopt ineffective coping strategies (10).

The integration of reproductive health into national strategies and programs is one of the targets of the Sustainable Development Goals. Raising awareness about puberty among adolescent girls requires fighting misconceptions and discrimination in communities. Therefore, this study aimed to assess the level of awareness about pubertal changes and to determine different factors affecting it among adolescent girls.

Participants and Methods

This cross-sectional study was conducted in Abnoub district, Assiut governorate, among girls in preparatory schools.

The sample size was calculated using OpenEpi version 3, based on the frequency of knowledge about menstruation as a normal physiological process of 74.3% (8). With a confidence interval of 95% and a precision of 5%, the sample size is a minimum of 294 girls.

The girls were selected randomly from Abnoub district, one rural and one urban school. Then, one class was selected randomly from each stage. All girls in the selected classes were invited to participate in the study. The final sample reached 392 girls.

A literature review about the topic was conducted by searching the Medline

database, the libraries, and medical journals to prepare the study instrument. A pilot study was performed to test the feasibility of the questionnaire, test the questionnaire for any misunderstanding, and estimate the required time for completing the questionnaire.

A self-administered, anonymous, structured questionnaire collected data through personal interviews. The questionnaire consists of 4 parts:

Part one: Socio-demographic data including age, residence, school grade, parents' level of education and occupation, and type of family.

Part two: Knowledge of adolescent girls about puberty and menstruation, such as:

- Definition of puberty, cause, and age, changes during puberty (physical, psychological, secondary sexual characters)
- Questions about menstruation include definition, age at menarche, hearing about menstruation before or after menarche, menstruation as a physiological process, cause and source of menstrual bleeding, and source of information about menstruation.

The knowledge score was based on responses to seven questions about puberty and menstruation (as shown in Table 2). Each correct answer was awarded one point, while incorrect or "don't know" responses received no points. This resulted in a total possible score of 7. Respondents who scored between 4 and 7 points were categorized as having good knowledge, while those who scored between 0 and 3 were considered to have poor knowledge.

Data was entered and analyzed using SPSS version 26. Descriptive statistics were performed in terms of frequencies, mean, and

SD. Then, analytic statistics were done according to the type of variable, either qualitative or quantitative, e.g., Chi-square, independent sample T-test. Values will be considered significant when the P-value is less than or equal to 0.05.

Ethical Considerations

The study proposal was approved by the IRB Committee of Assiut Faculty of Medicine (**IRB No: 04-2023-200233**). Approvals from the concerned authority, CAPMAS, Assiut Education Directorate, Abnub Education District, and selected schools were obtained. Written informed consent was obtained from parents before participating in the study. The aim of the study was explained to each participant before starting data collection. Privacy and confidentiality of all the data were assured.

Results:

Table 1 shows the socio-demographic characteristics of the students at the preparatory schools in the Abnub district. There were 202 girls from urban Abnub and 190 from rural Abnub. The mean age of the girls was 13.6 ± 1.05 and distributed in the three preparatory grades nearly equally. Regarding parents' education, about one third of fathers (34.2%) and mothers (31.6%) had secondary or diploma certificates. In the context of family, 55.4% lived in nuclear families and 44.6% in extended families, with 51.3% having an older sister and 30.9% having an older female relative in the same house. About half of the girls (49.7%) reported having a mobile phone, and 61 % having an internet connection.

Table 1: Socio-demographic characteristics of the studied preparatory schools' girls in Abnub district, Assiut

Characteristics	Frequency (Total =392)	Percentage
Age Mean \pm SD (Range)	13.6 \pm 1.05 (11-17)	
School grade		
First	134	34.2
Second	134	34.2
Third	124	31.6
Residence		
Urban	202	51.5
Rural	190	48.5

Characteristics	Frequency (Total =392)	Percentage
Father education		
Does not read or write	57	14.5
Read and write	57	14.5
Primary	22	5.5
Preparatory	33	8.5
Secondary or diplome	134	34.2
Intermediate	11	2.8
University	78	19.9
Mother education		
Does not read or write	86	21.9
Read and write	54	13.8
Primary	16	4.1
Preparatory	43	11
Secondary or diplome	124	31.6
Intermediate	21	5.4
University	48	12.2
Family type		
Nuclear	217	55.4
Extended	175	44.6
Presence of older sister		
Yes	201	51.3
No	191	48.7
Presence of older female relative in the same house		
Yes	121	30.9
No	271	69.1
Having mobile		
Yes	195	49.7
No	197	50.3
Having an internet connection		
Yes	239	61
No	153	39

Table 2 compares the awareness about puberty changes among the adolescent girls in urban and rural Abnub. Most of the urban girls (74.8%) and half of the rural girls (50.5%) knew the correct definition of puberty, with a statistically significant difference (P -value < 0.001). Similarly, 61% of urban and rural girls correctly reported the cause of puberty changes as hormonal. Regarding puberty changes, 77.7% of urban

and 51.6% of rural girls mentioned the correct answer with a statistically significant difference (P -value < 0.001). Most girls answered correctly regarding the age, but with no significant difference. Less than half of the urban and rural girls knew the exact cause of menstruation (36.6% vs 42.1%, respectively), with little knowledge about the source of menstrual blood (26.2% vs 22.6%, respectively).

Table 2: Awareness about puberty among the urban and rural preparatory schools' girls in Abnub district, Assiut

Characteristics	Urban (Total = 202) No (%)	Rural (Total = 190) No (%)	P-value
Puberty definition			
Menstrual bleeding	33 (16.3%)	32 (16.8%)	< 0.001
Sexual changes	13 (6.4%)	28 (14.7%)	
Psychosocial changes	5 (2.5%)	34 (17.9%)	
All of the above*	151 (74.8%)	96 (50.5%)	
Puberty cause			
Hormonal*	124 (61.4%)	116 (61.1%)	0.55
Pathological	12 (5.9%)	16 (8.4%)	
Psychological	37 (18.3%)	27 (14.2%)	

Others	29 (14.4%)	31 (16.3%)	
Characteristics	Urban (Total = 202) No (%)	Rural (Total = 190) No (%)	P-value
Puberty changes			
Breast growing	11 (5.4%)	11 (5.8%)	< 0.001
Underarm and pubic hair growing	14 (6.9%)	27 (14.2%)	
Menstruation	20 (9.9%)	54 (28.4%)	
All of the above*	157 (77.7%)	98 (51.6%)	
Puberty age			
Less than 8 years	5 (2.5%)	12 (6.3%)	0.14
From 8-10 years*	38 (18.8%)	30 (15.8%)	
More than 10 years	159 (78.7%)	148 (77.9%)	
Age of menstruation			
Less than 10 years	12 (5.9%)	20 (10.5%)	0.23
From 10-15 years*	172 (85.1%)	156 (82.1%)	
More than 15 years	18 (8.9%)	14 (7.4%)	
Cause of menstrual cycle			
Hormonal*	74 (36.6%)	80 (42.1%)	0.02
Pathological	9 (4.5%)	9 (4.7%)	
Psychological	6 (3%)	17 (8.9%)	
Do not know	113 (55.9%)	84 (44.2%)	
Source of menstrual blood			
Uterus*	53 (26.2%)	43 (22.6%)	0.49
Urinary bladder	4 (2%)	4 (2.1%)	
Vagina	20 (9.9%)	14 (7.4%)	
Abdomen	12 (5.9%)	7 (3.7%)	
Do not know	113 (55.9%)	122 (64.2%)	

Table 3 shows that more than three-quarters of urban and rural girls knew about menstruation before menarche, and more than two-thirds of them reported talking about it with someone, with no statistically significant difference. Regarding school health education, more than half of urban and

rural girls mentioned receiving health education about menstruation. While only 32.1% of rural girls reported health education about menstruation in religion class compared to 63.6% in urban settings, with a statistically significant difference (P-value < 0.001).

Table 3: Understanding how girls in urban and rural preparatory schools in Abnub District, Assiut learn about menstruation

Characteristics	Urban (Total = 202) No (%)	Rural (Total = 190) No (%)	P-value
Knowing about menstruation for the first time			
Before menarche	152 (77.9%)	145 (76.3%)	0.70
After menarche	43 (22.1%)	45 (23.7%)	
Talking about menstruation with anyone			
Yes	140 (69.3%)	129 (67.9%)	0.76
No	62 (30.7%)	61 (32.1%)	
Provision of school health education about menstruation			
Yes	110 (54.5%)	115 (60.5%)	0.22
No	92 (45.55)	75 (39.5%)	
Provision of health education about menstruation in a religious class			
Yes	129 (63.9%)	61 (32.1%)	< 0.001
No	73 (36.1%)	129 (67.9%)	

Figure 1 displays the source of information regarding puberty changes. Most girls cited their mothers as the (144 in urban and 135 girls in rural Abnub). Sisters,

friends, teachers, and social media were contributing sources with no statistically significant difference.

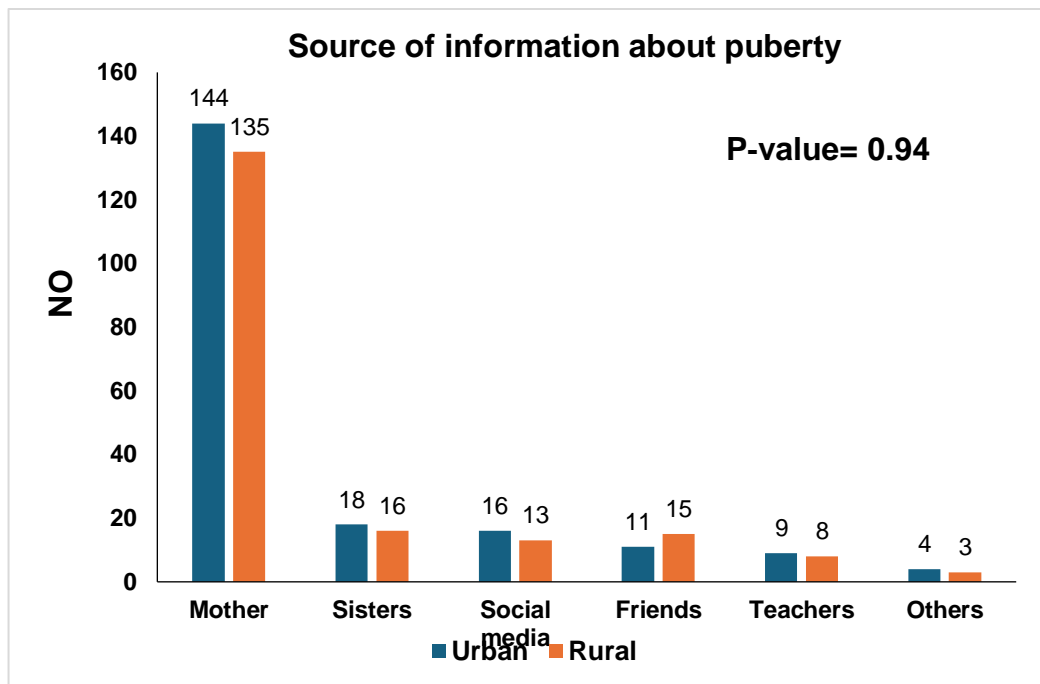


Figure 1: Source of information about puberty changes among urban and rural preparatory schools' girls in Abnub district, Assiut

Figure 2 portrays the level of knowledge among preparatory schools' girls. A good

knowledge level was found among 53.8% of the girls, while poor knowledge was reported among 46.2%.

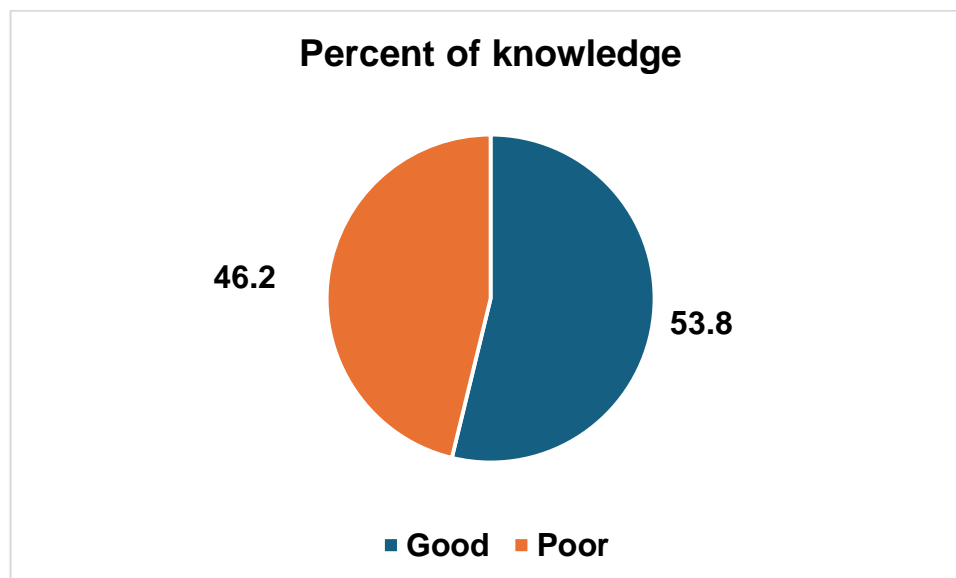


Figure 2: Knowledge score among the preparatory schools' girls in Abnub district, Assiut

Table 4 demonstrates the factors affecting knowledge score among preparatory schools' girls. Regarding age and school grade, good knowledge was more

common among girls aged 12-14 and first-grade students, with a statistically significant difference. Concerning residence, good knowledge was more common among rural

(57.8%) than urban (42.2%) girls, while poor knowledge was more common among urban (62.4%) than rural (37.6%) girls, with a statistically significant difference. About family, girls living in nuclear families or having an older sister reported higher knowledge than those in extended families, and those without an older sister, with no statistically significant difference. Adversely,

having an older female relative in the same house was associated with lower knowledge and a statistically significant difference. Regarding having mobile phones and internet connection, good knowledge was less common among girls having a mobile phone but more among those with an internet connection, with no statistically significant difference.

Table 4: Factors affecting knowledge score among the preparatory schools' girls in Abnub district, Assiut

Knowledge score	Good (211)	Poor (181)	P-value
Age group			
Less than 12 years	26 (12.3%)	17 (9.4%)	0.43
12-14 years	141 (66.8%)	118 (65.2%)	
More than 14 years	44 (20.9%)	46 (25.4%)	
School grade			
First	89 (42.2%)	45 (24.9%)	0.001
Second	61 (28.9%)	73 (40.3%)	
Third	61 (28.9%)	63 (34.8%)	
Residence			
Urban	89 (42.2%)	113 (62.4%)	< 0.001
Rural	122 (57.8%)	68 (37.6%)	
Family type			
Nuclear	112 (53.1%)	105 (58%)	0.32
Extended	99 (46.9%)	76 (42%)	
Presence of older sister			
Yes	114 (54%)	87 (48.1%)	0.23
No	97 (46%)	94 (51.9%)	
Presence of older female relative in the same house			
Yes	74 (35.1%)	47 (26%)	0.05
No	137 (64.9%)	134 (74%)	
Having mobile			
Yes	103 (48.8%)	92 (50.8%)	0.69
No	108 (51.2%)	89 (49.2%)	
Having internet connection			
Yes	129 (61.1%)	110 (60.8%)	0.94
No	82 (38.9%)	71 (39.2%)	

Discussion:

Adolescence is a time marked by psychological fluctuations, making it essential for girls to have an adequate understanding of pubertal changes and the menstrual cycle. However, many adolescent girls remain uninformed, primarily due to the absence of comprehensive health education both at home and in school.

The current study's findings revealed that knowledge of the urban and rural girls regarding puberty changes and menstruation was comparable. Regarding the puberty

definition, urban girls (74.8%) reported higher knowledge of the correct definition than rural girls (50.5%), with a statistically significant difference. This is comparable to previous studies (8,11).

Regarding the cause of puberty, more than 60% of urban and rural girls cited the correct answer. Concerning the age of puberty, most of the girls answered correctly (78.7% urban and 77.9% rural). In a previous study, the cause of pubertal changes was correctly answered by only 35% of rural girls and 62% of urban girls, while only 38% of rural girls were aware of

the correct age compared to 58% of urban girls (12).

The exact cause of menstruation was answered correctly by less than half of the urban and rural girls (36.6% vs 42.1%, respectively). This percentage was lower than previous reports (6, 13-15). A previous study found that more girls recognized menstruation as a normal biological process after receiving health education (16). This finding underscores the significance of implementing school-based health education programs that emphasize pubertal concerns and reproductive health for adolescent girls, including puberty changes and the menstrual cycle, in the curriculum of higher primary and first-grade preparatory students. This allows them to gain sufficient and reliable knowledge before facing such changes.

In the current study, most of the girls' information about puberty and menstruation was given by family members, especially mothers, followed by sisters, and then social media. Similarly, previous studies found the mother most informative regarding puberty and menstruation (6,12,17-20).

A meta-analysis of 46 studies conducted between 2000 and 2015 revealed that over half of girls aged 10–19 viewed their mothers as their main source of information regarding puberty, menarche, and menstruation. When mother-daughter communication about puberty is inconsistent or strained, it can negatively impact girls' confidence, contribute to feelings of shame and isolation, and limit their ability to seek out other information or services (21).

Conversely, a population council study in Egypt reported that adolescent girls primarily received information from older sisters, school friends, cousins, and the internet, as they felt more comfortable and less embarrassed discussing the topic with these sources (22).

Besides, a previous study conducted at Al Noor and Al Amal Schools in Assiut Governorate revealed that 41.3% of the girls received information about reproductive health from their friends, 36.3% from their mothers, and only 5.0% from mass media (1). Likewise, in a study involving

schoolgirls in Mansoura, Egypt, mass media emerged as the primary source of information. In Tanta, friends were the main source of knowledge about puberty, with mothers being the next most common source (23,24). Another Indian study reported that friends and relatives (41.2%) were a major source of information (13).

Teachers and textbooks contributed minimally to the dissemination of knowledge. This is particularly troubling, given that over half of the mothers in our study have either no formal education or only completed primary or secondary school. In addition, dependence on social media as a reliable source of information is perilous and doubtful. Teachers or healthcare professionals should be the primary source of accurate information.

Ideally, the mother should be the first informant about pubertal changes to her daughter. Unfortunately, this gap may be attributed to low literacy levels and the socio-economic status of mothers, which can reinforce their reluctance to discuss the importance of puberty changes and menstruation and foster a positive attitude toward it. Encouraging such conversations is crucial, as it promotes long-term reproductive health for every girl who, in turn, can pass on these healthy practices to her daughters.

The results of this study showed that more than three-quarters of urban and rural girls knew about menstruation before attaining menarche. This finding is much higher than previous studies (6,17). This is somewhat interesting and indicates a high knowledge share among young girls. The only concern is the trustworthiness of the source of information.

Research has indicated a lack of communication between parents and adolescents about puberty in Egypt. Findings from the 2014 Survey of Young People in Egypt (SYPE) revealed that just 48% of girls and 22% of boys aged 15 to 29 had ever discussed puberty with their parents (25).

Unfortunately, little knowledge about the source of menstrual blood was reported

among the studied girls (26.2% urban and 22.6% rural), and more than half of them did not know any answer. This finding is similar to previous reports (12).

The overall level of knowledge among preparatory schools' girls was good at 53.8% and poor at 46.2%. In Sohag, Egypt, more than two-thirds (68%) of participants had satisfactory knowledge of menstruation (19). In Saudi Arabia, above-average knowledge of the biological changes during puberty was observed in 56.2% of girls (20).

Differences in the questionnaires may explain the variation in results used and variations in study locations, cultural backgrounds, and parental education levels. The relatively high level of knowledge among adolescent girls in the current study could be linked to greater access to information sources like the internet and media, which have significantly expanded in recent years. Technological advancements such as mobile phones and satellite television appear to be key contributors to the improvement in girls' knowledge.

Concerning residence, good knowledge was more prevalent among rural (57.8%) than urban (42.2%) girls. Contrary to our findings, the knowledge level was significantly higher among urban girls in Sohag city, Egypt (19). This may be because a larger proportion of urban residents have better access to reproductive health services and greater decision-making autonomy than female students in rural areas. Furthermore, the variation could be linked to differences in how relevant health intervention programs are implemented. The current study shows slight variation between urban and rural Abnub regarding access to reproductive health services and information.

Conclusion:

The study aimed to assess the level of awareness regarding pubertal changes and menstruation among girls in both urban and rural areas. Findings revealed that rural adolescent girls had slightly lower levels of knowledge. Additionally, it was noted that school grade, residence, and the presence of

older female relatives were significant factors affecting girls' knowledge level.

There is a pressing need to enhance female literacy, particularly in rural regions, which can be achieved by engaging and educating parents, teachers, family members, and other influential individuals who can serve as key resources in spreading accurate knowledge.

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