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RESEARCH

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Association Between Menstruation Knowledge and Attitudes Toward Gender Norms Among Female Adolescents in Rural Nigeria: Analysis of AGILE-IE 2023

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Abstract

Despite heightened global focus on menstrual health and gender equality, adolescent girls in rural Nigeria still encounter significant deficiencies in knowledge and attitudes. Misinformation and cultural taboos regarding menstruation perpetuate negative gender norms, thereby constraining the empowerment and participation of girls. This study examines the relationship between adolescent girls' menstrual knowledge and their attitudes toward gender norms in rural areas of three northern Nigerian states. This is a cross-sectional study that utilized secondary data from the World Bank's AGILE Impact Evaluation 2023, with a sample of 8,188 in-school adolescent girls aged 15–20 from Kaduna, Kano, and Katsina States in northern Nigeria. Univariate, bivariate, and multivariate analyses were conducted to examine the relationship between knowledge of menstruation and gender attitudes, controlling for religion, state, place of residence, and boarding school attendance. Good menstrual knowledge was found to be very poor among the adolescent girls (2.80%), and their gender attitudes were also abysmal (96.91%). Adolescent girls possessing good menstrual knowledge demonstrated an almost twofold likelihood of exhibiting positive gender attitudes (AOR = 1.99; 95% CI: 1.13–3.51, $p = 0.018$). Muslim adolescents, as well as those residing in Kano and Katsina states, exhibited a notable decrease in the likelihood of possessing progressive gender attitudes. Urban residency correlated with improved gender attitudes, whereas attendance at boarding schools exhibited no notable impact. Poor understanding of menstruation is linked to poor gender attitudes among female adolescents in rural northern Nigeria. Integrating menstrual health education programs with sensitization about gender norms is essential for enhancing girls' empowerment and addressing discriminatory norms. Therefore, policies must consider sociocultural and religious influences that shape adolescent gender ideologies.

Keywords: Adolescents, Gender Norms, Knowledge and Attitudes, Menstrual Health, Northern Nigeria.

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1. INTRODUCTION

Menstruation is a natural biological process that signifies girls' transition into womanhood, yet in many rural Nigerian communities it remains surrounded by cultural taboos and misinformation (Uzoechi et al., 2023). These stigmas limit girls' access to accurate menstrual health education (Olson et al., 2022), resulting in unsafe hygiene practices, higher risks of infection, and adverse effects on psychological well-being, self-esteem, and social participation (Maulingin-Gumbaketi et al., 2022). This lack of knowledge not only impacts their physical health but also affects their psychological well-being, self-esteem, and social participation (Yilmaz et al., 2021). Consequently, menstrual-related absenteeism and school dropout remain common, perpetuating gender disparities in education and empowerment (Ames & Yon, 2022).

In rural Nigeria, the dissemination of menstrual health education remains inadequate due to several structural and socio-cultural factors (Usoro & Ette, 2023). School health programs are often under-resourced or absent, and families may avoid discussing menstruation because of traditional beliefs or discomfort (Sommer et al., 2021). The infrastructure for menstrual hygiene management, including access to sanitary products and clean water, is frequently lacking (Habtegiorgis et al., 2021). As a result, many adolescent girls rely on myths or misinformation passed down through generations or shared among peers. Poor menstrual hygiene practices that arise from this knowledge gap increase the risk of infections and other health complications (Shumie & Mengie, 2022). Additionally, menstrual-related absenteeism is common, affecting girls' academic performance and increasing dropout rates. This cycle of misinformation and poor health outcomes perpetuates gender disparities in education and empowerment (Girigoswami et al., 2024).

Menstrual blood and periods are often viewed as impure or dirty, leading to stigmatizing attitudes that portray menstruating girls as weak or inferior. Such perceptions reinforce discriminatory behaviors, including restrictions on girls' mobility, participation in religious or cultural events, and social interactions. These stereotypes limit girls' opportunities to develop confidence and assert their rights (King et al., 2025). Moreover, the stigmatization of menstruation reflects and reinforces broader gender norms that position women as subordinate, thereby undermining efforts to promote gender equality and empowerment (Sarkar et al., 2024). Importantly, the stigmatization of menstruation does not exist in isolation but is deeply embedded within wider societal expectations about gender roles. The same attitudes that frame menstruation as a source of shame also reinforce traditional norms that confine girls and women to subordinate positions.

Attitudes toward gender roles are shaped by multiple socializing agents, including family, culture, peers, and formal education. When these attitudes are positive, they promote girls' empowerment, self-worth, and agency, enabling them to challenge restrictive norms and pursue educational and personal goals (Alhalawani & Al-Serhan, 2024). In contrast, traditional gender norms often assign subordinate roles to females and restrict their decision-making power within households and communities (Agha, 2021). These dynamics strongly influence how girls perceive themselves and their future prospects (Adjei & Chan, 2023). Therefore, fostering gender-equitable attitudes from an early age is essential to create an enabling environment for girls to thrive. Education on reproductive health, including menstruation, can serve as an entry point to challenge harmful stereotypes and encourage more equitable gender norms (Fahs, 2020).

Research indicates that menstrual knowledge and gender attitudes are interconnected and together impact girls' development and well-being (Logie et al., 2024). Girls who possess accurate knowledge about menstruation tend to have better self-confidence and are more likely to resist harmful gender stereotypes (Gajda et al., 2022). Conversely, girls with limited menstrual knowledge are more vulnerable to internalizing stigma, shame, and low self-esteem, which can affect their mental health and social relationships (Bobel et al., 2020). Despite this,

most existing studies focus on menstrual hygiene management without adequately exploring how knowledge about menstruation influences gender attitudes (Mohammed & Larsen-Reindorf, 2020). This oversight limits the effectiveness of interventions designed to improve the health and social empowerment of adolescent girls.

Although menstrual health and gender equality have gained increasing attention globally, research specifically examining their association among female adolescents in rural Nigeria is scarce. Many interventions address menstrual hygiene separately from gender attitudes, missing opportunities to tackle the root causes of discrimination and misinformation. Rural areas face unique challenges such as poverty, low educational attainment, and entrenched cultural beliefs that require context-specific approaches (Chidakwa, 2024). Integrating menstrual education with gender sensitization could be key to promoting both physical health and social empowerment. Understanding the local dynamics and perceptions around menstruation and gender will help tailor programs that resonate with the community's values and needs (McLaren & Padhee, 2021). Such holistic approaches are crucial for achieving sustainable progress in improving the lives of adolescent girls. Recognizing these gaps, this study aims to investigate the association between menstruation knowledge and attitudes toward gender among female adolescents in rural Nigeria.

2. RESEARCH METHOD

This study employed a cross-sectional design, utilizing secondary data from the Adolescent Girls Initiative for Learning and Empowerment (AGILE): Impact Evaluation of a Safe Space-Based Life Skills Training and Digital Literacy Training in Rural Nigeria, 2023. The AGILE project, supported by the World Bank and the Government of Nigeria, aims to improve outcomes for adolescent girls in education, empowerment, economic opportunities, and reproductive health. These goals are pursued through structured interventions delivered in school-linked safe spaces.

The sample consisted of randomly selected adolescent girls aged 15–20 years, enrolled in senior secondary school year 1 (SS1) in rural and semi-urban public schools eligible for the AGILE interventions. The sampling was stratified by state and designed to represent eligible populations in the selected regions. The baseline survey included three linked datasets: adolescent survey, consisting of 8,223 adolescent girls (897 variables); caregiver survey, consisting of 8,007 caregivers (328 variables); and school survey, consisting of 270 school principals (51 variables). This analysis focuses on the adolescent dataset. After applying the inclusion criteria and removing cases with missing data on key variables, the final analytic sample consisted of 8,188 adolescent girls.

Data collection was conducted over 44 days between April and June 2023, using Computer-Assisted Personal Interviewing (CAPI) methods. Trained enumerators conducted face-to-face interviews at either the respondent's school or their home. Questionnaires were administered using SurveyCTO on tablets and translated from English into relevant local languages to ensure linguistic and cultural appropriateness. Enumerators received standardized training, and data collection was conducted simultaneously in Kaduna, Kano, and Katsina to ensure consistency across regions.

The primary outcome of interest was attitude towards gender norms. Four variables were used to generate this measure: (1) Only men should work for pay, (2) Girls are as smart as boys, (3) A mother should tolerate violence from the father, and (4) Families should give more encouragement to sons than daughters to attend university. Responses ranged from 1 = Strongly Disagree to 5 = Strongly Agree. A “good” attitude was defined as agreeing or strongly agreeing with item 2, while disagreeing or strongly disagreeing with items 1, 3, and 4. All other response patterns were categorized as “poor.”

The key independent variable was knowledge of menstruation. This was assessed using four items: (1) Women stop menstruating as they grow very old, (2) Pregnant women do not menstruate, (3) Menstrual blood comes from the stomach where food is digested, and (4) Periods must always come every 28 days. Responses were coded as 1 = True, 2 = False, and 98 = Don't Know. "Good" knowledge was defined as answering correctly: "true" for items 1 and 2, and "false" for items 3 and 4. All other responses were coded as "poor" knowledge. Control variables included religion (Christianity/Islam), state of residence (Kaduna/Kano/Katsina), type of residence (rural/semi-rural/urban), and boarding school attendance (yes/no).

All statistical analyses were conducted using STATA software, with univariate analysis presented as frequencies and percentages, bivariate analysis using Chi-square tests to examine associations between independent variables and attitudes towards gender, and binary logistic regression to assess their relationships, with results reported as 95% confidence intervals and significance set at $p < 0.05$. The original AGILE baseline evaluation protocol was approved by the National Health Research Ethics Committee (NHREC) of Nigeria, with informed consent obtained from all participants, and assent from adolescents under 18 alongside guardian or parental consent, while this secondary analysis utilized de-identified, publicly available data and therefore further ethical approval for this secondary analysis was not required.

3. RESULTS AND DISCUSSION

Table 1 below presents the general characteristics of the female adolescents in the three states in Nigeria. The adolescent girls' knowledge about menstruation was poor, as very few of them had good knowledge (2.80%). Likewise, their attitudes toward gender were poor (96.91%). The majority of them were Muslims (89.74%), with the highest percentage residing in Katsina State (40.49%). The highest percentage of adolescents lived in urban areas (44.54%). Most of them were not studying in boarding schools (88.20%).

Table 1. General description of the knowledge, attitude, and characteristics of the respondents

Variables	Frequency (n = 8.188)	Percentage
Knowledge of menstruation		
Poor	7959	97.20
Good	229	2.80
Attitude		
Poor	7935	96.91
Good	253	3.09
Religion		
Christian	840	10.26
Islam	7348	89.74
State		
Kaduna	2265	27.66
Kano	2608	31.85
Katsina	3315	40.49
Residence		
Rural	3066	37.45
Semi urban	1475	18.01
Urban	3647	44.54
Boarding school		
No	7222	88.20
Yes	966	11.80

The bivariate analysis is shown in Table 2 below. The analysis was done using a Chi-square test because all independent variables are categorical. It revealed that knowledge of menstruation, religion of respondents, state of residence, and attending boarding school or not were significantly associated with attitudes toward gender. However, the place of residence was not found to be significantly associated with attitude.

Table 2. Chi-square test of association between the dependent and independent variables.

Variables (n = 8.188)	Attitude		Total	Chi-square test (p-value)
	Poor (%)	Good (%)		
Knowledge of menstruation				9.4206**
Poor	97.01	2.99	7959	
Good	93.45	6.55	229	
Religion				359.2000***
Christian	86.19	13.81	840	
Islam	98.14	1.86	7348	
State				151.6998***
Kaduna	93.16	6.84	2265	
Kano	97.81	2.19	2608	
Katsina	98.76	1.24	3315	
Residence				4.9797
Rural	97.10	2.90	3066	
Semi urban	96.00	4.00	1475	
Urban	97.12	2.88	3647	
Boarding school				8.9982**
No	97.12	2.88	7222	
Yes	95.34	4.66	966	

Note: *p-value <0.05, **p-value<0.01, ***p-value<0.001

The multivariate analysis is shown in Table 3 below. It was found that most of the predictors were significantly associated with attitude towards gender. In detail, compared to female adolescents who had poor knowledge of menstruation, those who had good knowledge were 1.99 times more likely to have a good attitude towards gender after controlling for all independent variables. Moreover, compared to those who were Christian, those who were Muslim had an 84% decrease in the probability of having a good attitude towards gender. Based on the state of residence, compared to those living in Kaduna, adolescents residing in Kano and Katsina had a 42% and 64% lower probability of having a good attitude towards gender, respectively. Additionally, compared to those living in rural areas, those living in urban areas had 1.82% times more likelihood of having a good attitude towards gender after adjusting for all predictors. However, boarding school was not found to be significantly associated with attitudes towards gender.

The pseudo R-squared of the model revealed that the current model explains 11.70% of the factors related to attitude towards gender; the remaining percentage is attributed to other variables not included in this study.

Table 3. Binary logistic regression of the relationship between predictors and attitude

Variables (n = 8.188)	AOR	[95% conf. interval]		p-value
		lower	upper	
Knowledge of menstruation				
Poor	ref			
Good	1.99	1.13	3.51	0.018
Religion				
Christian	ref			
Islam	0.16	0.12	0.23	0.000
State				
Kaduna	ref			
Kano	0.58	0.38	0.87	0.009
Katsina	0.36	0.24	0.54	0.000
Residence				
Rural	ref			
Semi urban	1.25	0.88	1.78	0.206
Urban	1.82	1.31	2.54	0.000
Boarding school				
No	ref			
Yes	0.97	0.68	1.39	0.875
cons	0.14	0.11	0.18	0.000

Note: LR $\chi^2(7) = 264.22$, Prob > chi-square test = 0.0000, Pseudo R² = 0.1170

This study found that Most female adolescents in rural Nigeria demonstrated poor menstrual knowledge and negative gender attitudes. The very low level of menstrual knowledge is consistent with reported widespread menstrual misinformation among adolescent girls in rural Nigeria (Ngozi & Obohwemu, 2024). Similarly, a study in rural India showed that poor menstrual knowledge correlated with negative gender attitudes and stigma (Kumar et al., 2024). Furthermore, inadequate menstrual education across sub-Saharan Africa contributes to persistent gender biases and limited empowerment for girls (Anbesu & Asgedom, 2023). These studies collectively emphasize the urgent need for improved menstrual education to foster positive gender perspectives.

The bivariate analysis revealed significant associations between menstruation knowledge, religion, state, and boarding school attendance with attitudes toward gender norm, while residence was not associated. The link between menstruation knowledge and gender attitudes mirrors the results of previous studies, which found that increased menstrual health literacy positively influenced gender-equitable views among adolescents in rural Ethiopia and Tanzania (Baird et al., 2022; Njee et al., 2024). Adolescents identifying as Muslim were significantly less likely to report progressive gender attitudes, highlighting the influence of religious and cultural contexts on gender norms. Similar religious disparities in gender role perceptions among Muslim and Christian youths in Ethiopia have been established (Berhanu et al., 2025). Moreover, the regional cultural differences within Nigeria also significantly shaped adolescents' gender norms, supporting the observed state-level variations in this study (Koris et al., 2022).

In the multivariate analysis, adolescents with good menstrual knowledge were nearly twice as likely to have positive attitudes towards gender norms. This finding is consistent with a study that demonstrated that menstrual education interventions improved gender equity attitudes among adolescent girls in Uganda (Dagadu et al., 2022; Namuwonge et al., 2025). Likewise, a randomized controlled trial study found that comprehensive menstrual education led to more progressive gender views in South Asia (Sarkar et al., 2024). In contrast, a study in rural Malawi suggested that while menstrual knowledge influences attitudes, its impact may be

moderated by socioeconomic and community factors, emphasizing the need for holistic interventions (Chidya et al., 2024).

The study also found that Muslim adolescents were 84% less likely to have good gender attitudes compared to Christians. Consistent with a study that observed that religious teachings can reinforce traditional gender roles among Muslim youth in West Africa (Dunne & Crossouard, 2020). Additionally, another study identified similar patterns in Nigeria, where religious conservatism was linked to less progressive gender views (Tuki, 2025). However, regarding geographical differences, adolescents living in Kano and Katsina were less likely to have good gender attitudes compared to those in Kaduna. This aligns with regional disparities reported by a study, which found that northern Nigerian states with more conservative cultural norms exhibited lower gender equity attitudes (Eze et al., 2025). Similarly, some studies showed that sociocultural context at the state level plays a significant role in shaping adolescent beliefs about gender roles (Mochache et al., 2020; Moreau et al., 2021; Wuresah et al., 2025).

Several limitations should be acknowledged. First, the cross-sectional design precludes causal inference, as both menstrual knowledge and gender attitudes were measured at the same point in time. Second, the reliance on self-reported data may introduce recall or social desirability bias, particularly given the sensitivity of issues related to menstruation and gender norms. Third, the measures of menstrual knowledge and gender attitudes were restricted to only four items each, which may not fully capture the complexity of these constructs. Finally, the analysis did not include potentially important confounding variables, such as socioeconomic status and parental education, which may also influence adolescents' knowledge and attitudes.

4. CONCLUSION

The study concludes that menstrual knowledge, religious affiliation, and regional background are important factors associated with female adolescents' attitudes toward gender norms in Nigeria, where overall levels of both knowledge and positive attitudes remain low. To foster more supportive gender perspectives, context-specific menstrual education initiatives are recommended, designed to be both culturally and religiously sensitive, with particular attention to rural and traditionally conservative settings.

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