

Menstrual Perceptions and Beliefs among Female Adolescents in Secondary Schools in Suburban Edo State, Nigeria: Sociodemographic Correlates

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Abstract

Background: Menstrual perceptions are shaped by biological understanding, social beliefs and culturally embedded interpretations of menstruation. Although menstrual-health research has expanded across sub-Saharan Africa, evidence on how adolescent girls interpret menstruation in suburban Nigerian settings remains limited. This paper examined menstrual perceptions and beliefs among female secondary-school students in suburban Edo State and assessed their associations with selected sociodemographic characteristics. Methods: A descriptive cross-sectional survey was conducted among female adolescents who had attained menarche in three randomly selected secondary schools in Okada, Edo State, Nigeria. Of 344 questionnaires prepared for administration, 310 were completed and analysed, giving a response rate of 90.12%. Menstrual perception was assessed using 12 statements covering physiological understanding, supernatural and disease beliefs, reproductive anatomy, menstrual hygiene requirements, menstrual materials and disposal. Each item was scored 1 for a correct response and 0 for an incorrect or uncertain response. A composite score of more than 80%, corresponding to 10-12 correct responses out of 12, was classified as positive perception; scores of 0-9 were classified as needing improvement. Descriptive statistics and Pearson's chi-square tests were used, with statistical significance set at $p < .05$. Results: Positive menstrual perception was recorded among 57.42% of respondents. Most strongly rejected the view that menstruation is a curse from God and 88.4% strongly rejected its classification as a disease, while 84.5% strongly recognised menstruation as a physiological process. Correct anatomical understanding was less consistent, with 61.9% strongly identifying the uterus as the source of menstrual blood. Most respondents also rejected the view that sanitary pads were unnecessary, while 84.5% strongly agreed that special hygiene was required during menstruation. Responses concerning dry cloth, washing and reuse of menstrual materials, and disposal of used pads were more varied. Positive perception differed significantly by age, $\chi^2 = 26.162$, $p < .001$; school class, $\chi^2 = 112.821$, $p < .001$; and religion, $\chi^2 = 9.361$, $p = .002$. Conclusion: Menstrual perception among the surveyed adolescents was mixed. Strong recognition of menstruation as a normal physiological process coexisted with incomplete anatomical understanding and more variable beliefs concerning menstrual materials and disposal. The significant sociodemographic differences indicate that menstrual perceptions were not uniformly distributed across the sampled population. Menstrual-health education should therefore extend beyond basic biological normalisation to include reproductive anatomy, misconceptions and contextually appropriate guidance on menstrual hygiene and material management.

Keywords: Adolescent girls; menstrual beliefs; menstrual perception; menstrual health; menstruation; secondary schools; Nigeria.

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Introduction

Menstruation is a physiological feature of female reproductive development, but its meaning is not determined solely by biology. Adolescents encounter menstruation within social environments in which ideas about cleanliness, maturity, sexuality, religion and acceptable behaviour shape how menstrual experiences are interpreted. Menstrual beliefs can therefore extend beyond knowledge of the menstrual cycle to include judgements about whether menstruation is normal, shameful, contaminating, restrictive or indicative of illness. Fennie et al. (2022), in a scoping review of adolescent girls' perceptions and cultural beliefs, found that menstrual experiences were repeatedly shaped by cultural interpretations, social expectations, available resources and sources of information. Such findings indicate that menstrual perception should be examined as an important component of adolescent menstrual health rather than treated merely as an extension of factual knowledge.

The distinction between factual understanding and menstrual perception is particularly important. A girl may recognise menstruation as a biological process while simultaneously accepting beliefs that menstrual blood is impure, that certain activities should be avoided during menstruation, or that menstrual status should remain concealed. Menstrual stigma can persist even when basic menstrual information is available because stigma is sustained through social expectations, language, silence and repeated interpersonal practices (Olson et al., 2022). Consequently, improvement in menstrual knowledge does not necessarily eliminate negative meanings attached to menstruation. Perception encompasses the way menstrual information is interpreted within the social world in which an adolescent lives. This distinction is particularly relevant in Nigerian settings, where studies have reported varying levels of menstrual health knowledge among adolescent girls, demonstrating that awareness of menstruation and understanding of menstrual health do not necessarily translate into uniformly positive perceptions or beliefs about menstruation (Mowah & Obohwemu, 2024a).

Research among adolescent girls in African settings continues to demonstrate the persistence of these competing understandings. In Ghana, Kpodo et al. (2022) reported high levels of menstrual knowledge alongside continuing social and religious beliefs that characterised menstruation as evil or unclean. Restrictions linked to these beliefs affected girls' participation in religious and community activities. The coexistence of relatively strong knowledge and restrictive cultural interpretations is analytically important because it challenges the assumption that information alone is sufficient to reshape menstrual attitudes. Perceptions may remain embedded in social norms even where the biological basis of menstruation is understood.

Qualitative evidence from northern Ethiopia provides a similar picture. Betsu et al. (2023) found that adolescent schoolgirls could regard menstruation as a natural event while also describing it as frightening, embarrassing and closely associated with secrecy. Information was obtained through several interpersonal sources, but its content was not always accurate and was frequently influenced by established social taboos. This tension between biological normalisation and socially produced discomfort suggests that positive and negative menstrual beliefs can coexist within the same population. A simple distinction between knowledgeable and unknowledgeable adolescents may therefore obscure meaningful differences in how menstruation is understood.

Recent Nigerian evidence reinforces the importance of examining attitudes and perceptions directly. In a mixed-method study among in-school adolescent girls in Abuja, Ene et al. (2024) found that 70.08% of respondents were classified as having positive attitudes towards menstruation and menstrual hygiene management. At the same time, 62.15% reported menstruation-related restrictions. Class, religion and paternal educational attainment were associated with positive attitudes. These findings demonstrate that comparatively favourable attitudes at aggregate level can coexist with substantial exposure to restrictive menstrual norms. They also suggest that sociodemographic characteristics may be related to how menstruation is perceived, although the specific pattern is likely to vary between settings.

Religion represents one social context through which menstrual meanings may be reinforced, questioned or modified. Evidence from Ghana has shown that religious beliefs may influence perceptions of menstrual impurity and restrictions on participation in worship or community activities (Kpodo et al., 2022). More recent mixed-method evidence from Tanzania found differences in religion-based menstrual restrictions and menstrual stigma between adolescent girls from different religious backgrounds, while also showing that school, family and wider socio-cultural contexts contributed to these experiences (King et al., 2025). Religious affiliation should therefore not be treated as a direct explanation for menstrual attitudes. It is better understood as one characteristic situated within wider networks of beliefs, family practices, education and community expectations.

Age and educational progression may also be relevant to menstrual perception, although their influence is unlikely to be uniform. Increasing age may provide greater exposure to biological information and personal menstrual experience, but it may also increase exposure to established cultural rules concerning menstruation. A 2025 scoping review of menstrual hygiene knowledge, attitudes and practices among adolescent girls in African rural schools identified educational exposure, cultural taboos, religious beliefs, family communication and access to menstrual resources as recurrent influences on menstrual attitudes (Tshivule et al., 2025). These interrelated influences make it necessary to examine demographic associations empirically rather than assume that favourable perceptions necessarily increase with age or school level.

Attitudes and beliefs are also potentially modifiable. Evidence from a community-embedded sexual and reproductive health intervention in Ebonyi State, Nigeria showed that misconceptions surrounding adolescent menstruation could change following structured community engagement. Agu et al. (2024) documented changes in beliefs that had previously connected menstruation among unmarried adolescent girls with sexual activity or moral wrongdoing. The findings illustrate the importance of locating menstrual perception within the broader social environment and suggest that adolescents' beliefs may reflect messages circulating among parents, community leaders, schools and other influential groups.

The persistence of menstrual stigma has implications beyond the immediate interpretation of menstruation. Stigmatising beliefs may contribute to concealment, embarrassment, social restriction and reluctance to discuss menstrual concerns openly (Olson et al., 2022). Fennie et al. (2022) similarly found that secrecy and shame were recurrent features of adolescent menstrual experiences across different cultural contexts. These consequences make it important to identify not only whether adolescents recognise menstruation as a normal biological event, but also whether misconceptions remain concerning its cause, bodily origin and hygienic management. Research from Nigeria has further shown that menstrual hygiene practices and habits are shaped by how girls understand and manage menstruation in everyday life, reinforcing the importance of examining menstrual beliefs alongside behavioural responses (Mowah & Obohjemu, 2024b).

Evidence from Nigeria has expanded in recent years, but important contextual gaps remain. Recent research among female adolescents in secondary schools in suburban Edo State documented menstrual hygiene awareness, knowledge and sources of information, highlighting the continued importance of understanding how menstrual information is acquired and interpreted within local social contexts (Alaaya et al., 2026). Much of the available research, however, combines knowledge, attitudes and practices into a single KAP framework, which can limit detailed examination of the beliefs that constitute menstrual perception.

This paper therefore examines menstrual perceptions and beliefs among female adolescents attending secondary schools in suburban Edo State, Nigeria. Particular attention is given to beliefs about menstruation as a physiological or pathological phenomenon, misconceptions concerning the anatomical source of menstrual blood, perceived hygiene requirements, and beliefs concerning menstrual materials and their handling. The paper also examines whether categorised menstrual perception varies according to age, school class and religion. In doing so, it provides a focused

assessment of how menstruation is understood within a school-going adolescent population without conflating perception with either menstrual hygiene awareness or menstrual-management practice.

Methods

Study design and setting

A descriptive cross-sectional study was conducted in Okada community, Ovia North-East Local Government Area, Edo State, Nigeria, between January and June 2023. The design was selected to assess menstrual perceptions and beliefs among female secondary-school students at a defined point in time and to examine their associations with selected sociodemographic characteristics. The reporting of the observational design was structured with reference to the STROBE recommendations for cross-sectional studies (von Elm et al., 2007).

Okada is located in the South-South geopolitical zone of Nigeria and serves as the administrative headquarters of Ovia North-East Local Government Area. The study population comprised female students aged 10-19 years who were attending secondary schools within the community.

Eligibility criteria

Female students were eligible if they were enrolled in a secondary school in Okada community, were resident in Ovia North-East Local Government Area, had attained menarche and consented to participate. Students who did not satisfy this eligibility criteria were excluded.

Sample size and response rate

The minimum sample size was estimated using the single-population proportion formula (Cochran, 1977):

$$n = Z^2 pq / d^2$$

where n represented the required sample size, Z was the standard normal deviate at the selected confidence level, p represented the anticipated population proportion, q was $1 - p$, and d represented the required precision. A 95% confidence level was specified, giving $Z = 1.96$, while precision was set at 5%. An anticipated proportion of 72% was applied based on previous menstrual health and hygiene research conducted in Jos, Plateau State, Nigeria (Idoko et al., 2022). These parameters produced a minimum sample of approximately 310 respondents. After allowing 10% for non-response, the target sample was increased to 344.

Of the 344 questionnaires prepared for administration, 310 were completed and included in the analysis, giving a response rate of 90.12%. All descriptive and inferential analyses reported in this paper were therefore based on $N = 310$.

Sampling procedure

Cluster sampling was used to select respondents. Eight government-approved secondary schools in Okada community were treated as individual clusters: Okada Grammar School, Champions Academy, Starlight Group of Schools, Regina Mundi Catholic School, Igbinedion University Staff School, Great Future Academy, Unique Group of Schools and Divine Grace Academy.

Three school clusters were selected using simple random sampling through a dice-rolling procedure. The selected schools were Okada Grammar School, Regina Mundi Catholic School and Igbinedion University Staff School. Female students who had attained menarche within the selected clusters were recruited until the required sample was reached.

Data-collection instrument

Data were collected using a structured interviewer-administered questionnaire containing open-ended and closed-ended items. The questionnaire had been adapted from previous work examining menstrual hygiene awareness, management and perceptions among adolescent and young female populations, including research in eastern Ethiopia, South Africa and Edo State, Nigeria (November 2021; Hussein et al., 2022; Tomlinson, 2022).

The full instrument contained separate sections on sociodemographic characteristics, menstrual hygiene awareness, menstrual perception and menstrual hygiene practices. The analysis reported in this paper was restricted to the sociodemographic and menstrual-perception components.

The perception component consisted of 12 statements presented using a five-point response format ranging from strongly agree to strongly disagree. The statements assessed perceptions concerning:

1. menstruation as a curse from God;
2. menstruation as a physiological process;
3. menstruation as a disease;
4. the uterus as the source of menstrual blood;
5. the liver as the source of menstrual blood;
6. the stomach as the source of menstrual blood;
7. the bladder as the source of menstrual blood;
8. whether sanitary pads are unnecessary during menstruation;
9. whether special hygiene is required during menstruation;
10. whether dry cloth is hygienic for menstrual use;
11. whether used menstrual pads can be disposed of in a dustbin; and
12. whether cloth used during menstruation can be washed and reused.

These items allowed biological beliefs, misconceptions concerning the anatomical source of menstrual blood, and attitudes towards menstrual hygiene requirements and menstrual materials to be examined separately rather than represented only through a composite score.

Measurement and classification of menstrual perception

Menstrual perception was assessed using 12 statements presented on a five-point response scale ranging from strongly agree to strongly disagree. The statements addressed beliefs concerning the physiological nature of menstruation, supernatural and disease interpretations, the anatomical source of menstrual blood, menstrual hygiene requirements, menstrual materials, disposal and reuse.

For calculation of the composite perception score, each response classified as correct according to the scoring protocol received 1 point, while an incorrect or uncertain response received 0 points. Scores across the 12 items were summed, giving a possible raw score ranging from 0 to 12.

A composite score of more than 80% was classified as positive perception, while a score below 80% was classified as need improvement. Because the scale contained 12 binary-scored items, the >80% threshold translated operationally to a raw score of 10-12 correct responses, equivalent to 83.3%-100%. Scores of 0-9 correct responses, equivalent to 0%-75%, fell within the need-improvement category. An exact score of 80% was not mathematically obtainable on the 12-item binary scale and therefore created no unclassified boundary value.

Individual perception items were also reported separately as frequencies and percentages. This allowed specific beliefs and misconceptions to be examined independently of the composite classification.

Instrument review and pre-testing

The questionnaire was reviewed by members of the research team, the project supervisor and the Head of the Department of Community Medicine before use. Pre-testing was undertaken in Usen, Ovia South-

West Local Government Area, Edo State, approximately 5 km from Okada. The community was selected because it was considered sufficiently similar to the main study setting.

Approximately 10% of the minimum sample size was included in the pre-test. The exercise was used to assess comprehensibility and identify problems in the wording and administration of questionnaire items. Necessary adjustments were made before the final instrument was administered.

Data management and statistical analysis

Completed questionnaires were checked for completeness, serialised and entered into IBM SPSS Statistics version 27. Descriptive statistics were used to summarise respondent characteristics and the distribution of responses to the 12 menstrual-perception statements. Categorical variables were reported using frequencies and percentages, while age was additionally summarised using the mean and standard deviation.

The proportion of respondents classified as having positive or negative menstrual perception was calculated from the composite perception score.

Pearson's chi-square test was used to examine associations between categorised menstrual perception and selected sociodemographic characteristics. The inferential analysis for this paper was restricted to age, school class and religion, corresponding to the variables for which complete cross-tabulated results were available. Statistical significance was determined at $p < .05$.

No multivariable analysis was undertaken. Consequently, the analyses were designed to identify bivariate associations rather than independent predictors or causal relationships.

Ethical considerations

Ethical approval was obtained from the Ethics Committee of Igbinedion University, Okada, Edo State, Nigeria, with approval code IUO/Ethics/042. Participation was voluntary, and respondents were informed that refusal to participate or withdrawal would not attract any penalty.

Names were not recorded on the questionnaires. Privacy was maintained during data collection, confidentiality was protected, and completed data were accessible only to members of the research team.

Results

Of the 344 questionnaires prepared for administration, 310 were completed and analysed, giving a response rate of approximately 90%. The mean age of respondents was 14.21 ± 1.36 years. Most respondents were aged 13-16 years (84.5%), while 11.6% were aged 9-12 years and 3.9% were aged 17-18 years. SS1 contained the largest proportion of respondents (31.3%), followed by JSS2 (26.8%) and JSS3 (20.0%). The selected age and school-class characteristics are summarised in Table 1. Religion was retained for the inferential analysis, with 268 Christian and 42 Muslim respondents represented in the cross-tabulation.

Table 1: Selected sociodemographic characteristics of respondents (N = 310)

Characteristic	n	%
Age (years)		
9-12	36	11.6
13-16	262	84.5

Characteristic	n	%
17-18	12	3.9
School class		
JSS1	6	1.9
JSS2	83	26.8
JSS3	62	20.0
SS1	97	31.3
SS2	50	16.1
SS3	12	3.9

Note: Percentages are based on N = 310. Mean age was 14.21 ± 1.36 years.

Responses to the 12 perception statements are shown in Table 2. Menstruation was strongly identified as a physiological process by 84.5% of respondents, whereas 91.9% strongly disagreed that it was a curse from God and 88.4% strongly disagreed that it was a disease. Concerning the anatomical source of menstrual blood, 61.9% strongly agreed that blood originates from the uterus. Strong disagreement was recorded for the liver (80.3%), stomach (84.2%) and bladder (84.2%) as the source of menstrual blood.

Table 2: Distribution of responses to menstrual perception statements (N = 310)

Perception statement	Strongly agree (%)	Agree (%)	Maybe (%)	Disagree (%)	Strongly disagree (%)
Menstruation is a curse from God	3.9	0.0	2.3	1.9	91.9
Menstruation is a physiological process	84.5	7.7	7.7	0.0	0.0
Menstruation is a disease	0.0	0.0	1.9	9.7	88.4
Menstrual blood is from the uterus	61.9	0.0	6.8	7.7	23.5
Menstrual blood is from the liver	3.9	0.0	6.1	9.7	80.3
Menstrual blood is from the stomach	0.0	0.0	6.1	9.7	84.2
Menstrual blood is from the bladder	0.0	0.0	13.9	1.9	84.2
Sanitary pads are not necessary during menstruation	0.0	0.0	0.0	1.9	98.1

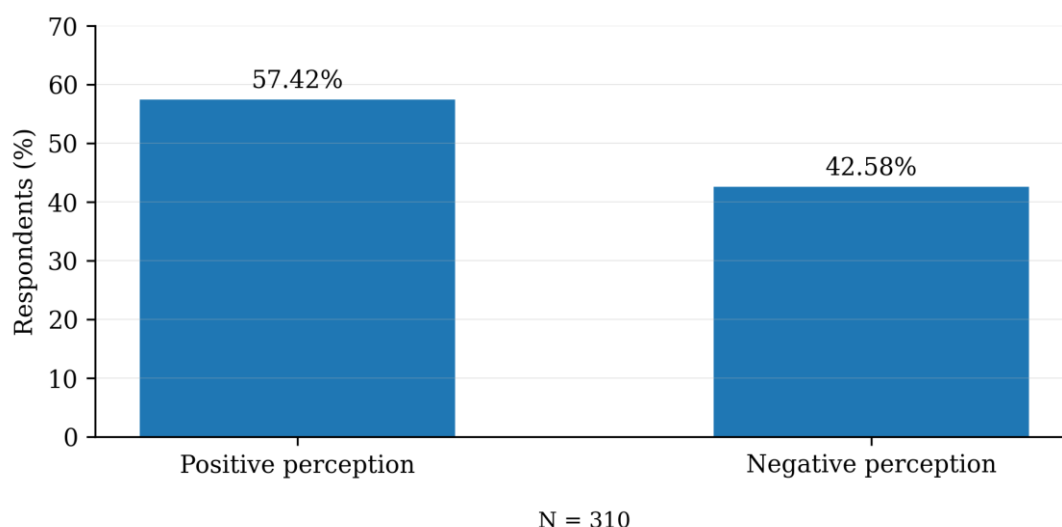
Perception statement	Strongly agree (%)	Agree (%)	Maybe (%)	Disagree (%)	Strongly disagree (%)
Special hygiene is needed during menstruation	84.5	13.5	0.0	0.0	0.0
Dry cloth is hygienic during menstruation	23.9	18.4	0.0	0.0	57.7
Used menstrual pads can be disposed of in the dustbin	2.3	28.4	11.6	11.3	46.5
Dry cloth used during menstruation can be washed and reused	25.5	14.8	1.9	33.9	23.9

Note: Percentages are reported to one decimal place. Response categories reproduce the five-point questionnaire format.

Perceptions concerning menstrual materials were less uniform. Nearly all respondents (98.1%) strongly disagreed that sanitary pads were unnecessary during menstruation, and 84.5% strongly agreed that special hygiene was needed. For the statement that dry cloth was hygienic during menstruation, 23.9% strongly agreed, 18.4% agreed and 57.7% strongly disagreed. Responses to disposal of used pads in a dustbin were distributed across all categories: 2.3% strongly agreed, 28.4% agreed, 11.6% were uncertain, 11.3% disagreed and 46.5% strongly disagreed. For washing and reusing dry cloth, 25.5% strongly agreed, 14.8% agreed, 1.9% were uncertain, 33.9% disagreed and 23.9% strongly disagreed.

The composite perception classification is presented in Figure 1. Positive perception accounted for 57.42% of respondents, while 42.58% were classified as having negative perception. The corresponding cross-tabulated totals were 178 respondents in the positive category and 132 in the negative category.

Figure 1: Composite menstrual perception classification among respondents (N = 310)



Note: Positive and negative perception percentages were 57.42% and 42.58%, respectively.

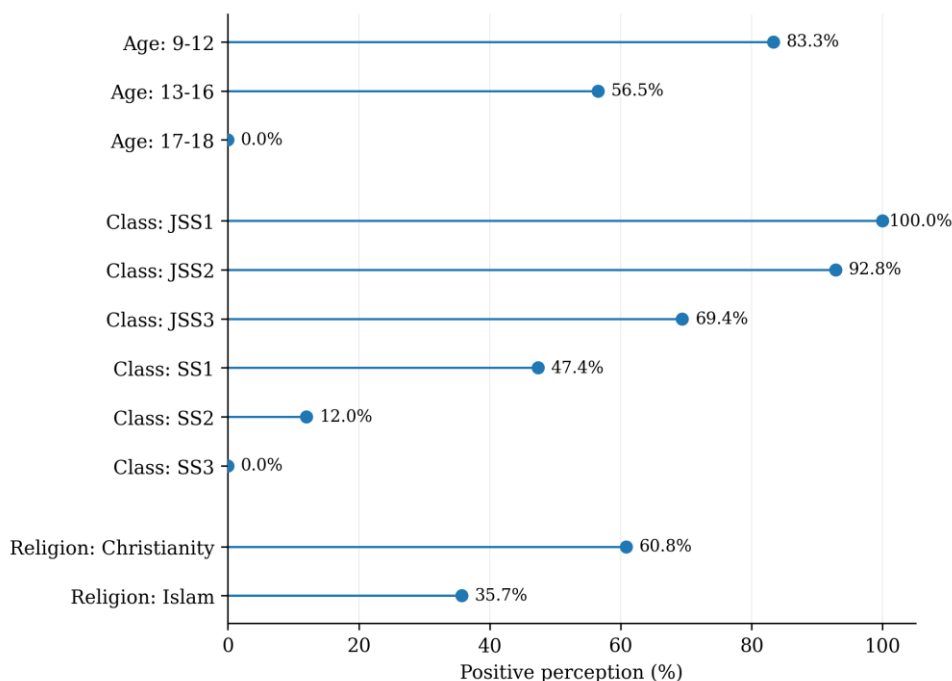
Bivariate associations between perception category and sociodemographic characteristics are reported in Table 3. Positive perception varied significantly across age groups ($\chi^2 = 26.162$, $p < .001$). The proportion with positive perception was 83.3% among respondents aged 9-12 years, 56.5% among those aged 13-16 years and 0.0% among those aged 17-18 years. School class was also associated with perception ($\chi^2 = 112.821$, $p < .001$). Positive perception was recorded for 100.0% of JSS1 respondents, 92.8% of JSS2, 69.4% of JSS3, 47.4% of SS1, 12.0% of SS2 and 0.0% of SS3 respondents.

Table 3: Sociodemographic characteristics associated with menstrual perception (N = 310)

Characteristic	Category	Positive n (%)	Negative n (%)	χ^2	p
Age (years)	9-12	30 (83.3)	6 (16.7)	26.162	< .001
Age (years)	13-16	148 (56.5)	114 (43.5)		
Age (years)	17-18	0 (0.0)	12 (100.0)		
School class	JSS1	6 (100.0)	0 (0.0)	112.821	< .001
School class	JSS2	77 (92.8)	6 (7.2)		
School class	JSS3	43 (69.4)	19 (30.6)		
School class	SS1	46 (47.4)	51 (52.6)		
School class	SS2	6 (12.0)	44 (88.0)		
School class	SS3	0 (0.0)	12 (100.0)		
Religion	Christianity	163 (60.8)	105 (39.2)	9.361	.002
Religion	Islam	15 (35.7)	27 (64.3)		

Note: Percentages are calculated within sociodemographic categories. Values below .001 are reported as $p < .001$.

Religion was significantly associated with perception category ($\chi^2 = 9.361$, $p = .002$). Positive perception was recorded among 60.8% of Christian respondents and 35.7% of Muslim respondents, while negative perception accounted for 39.2% and 64.3%, respectively. Figure 2 displays the positive-perception proportions across all age, school-class and religious subgroups included in the chi-square analyses.

Figure 2: Positive menstrual perception across sociodemographic subgroups (N = 310)

Note: Values are subgroup-specific percentages classified as having positive menstrual perception. Statistical tests for each characteristic are reported in Table 3.

Discussion

Principal findings

Just over half of the female adolescents were classified as having a positive menstrual perception, with a composite positive-perception prevalence of 57.42%. The item-level findings, however, revealed a more differentiated pattern than the composite score alone suggests. Most respondents strongly rejected the proposition that menstruation is a curse from God, 84.5% strongly recognised menstruation as a physiological process, and 88.4% strongly rejected its classification as a disease. Understanding of menstrual anatomy was less complete, with 61.9% strongly identifying the uterus as the source of menstrual blood. Perceptions concerning menstrual materials, hygiene and disposal were also more variable. Positive perception differed significantly by age, school class and religion.

This combination of relatively favourable biological beliefs with a more moderate composite perception score is consistent with evidence that menstrual understanding is multidimensional. Uzoechi et al. (2023), in their systematic review of Nigerian schoolgirls, found marked variation between factual menstrual knowledge and attitudes, with negative attitudes persisting in settings where some elements of menstrual knowledge were comparatively strong. Similarly, Tomlinson et al. (2024) identified substantial heterogeneity across 35 studies from Anglophone West Africa, reflecting differences in what adolescents knew, how menstruation was interpreted socially and the conditions in which menstruation was managed. The present results therefore reinforce the importance of examining specific beliefs rather than relying exclusively on a single composite classification.

Biological understanding and menstrual misconceptions

The strong rejection of menstruation as either a curse or a disease represents an important finding. Menstrual stigma in many low- and middle-income settings has historically been sustained through narratives of contamination, impurity, supernatural causation and illness. Hennegan et al. (2019), in a systematic review and qualitative metasynthesis, demonstrated that girls' menstrual experiences are shaped not only by material resources but also by expectations of secrecy, shame and social restriction. The high proportion rejecting supernatural and disease interpretations suggests that these particular beliefs were not dominant among the adolescents surveyed.

Recognition of menstruation as a physiological process was also high. This compares favourably with evidence from northern Ghana, where 81.6% of adolescent schoolgirls recognised menstruation as a normal physiological process (Mohammed & Larsen-Reindorf, 2020). The Ghanaian study nevertheless found substantial misconceptions in other domains, illustrating that correct understanding of one aspect of menstruation cannot be assumed to extend to menstrual anatomy or wider menstrual-health knowledge.

This distinction is particularly relevant to the anatomical findings. Although most respondents correctly rejected the liver, stomach and bladder as sources of menstrual blood, only 61.9% strongly identified the uterus as the correct source. Comparable misconceptions have been documented elsewhere in West Africa. Mohammed and Larsen-Reindorf (2020) reported that only 2.8% of girls in their rural Ghanaian sample identified the uterus correctly, despite much higher recognition of menstruation as a physiological process. The Nigerian systematic review by Uzoechi et al. (2023) similarly identified gaps in adolescents' understanding of reproductive anatomy across several included studies.

The difference between recognising menstruation as normal and understanding its anatomical basis has practical implications for menstrual health education. Biological normalisation may reduce misconceptions that menstruation represents disease or supernatural punishment, but incomplete understanding of reproductive anatomy can remain. Menstrual education should therefore go beyond reassurance that menstruation is normal and include clear explanations of the endometrium, uterus, menstrual bleeding and the reproductive cycle. Such content may help prevent fragmented knowledge in which adolescents recognise menstruation as physiological without understanding what is occurring physiologically.

Perceptions concerning menstrual hygiene and materials

Most respondents rejected the statement that sanitary pads were unnecessary, while 84.5% strongly agreed that special hygiene was needed during menstruation. These findings indicate strong endorsement of menstrual cleanliness and menstrual-care requirements. They should, however, be interpreted within the boundaries of the questionnaire.

The near-universal endorsement of sanitary pads should not be equated with evidence that disposable pads are the only acceptable menstrual material. Contemporary menstrual-health frameworks emphasise access to menstrual materials that are acceptable, safe, affordable and suitable to individual needs rather than prescribing a single product. Hennegan et al. (2020), in developing and validating the Menstrual Practice Needs Scale in Uganda, showed that menstrual experience depends on whether individuals can change, wash, dispose of or store materials comfortably and privately, alongside their confidence in the materials being used. Product type alone therefore provides an incomplete indication of menstrual health.

Similar caution applies to the perception of cloth. In the present findings, 42.3% either strongly agreed or agreed that dry cloth was hygienic during menstruation, while opinions concerning washing and reusing cloth were divided. Reusable cloth is not inherently unsafe simply because it is reusable. Its suitability depends on the type of material, how it is washed, whether it can be dried completely, and how it is stored between uses. Hennegan et al. (2019) identified these environmental and practical

conditions as central to girls' experiences with menstrual materials across low- and middle-income countries.

Responses concerning disposal also showed considerable variation. Fewer than half strongly rejected disposal of used pads in a dustbin, while other respondents agreed, disagreed or expressed uncertainty. This item requires particularly cautious interpretation because appropriate disposal depends partly on the waste-management system available. The response should therefore be understood as a perception of disposal rather than as a direct measure of objectively safe disposal behaviour.

These item-level patterns also help explain why the composite positive-perception prevalence was substantially lower than the very high percentages recorded for some biological statements. The perception scale combined fundamentally different domains, including supernatural beliefs, reproductive anatomy, attitudes towards menstrual products, hygiene expectations and waste disposal. The resulting 57.42% therefore represents performance against the predefined scoring structure of this instrument. It should not be interpreted as a universal measure of menstrual-health literacy or as evidence that 42.58% of participants held globally negative views about menstruation.

Age and school-class differences

Perception varied substantially with age. Positive perception was recorded among 83.3% of respondents aged 9-12 years and 56.5% of those aged 13-16 years, while none of the 12 respondents aged 17-18 years was classified as having positive perception. The association was statistically significant.

This pattern differs from findings commonly reported for menstrual knowledge. In northern Ghana, older adolescent girls had substantially lower adjusted odds of poor menstrual knowledge than younger girls (Mohammed & Larsen-Reindorf, 2020). Tomlinson et al. (2024) likewise identified age and educational level among the factors associated with menstrual knowledge across West African research. The contrast is important because *knowledge and perception are not interchangeable constructs*. Greater age or longer exposure to menstruation does not necessarily imply a more positive score on an instrument combining biological, cultural and product-related beliefs.

School class showed an even stronger association with perception. Positive perception declined from 100% in JSS1 and 92.8% in JSS2 to 47.4% in SS1, 12.0% in SS2 and 0% in SS3. This pattern should not be interpreted as evidence that advancing through school causes perceptions to deteriorate. Age and school class are closely related, and no multivariable analysis was conducted to separate their respective associations. The JSS1 and SS3 categories also contained only six and 12 respondents, respectively, making percentages at these extremes especially sensitive to small numbers.

The direction of the class gradient nevertheless warrants further investigation because formal schooling is generally expected to provide opportunities for improved menstrual understanding. Ssemata et al. (2023) showed in Ugandan secondary schools that formal educational environments can coexist with persistent menstrual myths, misconceptions and negative social norms. Their qualitative findings indicate that exposure to school does not automatically guarantee comprehensive menstrual-health education. The observed class pattern in Edo State therefore identifies an empirical question for future longitudinal or multivariable research rather than providing evidence of an educational effect.

Religion and menstrual perception

Religion was significantly associated with perception. Positive perception was recorded among 60.8% of Christian respondents compared with 35.7% of Muslim respondents. The difference is notable, but religious affiliation should not be interpreted as the mechanism producing the observed pattern.

Research from West Africa demonstrates that menstruation can intersect with religious practices, beliefs about purity and restrictions on participation. Mohammed and Larsen-Reindorf (2020), for example, found high levels of religion-related menstrual restriction among adolescents in northern Ghana. Their qualitative data showed that religious practice and cultural convention were often interwoven, making

it difficult to attribute restrictions exclusively to theological teaching. Tomlinson et al. (2024) similarly identified religion among several characteristics associated with menstrual knowledge and management across West African studies.

The present questionnaire recorded religious affiliation but did not assess denomination, religiosity, specific teachings, attendance at religious institutions, household interpretation of religious rules or exposure to menstrual-health education within faith settings. The finding therefore establishes a bivariate association between religious affiliation and perception score, but it does not explain why that association occurred. Socioeconomic circumstances, school attended, family communication, ethnicity and other unmeasured characteristics could also contribute to the observed difference.

Implications for menstrual-health education

The findings suggest that menstrual education should address both *biomedical understanding and socially embedded beliefs*. High recognition that menstruation is physiological is encouraging, but the anatomical gaps and mixed responses regarding menstrual materials indicate that education limited to basic definitions may be insufficient. West African evidence similarly shows that adolescents can possess some correct menstrual information while retaining other misconceptions or restrictive beliefs (Tomlinson et al., 2024).

School-based interventions may provide one route for addressing these multiple dimensions. Ssemata et al. (2023) identified knowledge gaps, myths and negative norms at individual and interpersonal levels within Ugandan secondary schools, supporting intervention approaches that address the broader school environment rather than information alone. More compellingly, the 2025 MENISCUS cluster-randomised trial demonstrated that a multi-component intervention combining teacher-delivered puberty education, menstrual-health information, menstrual materials, pain-management support and improvements to school sanitation could improve several menstrual-health outcomes among Ugandan secondary-school students (Nelson et al., 2025). The intervention evidence supports approaches that integrate education with the physical and social conditions in which menstruation is experienced.

The present results also suggest that menstrual education should avoid reproducing rigid messages that one product or disposal method is universally correct. Education should instead explain principles of menstrual hygiene, including the use of clean absorbent materials, appropriate changing, safe washing and drying where reusable materials are used, privacy, hand hygiene and locally appropriate waste management. Such an approach is more likely to distinguish biomedical principles from context-dependent product choices.

Strengths and limitations

An important strength is the item-level assessment of menstrual perception. Rather than relying solely on a single positive or negative category, the questionnaire captured beliefs concerning physiological normality, disease, supernatural causation, reproductive anatomy, menstrual materials, hygiene and disposal. This permitted identification of domains in which perceptions were highly favourable alongside domains showing greater uncertainty.

Several limitations should qualify interpretation. First, the cross-sectional design cannot establish temporal or causal relationships. Second, the study was conducted among school-going adolescents from three selected secondary schools within one suburban community, limiting generalisability to adolescents outside school and to other geographical settings.

Third, menstrual perception was assessed through a locally applied 12-item instrument rather than a widely established multidimensional menstrual-attitude scale. Some items also combine perception with normative judgements about menstrual products and disposal. The composite score should consequently be interpreted according to the content and scoring rules of this instrument rather than as a comprehensive measure of menstrual stigma or menstrual-health literacy.

Fourth, responses concerned a socially sensitive topic and may have been influenced by social-desirability bias, particularly for statements concerning religion, hygiene and culturally disapproved beliefs. Fifth, the chi-square analyses were bivariate. Significant associations with age, class and religion cannot therefore be regarded as independent predictors. The small numbers in some age and school-class categories further require caution when interpreting the most extreme percentages.

Future research should use validated multidimensional measures of menstrual attitudes and stigma alongside detailed assessment of reproductive anatomy, family communication, religious and cultural beliefs, school exposure and menstrual-health education. Multivariable analyses would also help determine whether the observed age, class and religion associations persist after adjustment for correlated social and educational characteristics.

The findings nevertheless demonstrate that menstrual perception cannot be characterised adequately as simply positive or negative. Strong acceptance of menstruation as a normal physiological process coexisted with incomplete anatomical understanding and more divided perceptions concerning menstrual materials and disposal. This pattern highlights the value of examining the specific beliefs that contribute to composite menstrual-perception scores.

Conclusion

Menstrual perceptions among the surveyed female adolescents were mixed rather than uniformly positive or negative. Although 57.42% were classified as having a positive perception, the item-level findings showed considerable variation across different dimensions of menstrual belief. Most respondents recognised menstruation as a physiological process and rejected interpretations of menstruation as either a disease or a curse. Understanding of menstrual anatomy was less complete, however, and perceptions concerning menstrual materials, hygiene requirements, reuse and disposal were more varied.

These findings indicate that favourable beliefs about the normality of menstruation can coexist with gaps in anatomical understanding and uncertainty about some aspects of menstrual management. The composite perception score should therefore be interpreted alongside the individual questionnaire items rather than treated as a complete representation of menstrual understanding.

Perception was significantly associated with age, school class and religion. The observed patterns demonstrate that menstrual perceptions were not distributed uniformly across the sampled population. However, because the analysis was cross-sectional and limited to bivariate associations, the findings do not establish causation or identify age, educational level or religion as independent determinants of menstrual perception.

Menstrual-health education for adolescents should therefore extend beyond basic recognition of menstruation as a normal biological event. Greater attention is needed to reproductive anatomy, misconceptions surrounding menstrual blood, the principles underlying hygienic use of menstrual materials, and contextually appropriate approaches to washing, reuse and disposal. Future research should employ validated multidimensional measures and multivariable analytical approaches to examine how family, school, cultural, religious and socioeconomic factors relate to menstrual perceptions among adolescent girls.

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Authors' Contributions

All authors played a substantive role in shaping this study and developing the manuscript. B.K.A., K.A., I.K.A., O.O.O., O.O.A., and T.O.O. conceptualised the study and designed the overall research framework under the supervision of H.E. Data analysis, interpretation and validation of findings were carried out collaboratively, with each author contributing to the discussions that informed the final results. B.K.A. and C.E.E. prepared the initial manuscript draft, covering the introduction, methods, results and discussion. Co-authors strengthened the analysis, offered detailed revisions and enhanced the clarity and coherence of the final document. Every author reviewed the complete manuscript, approved the final version and accepted responsibility for the integrity of the work.

Conflict of interest

The authors declare no conflict of interest.

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