

Status and Factors of Menstrual Knowledge, Attitudes, Behaviors and Their Correlation with Psychological Stress in Adolescent Girls



Altangarvdi Borjigen¹, Chi Huang¹, Mengxiang Liu¹, Jing Lu¹, Huiting Peng¹, Chandrakala Sapkota¹, Jiangming Sheng^{2,*}

¹Xiang Ya Nursing School, Central South University, Changsha, China

²The Second Xiang Ya Hospital, Central South University, Changsha, China

ABSTRACT

Background and Objective: Adolescent girls perceive menstruation as a negative experience, which can affect adolescents' physical and mental health. The aims of this study were to describe the menstrual knowledge, attitudes, and behaviors of adolescent girls in China and to examine their association with psychological stress.

Design, Setting, Participants, Interventions, and Main Outcome Measures: A cross-sectional study was conducted among 1349 adolescent girls aged 11-14 years in Changsha, China. Participants anonymously completed questionnaires that assessed sociodemographic characteristics, menstrual knowledge and attitudes, dysmenorrhea self-care behaviors, and perceived stress. One-way analysis of variance and Pearson r correlation and multiple linear regression analyses were conducted to examine the differences and associations among variables.

Results: The mean age of menarche was 11.70 (± 0.82) years. A total of 1053/1349 (78.1%) of girls had a knowledge of menstruation before menarche and their mothers were the main source 931/1349 (69.0%) of their knowledge. More than half (53.4%) of adolescent girls experienced different degrees of dysmenorrhea. The mother's education, family monthly income, family type, and the girls' age, grade, menstrual status, age at menarche, sanitary napkin change frequency, menstrual restrictions, and dysmenorrhea influenced menstrual knowledge, attitudes, and practice. Psychological stress was affected by age, grade, age at menarche, sanitary napkin change frequency, menstrual restrictions, dysmenorrhea, and menstrual knowledge, attitudes, and practices.

Conclusion: Psychological stress management during menstruation should be a focus of health education programs for adolescent girls. During adolescence, health care providers should not only pay attention to the physical changes of adolescence girls, but also provide stress management skills to help them cope with menstrual-related concerns.

Key Words: Menstruation, Stress, Psychological, Adolescent, China

Introduction

Adolescence is a stage of growth and development that occurs after childhood and before adulthood or between the ages of 10 and 19 years.¹ Most girls experience their first period during adolescence. The menstrual cycle is often irregular during the adolescent period and menstrual characteristics are typically different from those of adult women.² Adolescent girls typically experience 5-7 years of irregular menstrual cycles before they establish regular periodic ovulation.

Studies indicate that prepubescent girls do not understand menstruation^{3,4} and their mothers are the most common source of menstrual knowledge.⁵ Additionally, adolescent girls do not consult with health care professionals because they feel ashamed of their bodies.⁶⁻⁹ Because of cultural norms, adolescent girls commonly hold negative attitudes and beliefs toward menstruation.¹⁰ In China, girls believe that it is better not to menstruate.³ Inadequate menstrual knowledge and a negative attitude

toward menstruation can lead to poor menstrual hygiene practices among adolescents.^{4,11} Poor hygiene practices can influence physical and psychological health and quality of life resulting in reproductive tract infections, school absences, social restrictions, and psychological stress.^{12,13}

Previous studies indicate there is an interaction between health knowledge, attitude, practice, and stress management.¹⁴ Insufficient knowledge appears to be a source of psychological stress. However, with adequate knowledge and a positive attitude toward health issues, individuals tend to have lower levels of psychological stress.¹⁵ Improving health-related behaviors has also been shown to decrease psychological stress.^{16,17}

The aims of this study were to: (1) describe menstruation knowledge, attitudes, and practices (KAP) among adolescent girls in Changsha city, Hunan province, China; and (2) examine the association between menstrual KAP and psychological stress in adolescent girls.

Materials and Methods

Setting and Recruitment

This study was conducted from December, 2018 to February, 2019 at 2 junior high schools in Changsha city in

The authors indicate no conflicts of interest.

* Address correspondence to: Jiangming Sheng, The Second XiangYa Hospital, Central South University, Changsha, 410013, China; Phone: +86-13874804468

E-mail address: sjmingming@126.com (J. Sheng).

Hunan province, China. One district from the 5 districts in Changsha was randomly chosen. Then, 2 of the 19 middle schools were randomly chosen from the chosen district. This probability selection strategy helped to maximize the representativeness of the sample to ensure external validity. Permission to conduct the study was received from the schools' principals.

Female students were recruited from grades 7, 8, and 9. Female students who had reached menarche and those who had not reached menarche were included. Adolescent girls who had mental disorders, psychological problems, dysfunctional uterine bleeding, anemia, pelvic inflammatory disease, and any chronic health problems were excluded from the study according to the medical examination for school enrollment and the information from students' parents. The school teacher help us to recruit the participants on the basis of the inclusion and exclusion criteria.

Measurements and Procedures

In the study, we used the same data collection procedures that we used in our pilot study in which we found that participants had no problems with completing the questionnaires. The questionnaires were self-administered to all participants. The researchers were present at the time the participants completed the questionnaires to give instructions about how to complete the questionnaires and to answer any questions that participants asked about the questionnaires. Participants completed all of the study questionnaires at school during their night classes.

The participants were asked to anonymously complete the Menstrual Knowledge Questionnaire, Menstrual Attitude Questionnaire, Dysmenorrhea Related Self-care Behavior Questionnaire, and Perceived Stress Scale. In addition, participants completed sociodemographic questions about their age, grade, mother's education level, monthly income, family type, age of menarche, knowledge of menstruation before menarche, menstrual knowledge source, restrictions during menstruation, and dysmenorrhea.

The Menstrual Knowledge Questionnaire is a 13-item scale that was developed by Ou-Yang¹⁸ in Chinese. A score of 1 is assigned for each correct answer and a score of 0 is assigned for each wrong answer. The higher the score, the higher the level of menstrual knowledge. A percentage of correct answers is calculated by dividing the score by the total number of items. The reliability Kuder Richardson-20 (KR-20) of this questionnaire was 0.64.³

The Menstrual Attitude Questionnaire was developed by Brooks-Gunn and Ruble¹⁹ in 1980 and is widely used around the world and in various cultures. The Chinese version was developed by Lu²⁰ in 2001. It is a multidimensional scale that has 5 domains: (1) menstruation as a psychologically and physically debilitating event; (2) menstruation as a natural, positive event; (3) menstruation as a bothersome event; (4) menstruation as a predicted and anticipated event; and (5) menstruation as an event with no effect on behavior. The response options ranged from 1 = strongly disagree to 5 = strongly agree, with total scores

from 33 to 165. Internal consistency reliability of the questionnaire was measured with Cronbach α ; the coefficients ranged from 0.95 to 0.97. This is a reverse scoring questionnaire; a high score indicates a negative attitude, and a low score indicates a positive attitude.

The Dysmenorrhea Related Self-care Behavior Questionnaire was used to assess menstrual behaviors adopted to relieve discomfort for dysmenorrhea. The Chinese version of the questionnaire was developed by Chang and Chuang¹¹ in 2012, and consists of 18 items. The response options range from 1 (never) to 5 (very often), which ranges from 18 to 90. A higher score is reflective of positive self-care behaviors that relieve the discomfort of dysmenorrhea. The Cronbach α coefficient for internal consistency reliability was 0.93 for the questionnaire.

The Perceived Stress Scale was used to assess the frequency of psychological stress. This widely used scale was developed by Cohen et al in 1983.²¹ There are 3 versions of the scale: 3-, 10-, and 14-item versions. The 10-item version was used in this study and has shown good reliability and validity in community samples of different populations, cultures, and institutions. The Chinese version, translated by Wang,²² had a Cronbach α coefficient of 0.91. Respondents rated how often they believed or thought a particular way about stress. The response options range from 0 (never) to 4 (very often) and are totaled to give an overall score ranging from 0 to 40. Scores are categorized as low perceived stress (0-13), moderate perceived stress (14-26), and high perceived stress (27-40).

Ethical Considerations

The study was approved by the Xiang Ya Nursing School of the Central South University Institutional Research Review Board. The study purpose was explained to the students. Informed consent was received from all girls and their guardians. We ensured that responses were anonymous by coding each questionnaire, and that individual personal information remained confidential. Participants had the right to withdraw from the study at any point and could refuse to answer any question without consequences.

Data Analyses

Two researchers verified and entered data using SPSS version 22.0 (IBM Corp, Armonk, NY). Data were analyzed using SPSS. Descriptive statistics, percentages, means, and SDs, were used to describe the study variables. The 1-way analysis of variance test was used to examine mean differences in menstrual knowledge, attitude, and behavior and psychological stress among sociodemographic characteristics. The Pearson r correlation test was used to examine the relationship between psychological stress and menstrual KAP.

Statistically significant variables from the 1-way analysis of variance results were entered into the multiple linear regression analysis. Multiple linear regression models were on the basis of backward elimination of nonsignificant variables and adjusted for the following predictors:

smoking habit, alcohol consumption, exercise amount, and body mass index.²³

Results

Participants' Sociodemographic and Menstrual Characteristics

Of the 1400 questionnaires distributed, 1355 were completed for a response rate of 96.8%. Of the 1355 questionnaires completed, 1349 questionnaires were valid (99.6%). Participants ranged in age from 11 to 14 years, with an average age of 12.63 years (SD = 0.90). Most of the participants lived in an urban area (n = 1260; 93.4%) and a nuclear family household (n = 950; 70.4%). Other demographic details are presented in [Table 1](#).

Among the sample, 1060 (78.6%) adolescent girls had achieved menarche. The mean age of menarche was 11.7 (SD = 0.82) years. Seventy-eight percent (n = 1053) of the girls had knowledge about menstruation before menarche and the principal source of this knowledge were their mothers (n = 931; 69.0%). Most of the girls changed sanitary napkins at school (n = 999; 94.2%), with 61.2% (n = 826) of them changing sanitary napkins every 4 hours. Slightly more than half of the sample (n = 546; 51.5%) reported they followed various restrictions during

Table 1
Sociodemographic Characteristics and Menstrual-Related Information for Adolescent Girls (n = 1349)

Variable	Subgroup	n (%)
Age, years	11	78 (5.80)
	12	624 (46.30)
	13	390 (28.90)
	14	257 (19.00)
Mother's education	Primary and below	86 (6.40)
	Middle and high school	843 (62.50)
	Undergraduate and above	420 (31.10)
Monthly income, RMB or CNY	Less than 5000	417 (30.90)
	5000-10,000	620 (46.00)
	More than 10,000	312 (23.10)
Home address	Urban	1260 (93.40)
	Rural	89 (6.60)
Family type	Single-parent family	80 (5.90)
	Nuclear family	950 (70.40)
	Kinship family	319 (23.70)
Menarche	Pre-	289 (21.40)
	Post-	1060 (78.60)
Age at menarche, years	Younger than 13	932 (69.10)
	13 or older	131 (10.50)
Heard about menstruation before menarche	Yes	1053 (78.10)
	No	296 (21.90)
Source of menstrual information	Mother	931 (69.00)
	Teacher	194 (14.40)
	Friends	174 (12.90)
	Sister	113 (8.40)
	Book or Internet	120 (8.90)
Changed sanitary napkins at school	Yes	999 (94.20)
	No	61 (5.80)
Sanitary napkin change frequency	Every 4 hours	826 (61.20)
	Every 6 hours	200 (14.80)
	Every 8 hours and more	87 (6.40)
	Restrictions during menstruation	Yes
Dysmenorrhea	No	546 (51.50)
	Yes	566 (53.40)
	No	494 (46.60)

RMB, Ren Min Bi; CNY, China Yuan.

menstruation, for example no cold drinks, no strenuous exercise such as running, no bathing, etc. More than half (53.4%) of the sample experienced different degrees of dysmenorrhea. The mean score for menstrual knowledge was 7.57 (SD = 2.69), 92.90 (SD = 10.91) for menstrual attitudes and 63.50 (SD = 11.89) for menstrual practices. The percentage of correct answers about menstrual knowledge was 58.25%.

Differences in Menstrual KAP and Psychological Stress among Sociodemographic Characteristics

[Table 2](#) indicates that the girls who were older, in a higher grade, mother's education level was lower, family monthly income was lower, from a single-parent household, postmenarche (reaching menarche after age 13), had knowledge about menstruation before menarche, changed sanitary napkins more frequently and suffered dysmenorrhea had a higher score for menstrual knowledge. Menstrual attitude varied positively according to age, grade, menstrual status, and age at menarche. Menstrual attitude varied negatively according to mother's education. Dysmenorrhea varied according to age, grade, and menstrual restrictions.

The mean score of psychological stress was moderate (20.76 ± 5.24) for the sample. Adolescent girls who reached menarche before age 13 years had higher psychological stress than those who reached menarche after age 13 years ([Table 2](#)). Girls who changed sanitary napkins every 6 hours had higher psychological stress than those who changed sanitary napkins every 4 hours and every 8 or more hours. Psychological stress was higher for girls with menstrual restrictions and dysmenorrhea compared with girls without menstrual restrictions and dysmenorrhea.

Psychological stress correlated with age, grade, age at menarche, sanitary napkin change frequency, restrictions during menstruation, and dysmenorrhea ([Table 2](#)). Menstrual KAP had a significant positive correlation with psychological stress ([Table 3](#)).

Predictors of Psychological Stress

Psychological stress decreased with age, and increased with sanitary napkin change, and menstrual KAP. Grade, age at menarche, menstrual restrictions, and dysmenorrhea were excluded from the model. The coefficient of determination (R^2) of this model was 0.105, indicating that 10.5% of the variance in psychological stress was explained by participant's age, sanitary napkin change frequency, and menstrual KAP ([Table 4](#)).

Discussion

Study findings indicate that most adolescent girls were not knowledgeable about menstruation, had negative attitudes toward menstruation, and were not engaged in helpful hygienic menstrual practices. There was a significant but weak association between menstrual KAP and psychological stress among adolescent girls. Psychological

Table 2
Univariate Analysis of Menstrual Knowledge, Attitude, Practice, and Psychological Stress in Adolescent Girls

Variable	Knowledge		Attitude		Practice*		Stress	
	Mean ± SD	P	Mean ± SD	P	Mean ± SD	P	Mean ± SD	P
Age (years)		.000 [†]		.004 [‡]		.000 [†]		.021 [§]
11	6.47 ± 3.21		94.52 ± 9.50		20.61 ± 4.56		20.61 ± 4.56	
12	6.61 ± 2.92		93.79 ± 9.70		20.61 ± 4.99		20.61 ± 4.99	
13	8.78 ± 2.04		92.16 ± 10.41		21.39 ± 5.43		21.39 ± 5.43	
14	8.39 ± 1.58		91.57 ± 10.71		20.22 ± 4.49		20.22 ± 4.49	
Grade		.000 [†]		.004 [§]		.000 [†]		.004 [‡]
Seventh	6.60 ± 2.94		93.78 ± 9.42		93.78 ± 9.42		20.69 ± 5.00	
Eighth	9.03 ± 1.91		92.18 ± 10.89		92.18 ± 10.89		21.40 ± 5.56	
Ninth	8.23 ± 1.51		91.66 ± 10.77		91.66 ± 10.77		20.05 ± 4.10	
Mother's education		.000 [†]		.013 [§]		.174		.426
Primary and below	8.23 ± 2.18		90.49 ± 12.20		66.04 ± 10.24		20.95 ± 5.48	
High school	7.89 ± 2.49		92.74 ± 10.22		66.18 ± 11.06		20.87 ± 5.04	
Undergraduate and above	6.79 ± 2.99		93.83 ± 9.39		64.20 ± 10.24		20.49 ± 4.89	
Monthly income, RMB or CNY		.000 [†]		.878		.961		.108
Less than 5000	7.90 ± 2.43		93.11 ± 9.88		66.12 ± 9.59		20.43 ± 4.62	
5000–10,000	7.55 ± 2.64		92.80 ± 10.01		65.96 ± 10.78		21.05 ± 4.98	
More than 10,000	7.11 ± 2.96		93.05 ± 10.70		65.72 ± 12.49		20.55 ± 5.45	
Home address		.000 [†]		.777		.306		.457
Urban	7.54 ± 2.74		92.98 ± 10.92		63.52 ± 11.77		20.78 ± 5.27	
Rural	7.93 ± 1.91		91.86 ± 10.73		63.32 ± 13.54		20.40 ± 4.92	
Family type		.012 [§]		.807		.462		.057
Single-parent family	8.31 ± 2.50		92.35 ± 10.34		64.01 ± 13.76		21.44 ± 5.48	
Nuclear family	7.59 ± 2.71		92.92 ± 10.29		65.99 ± 10.73		20.88 ± 5.04	
Kinship family	7.32 ± 2.65		93.16 ± 9.61		65.16 ± 10.07		20.22 ± 4.82	
Menarche		.000 [†]		.043 [§]		.681		.248
Pre-	6.33 ± 3.22		94.01 ± 9.91		94.01 ± 9.91		20.46 ± 5.27	
Post-	7.90 ± 2.42		92.65 ± 10.18		92.65 ± 10.18		20.84 ± 4.95	
Age at menarche, years		.036 [§]		.021 [§]		.304		.019
Younger than 13	7.83 ± 2.52		92.95 ± 9.92		65.49 ± 10.97		20.97 ± 4.93	
13 or older	8.29 ± 1.80		90.82 ± 11.66		66.88 ± 9.64		19.92 ± 4.83	
Understanding of menstruation before menarche		.000 [†]		.954		.301		.716
Yes	7.70 ± 2.54		92.95 ± 10.13		65.80 ± 10.69		20.78 ± 4.98	
No	7.09 ± 3.11		92.91 ± 10.16		65.29 ± 11.24		20.66 ± 5.16	
Changed sanitary napkins in school		.000 [†]		.755		.597		.398
Yes	7.92 ± 2.38		92.69 ± 10.20		65.74 ± 10.84		20.77 ± 4.99	
No	6.87 ± 3.17		93.01 ± 9.99		64.57 ± 10.80		21.18 ± 4.47	
Sanitary napkin change frequency		.010 [‡]		.020 [§]		.135		.006 [‡]
Every 4 hours	7.99 ± 2.33		92.63 ± 10.39		66.17 ± 11.29		20.62 ± 4.92	
Every 6 hours	7.42 ± 2.74		93.56 ± 8.89		63.82 ± 9.43		21.84 ± 4.87	
Every 8 hours and more	7.80 ± 2.50		91.17 ± 11.41		65.24 ± 8.19		20.47 ± 5.10	
Menstrual restrictions		.591		.218		.049 [§]		.043 [§]
Yes	7.87 ± 2.46		92.27 ± 11.04		66.75 ± 10.86		21.12 ± 4.95	
No	7.79 ± 2.48		93.02 ± 9.35		64.86 ± 11.44		20.52 ± 4.97	
Dysmenorrhea		.000 [†]		.154	–	–		.000 [†]
Yes	8.09 ± 2.26		92.26 ± 10.06		–		21.38 ± 4.94	
No	7.49 ± 2.69		93.13 ± 10.22		–		20.27 ± 4.81	

RMB, Ren Min Bi; CNY, China Yuan.

* Only for adolescent girls with dysmenorrhea.

† P < .001.

‡ P < .01.

§ P < .05.

Table 3
Pearson r Values Between Psychological Stress and Menstrual KAP in Adolescent Girls

Variable	1. Menstrual Knowledge	2. Menstrual Attitude	3. Menstrual Practice	4. Psychological Stress
1. Menstrual knowledge	–			
2. Menstrual attitude	–0.134*	–		
3. Menstrual practice	0.113*	–0.192*	–	
4. Psychological stress	0.082 [†]	–0.186*	0.168*	–

KAP, knowledge, attitudes, and practices.

* P < .001.

† P < .01.

Table 4
Multiple Linear Regression Analysis of Factors Affecting Psychological Stress in Adolescent Girls

Variable	B	95% CI	P	F
(Constant)	19.582	13.57 to 25.593	.000*	9.073*
Age	–0.649	–1.188 to –0.110	.018 [†]	
Sanitary napkin change frequency	0.855	0.243 to 1.468	.006 [‡]	
Menstrual knowledge	0.324	0.114 to 0.534	.003 [‡]	
Menstrual attitude	–0.073	–0.115 to –0.030	.001*	
Menstrual practice	0.073	0.032 to 0.114	.000*	

CI, confidence interval.

* P < .001.

† P < .05.

‡ P < .01.

stress management during menstruation should form a vital element of any health program aimed at adolescent girls.

The main finding of this study was that the correlation between menstrual knowledge, attitude, and psychological stress showed a positive relationship. Although another study reported the relationship between menstruation and psychological response (such as fear and shame, cannot concentrate on class), it was a qualitative research study, which described the experience.²⁴ Related studies have shown that adolescent girls tend to focus on their physiological responses during menstruation, but do not monitor their psychological stress during their period and pay little attention to stress management.^{3,5} The girls with a higher level of menstrual knowledge and a better attitude toward menstruation are more likely to be aware of what is happening to their bodies, maybe this was the reason that higher score of knowledge and attitude accompanied increasing psychological stress among adolescent girls. Therefore, stress management should be included in menstruation-related education, to help girls achieve a balance between physical and psychological health, and support them in making a healthier transition from adolescence to adulthood. However, in the regression model of this study, the independent variables related to menstruation can only explain little of the variance of psychological stress, possibly because some other factors that influence the psychological stress of adolescent girls were not included in our study. Previous research has also shown that psychological stress of adolescent girls is affected by various factors, such as school, family and home life, relationship, sex, and violence.^{25,26} Therefore, the relationship between menstrual knowledge, attitude, and psychological stress remains to be further studied.

In our study, adolescent girls in single-parent families have higher levels of menstrual knowledge, and they also have higher perceived psychological stress, which is in accordance with the previously mentioned finding. Consistent with the study by Kalman,²⁷ adolescent girls living in a family headed by a single father face greater menstrual challenges, yet at the same time, they might also enjoy a closer relationship with their parent, because their parent might pay more attention to changes in their daughters during adolescence. However, as they learn to manage menstruation, adolescent girls might encounter more embarrassment in speaking about menstrual problems with their fathers, which could also increase their psychological stress. The difference we found was that adolescent girls living in families headed by a single father or a single mother had higher menstrual knowledge and higher levels of stress. However, there are very limited studies on families headed by single mothers. Future studies that focus on this family type are required.

Our results showed that the mothers were girls' main source of information, consistent with the findings of previous studies. However, adolescent girls, whose mothers had a higher degree of education and whose monthly family income was higher, had lower levels of menstrual knowledge, practices, and a more negative attitude. This is different from the results of Upashe et al²⁸ and Abioye-Kuteyi et al,²⁹ which show that girls' menstrual

knowledge levels are positively correlated with their parents' education level. Girls whose parents have received higher education are more likely to have received training. However, this is the same as the results of Wong et al,³⁰ who also reported that adolescent girls' overdependence on their mother's care reduces their level of self-knowledge and constrains their behaviors. Because of the pressures of competition in today's society, highly educated mothers might be busier with their career and earning money, then have less time to communicate with their adolescent daughters about menstruation.

Limitations

There are several limitations in this study. First, the study was conducted only in the Hunan province, which limits the generalization of the findings to adolescent girls in the whole of China. Second, because of the cross-sectional research design, a causal relationship between menstrual KAP and psychological stress cannot be assumed. Third, adolescent girls with mental disorders or health problems were not included in the study. It is possible that participants who were included in the study might have had such issues, because some students and their parents would avoid reporting these problems and the medical examination also did not report these problems.

Conclusion

To our knowledge, this is the first study of its kind conducted in China. In our study, the level of menstruation KAP is part of the cause of psychological stress in adolescent girls, or psychological stress levels might be the limiting factor in adolescent girls' level of menstrual KAP, or both. On the basis of this study, schools, teachers, professionals, and family members should not only pay attention to the physical changes that children undergo during adolescence, but also to stress management methods that can help adolescents cope more effectively. Unlike adults and children, adolescent girls have special challenges and needs that should be addressed in a unique way. Therefore, a further study should be conducted to determine the causal relationship between menstrual KAP and psychological stress.

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