



Menstrual Cycle and Contraception in a Malian University Setting: Knowledge and Practical Attitudes Among Female Students

Aminata KOUMA¹, Abdoulaye SISSOKO⁴, Mamadou SIMA³, Aminata DIANGOUBA², Bouroulaye DIARRA, Amadou BOCOUM², Tioukani THERA³, Ibrahima TEGUETE², Youssouf TRAORE²

¹Department of Obstetrics and Gynecology, CHU Kati, Mali

²Department of Obstetrics and Gynecology, CHU Point G, Mali

³Department of Obstetrics and Gynecology, CHU Gabriel Touré, Mali

⁴Department of Obstetrics and Gynecology, Mohamed VI Hospital, Mali

Correspondence

Aminata KOUMA

CHU BSS Kati, Mali

Tel: +223 78 85 55 46

- Received Date: 10 Jan 2026
- Accepted Date: 17 Apr 2026
- Publication Date: 21 Apr 2026

Keywords

Menstrual cycle, knowledge, practices, contraception, FMOS

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Abstract

Objective: To assess the knowledge and practices of medical students regarding the menstrual cycle and contraception.

Methods: A cross-sectional analytical study was conducted at the Faculty of Medicine and Odontostomatology (FMOS) from March 30 to May 30, 2019. A total of 207 female students were randomly selected. Data were collected using a structured, anonymous, self-administered questionnaire. Statistical analysis was performed using SPSS version 21.0, Excel 2016, and Word 2016. The chi-square test was used for comparisons, with a significance level set at $p < 0.05$.

Results: Approximately 48.4% of students correctly identified their fertile period. Nearly all participants had heard of family planning. It was primarily associated with prevention of unintended pregnancies (60.6%), birth spacing (20%), family well-being (6%), and fertility regulation (3.3%).

A total of 75.4% had used at least one contraceptive method. The male condom was the most commonly used method (79.9%), followed by oral contraceptives (57%), implants (45.3%), natural methods (45.3%), and intrauterine devices (32.3%).

Emergency contraception was known by 91.7% of participants, but only 8.2% had used it.

Conclusion: Most medical students demonstrated basic knowledge of the menstrual cycle and a relatively high level of awareness regarding contraceptive methods. However, the utilization rate remains suboptimal despite favorable attitudes. The male condom remains the most widely used method, mainly due to its dual protection against pregnancy and sexually transmitted infections.

Introduction

In 2005, an estimated 536,000 maternal deaths occurred worldwide, the majority in developing countries. In Mali, the maternal mortality ratio was estimated at 325 per 100,000 live births according to the Demographic and Health Survey (DHS VI). Fertility remains high, particularly among women aged 20–24 years, with an average of 6.3 children per woman. Contraceptive prevalence remains low, estimated at 16.4% in 2018. Family planning is a key component of reproductive health services promoted by the African Society of Gynecology and Obstetrics (SAGO) to reduce maternal and neonatal mortality. It enables individuals to determine the number and spacing of their children through contraceptive use. The menstrual cycle is a coordinated physiological process preparing the female body for pregnancy. Contraceptive methods prevent pregnancy either by interfering with components of this cycle or by preventing sperm from reaching

the ovum. Globally, among 1.9 billion women of reproductive age (15–49 years), approximately 1.1 billion require family planning services, with 164 million having unmet needs. Contraceptive use among adolescents remains low worldwide. In Africa, usage rates range from 26% to 36% depending on the country. Limited knowledge, fear of side effects, and underestimation of pregnancy risk contribute to low contraceptive uptake. Adolescent pregnancies remain a major public health concern, often associated with adverse socio-economic outcomes. Universities represent a strategic environment for targeting young populations; however, health indicators in this setting remain insufficiently documented.

Method

Study type and period

This was a descriptive and analytical cross-sectional study conducted at the Faculty of Medicine and Odontostomatology (FMOS) in Mali from March 30 to May 30, 2019.

Citation: Kouma A, Sissoko A, Sima M, et al. Menstrual Cycle and Contraception in a Malian University Setting: Knowledge and Practical Attitudes Among Female Students. Arch Clin Obs Gyn Res. 2026;5(1):016.

Study population

The study included female students from the 4th to 7th year of FMOS. This choice was made because contraception courses are taught starting in the 4th year of medical school.

Sampling

The sample size was calculated based on the results of the 2018 Demographic and Health Survey (DHS) VI, which indicated a contraceptive prevalence of 16% in Mali. Since contraceptive prevalence in the university setting was unknown, we assumed a prevalence of 16% with a 5% confidence level, as well as a 5% margin of error. The Schwartz formula was used to calculate the sample size. $n = Z\alpha^2pq/i^2$.

- $Z\alpha = 1.96$: reduced deviation corresponding to the accepted risk α (with a significance level of 0.05); P = Prevalence of contraceptive use in the general population, which is 16% according to the EDSM-VI in Mali in 2018.

The calculated sample size was $n = 206.5244$. Thus, we concluded the minimum sample size was 207 women.

Data Collection

Data were collected using an individual questionnaire. The students were uninfluenced by the questionnaire as no time limit was imposed for completion.

Study Procedure

Data were collected using anonymous written questionnaires. Surveys were conducted in the various classrooms during periods of inactivity after explaining the objectives of our study and emphasizing the confidentiality of the survey data. The students were interviewed at the university or at their internship sites.

Table 1: Distribution of respondents according to sociodemographic characteristics

Sociodemographic characteristics	Number (n=207)	Percentage (%)
Marital status		
Engaged	15	7.3
Married	39	18.8
Single	153	73.9
Level of study		
4th year	77	37.2
5th year	46	22.2
6th year	46	22.2
7th year	38	18.4
Religion		
Christian	42	20.3
Muslim	165	79.7
History of pregnancy		
Yes	68	32.9
No	139	67.1
Pregnancy intention (n=68)		
Yes	46	67.6
No	22	32.4
Pregnancy outcome		
Abortion	16	23.5
Term pregnancy	52	76.4

Data Analysis

Individual data were coded digitally to allow for computer processing. The following software was used for report entry and data analysis: SPSS 21.0, epidemiology software for data entry and analysis; Excel 2016, spreadsheet program for graphs and tables; and Word 2016, word processing software for data entry. The use of the chi-square test made it possible to compare certain frequencies, and the significance threshold was set at $P=0.05$. The variables studied were: sociodemographic characteristics, gynecological and obstetric history, knowledge of the menstrual cycle; knowledge of family planning; knowledge of the advantages and adverse effects of contraceptive methods; and contraceptive practices.

Knowledge of the Menstrual Cycle

A high proportion of students (93.7%) reported having knowledge of the menstrual cycle. More than half (50.7%) were able to identify the different phases of the cycle, while 48.3% correctly identified the fertile window. Menarche most commonly occurred between the ages of 11 and 13 years (59.4%). The majority of students (86.9%) reported having a regular menstrual cycle, whereas 13% experienced irregular cycles. The duration of menstruation was predominantly between 4 and 6 days (87.9%).

Table 2: Distribution of respondents according to knowledge of the menstrual cycle

Knowledge of menstrual cycle	Number (n=207)	Percentage (%)
Yes	194	93.7
No	13	6.3
Knowledge of menstrual cycle phases		
Does not know	15	7.2
Follicular and luteal phases	87	42.0
Follicular phase, ovulation and luteal phase	105	50.7
Knowledge of fertile period		
Does not know	20	9.6
After menstruation	34	16.4
Mid-cycle	53	25.6
At ovulation	100	48.4

Knowledge and Practice of Family Planning

All female students reported being aware of and having heard about family planning. At least two benefits of contraceptive methods were identified by 97% of the participants. The majority associated family planning with the prevention of unintended pregnancies (86.9%), followed by birth spacing (41.1%) and protection against sexually transmitted infections (STIs), including HIV/AIDS (29.9%). Condoms were the most widely recognized contraceptive method (79.9%). Oral contraceptives were known by 57% of the students, while emergency contraception was known by 91.7%; however, only 8.2% reported having used it at the time of the survey. Knowledge of natural contraceptive methods was also reported, including the Lactational Amenorrhea Method (LAM) (22.7%), basal body temperature method (16.7%), cervical mucus method (9.3%), periodic abstinence (9.3%), withdrawal (6.7%), and diaphragm use (4.7%). In terms of practice, the most commonly used

contraceptive method was the male condom (34.3%), followed by oral contraceptives (17.3%), emergency contraception, and implants.

Table 3: Distribution of respondents according to knowledge and practices of contraceptive methods

Knowledge of modern contraceptive methods	Number (n=207)	Percentage (%)
Method		
Vasectomy	1	0.4
Spermicides	3	1.4
Diaphragm	9	4.3
Tubal ligation	14	6.8
Natural methods	40	19.3
Intrauterine device (IUD)	59	28.5
Emergency contraception	67	32.3
Injectable contraceptives	86	45.3
Implants	86	45.3
Oral contraceptives	118	57.0
Condoms	164	79.9
Vasectomy	1	0.4
Spermicides	3	1.4
Diaphragm	9	4.3
Tubal ligation	14	6.8
Natural methods	40	19.3
Intrauterine device (IUD)	59	28.5
Emergency contraception	67	32.3
Injectable contraceptives	86	45.3
Implants	86	45.3
Oral contraceptives	118	57.0
Condoms	164	79.9
Benefits of contraceptive methods		
Does not know	5	2,4
Regulates fertility	8	3,9
Promotes family fulfillment	15	7,2
Ensures family well-being	26	12,6
Protects against STIs/HIV/AIDS	62	29,9
Allows birth spacing	85	41,1
Prevents unintended pregnancies	180	86,9
Contraceptive methods used at the time of survey (n=207)		
Withdrawal	2	1,0
IUD	9	4,3
Injectable contraceptive	9	4,3
Jadelle implant	12	5,7
Emergency contraception	17	8,2
Oral contraceptive pill	36	17,3
Male condom	71	34,3
No method	51	24,6

Sexual Behavior of the Female Students Surveyed

The age of first sexual intercourse was over 18 for 85.9% of the female students surveyed. The majority of students (75.4%) had had at least one sexual encounter; among them, 84% were aware of the use of protection during sexual intercourse.

Table 4: Distribution of respondents according to sexual behavior

Sexual behavior	Number	Percentage (%)
History of sexual intercourse (n=207)		
Yes	156	75.4
No	51	24.6
Reasons for non-use of contraception (n=51)		
Tradition and religion	2	2.0
Reduced pleasure	10	19.6
Unmarried	13	25.5
No sexual activity	26	50.9
Age at first sexual intercourse (n=156)		
<16 years	7	4.5
16–18 years	15	9.6
>18 years	134	85.9
Consultation of health provider for contraception		
Yes	21	13.5
No	135	86.5
Use of protection during sexual intercourse		
Never	25	16.0
Always	131	84.0

Bivariate Analysis

The bivariate analysis was conducted to assess the association between sociodemographic characteristics and prior contraceptive experience. Regarding age, no statistically significant association was found between age group and previous use of a contraceptive method ($p = 0.068$). Thus, contraceptive experience does not appear to be influenced by age in this study population. In contrast, a statistically significant association was observed between marital status and prior contraceptive experience ($p = 0.005$). Single students had a higher prevalence of previous contraceptive use compared to other marital status groups. These findings suggest that marital status is a significant determinant of contraceptive experience, whereas age is not.

Table 5: Distribution of respondents according to past contraceptive use and marital status

Marital status	Past contraceptive use: Yes	Past contraceptive use: No	Total (%)
Single	107 (69.9%)	46 (30.1%)	153 (73.9)
Married	37 (94.9%)	2 (5.1%)	39 (18.8)
Engaged	12 (80%)	3 (20%)	15 (7.2)
Total	156 (73.3)		

Discussion

Sociodemographic Characteristics

Age and Marital Status

The study population consisted predominantly of young women, with a mean age of 24.07 ± 1.92 years (range: 20–29 years), and a predominance of the 20–24-year age group (60.4%). These findings are consistent with studies conducted in similar university settings, notably in Cameroon and Côte d'Ivoire, where comparable age distributions have been reported [12,14]. The majority of participants were single (73.9%), reflecting the typical demographic profile of university populations. This proportion is comparable to findings reported by Aka *et al.* (89.9%) and Sogoba (76.5%) [14,15]. In contrast, community-based studies in West Africa, such as those conducted in Benin, report higher proportions of married women, highlighting contextual differences between academic and community populations [17].

Educational Level and Religion : Contraceptive use appeared to increase with academic level, suggesting a positive influence of education on reproductive health behaviors. Similar trends have been observed in other African university settings [17]. Religion remains an important sociocultural determinant. In this study, Muslim participants predominated (79.7%), which is consistent with national demographic patterns. Religious beliefs may influence attitudes toward contraception and reproductive decision-making, as reported in several African contexts [17].

Sexual Behavior

Sexual Activity and Age at First Intercourse

A high proportion of students (75.4%) reported being sexually active, consistent with findings from Abidjan (85.1%) and Ouagadougou (59.4%) [14,18]. This highlights the increased exposure of university students to risks of unintended pregnancy. The age at first sexual intercourse was above 18 years in the majority of cases (85.9%), which is slightly higher than findings in comparable studies, suggesting delayed sexual initiation in this population.

Pregnancy and Abortion History

The prevalence of pregnancy among students (32.9%) and the proportion of unintended pregnancies (10.3%) remain concerning. The rate of abortion (23.5%), including a significant proportion of clandestine procedures (56%), underscores the persistent issue of unsafe abortion in low-resource settings. These findings are consistent with studies conducted in Côte d'Ivoire and Nigeria, which reported similarly high rates of induced abortion among young women [14,19]. The persistence of unsafe abortion reflects inadequate access to effective contraception and limited sexual education.

Knowledge of the Menstrual Cycle

A high level of awareness of the menstrual cycle was observed (93.7%). However, only half of the participants (50.7%) could correctly identify its phases, and less than half (48.4%) accurately identified the fertile period. Although most students demonstrated basic knowledge, gaps persist in the understanding of reproductive physiology. These deficiencies may contribute to incorrect use of natural contraceptive methods.

Knowledge and Practices of Contraception

All participants were aware of contraception, consistent with

previous studies conducted in Bamako [15,21]. This high level of knowledge is likely related to formal medical education. Despite this, contraceptive use remains suboptimal, particularly for long-acting reversible contraceptives (LARC). Similar findings have been reported in Tanzania and other African settings [22]. The male condom was the most commonly used method (34.3%), likely due to its accessibility and dual protection against pregnancy and sexually transmitted infections. Oral contraceptives were the second most used method (17.3%). These findings align with data from Cameroon and other African university populations. Emergency contraception was widely known (91.7%) but underutilized (8.2%), indicating a gap between knowledge and practice. Additionally, misuse of emergency contraception was observed, with some participants using it as a routine method rather than as a backup option.

Barriers to Contraceptive Use

Barriers to contraceptive use were multifactorial. The main reasons identified were absence of sexual activity (50.9%), unmarried status (25.5%), and religious or cultural factors (19.6%). Fear of side effects was a major deterrent, reported by 32.1% of participants. This finding is consistent with studies conducted in Nigeria, Benin, and Côte d'Ivoire, where fear of adverse effects is a primary barrier to contraceptive uptake [17,23].

Misconceptions regarding infertility and long-term health risks further contribute to reluctance in contraceptive use. The influence of sociocultural and religious norms varies across settings but remains a significant determinant of contraceptive behavior in Mali and other African countries.

Conclusion

This study demonstrates that female medical students have a high level of knowledge regarding the menstrual cycle and contraceptive methods. However, this knowledge does not consistently translate into effective contraceptive use. The low utilization of modern and long-acting contraceptive methods, despite high awareness, highlights the persistence of sociocultural barriers, misconceptions, and fear of side effects. Strengthening reproductive health education, improving access to a wider range of contraceptive methods, and implementing targeted interventions within university settings are essential to bridge the gap between knowledge and practice. The promotion of comprehensive, evidence-based sexual and reproductive health programs in academic institutions remains a priority for reducing unintended pregnancies and unsafe abortions.

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