

FORMATION OF THE MENSTRUAL CYCLE AND MENSTRUAL HYGIENE CULTURE AMONG ADOLESCENT GIRLS

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Abstract

The formation of the menstrual cycle is one of the most important biological events in the reproductive development of adolescent girls. Menarche marks the beginning of reproductive maturity, but the early years after the first menstruation are often characterized by physiological irregularity because the hypothalamic–pituitary–ovarian axis is still maturing. At the same time, menstruation is not only a medical and physiological process; it is also closely connected with hygiene, education, emotional well-being, school attendance, family communication, and social attitudes. International health organizations increasingly emphasize menstrual health as a key component of adolescent health, gender equality, and public health. According to ACOG, the menstrual cycle should be considered an additional “vital sign” in adolescent girls because menstrual patterns can provide important information about general health, endocrine function, nutrition, stress, and possible gynecological disorders.

Recent global data also show that many schools still lack adequate menstrual health facilities. UNICEF and WHO reported in 2024 that only 39% of schools worldwide provide menstrual health education, and only 31% of schools globally have bins for menstrual waste in girls' toilets. These figures demonstrate that menstrual hygiene culture remains an urgent issue in adolescent health education.

This article analyzes the physiological formation of the menstrual cycle among adolescent girls, the medical significance of normal and abnormal menstrual patterns, and the role of menstrual hygiene culture in protecting reproductive health. The study is based on scientific literature, international recommendations, and public health statistics. The findings show that timely education, access to hygienic products, supportive school environments, and early recognition of menstrual disorders are essential for improving adolescent girls' health and quality of life.

Keywords: adolescent girls, menstrual cycle, menarche, menstrual hygiene, reproductive health, puberty, menstrual education, dysmenorrhea, abnormal uterine bleeding.

Introduction

Adolescence is a critical period in the physical, psychological, and reproductive development of girls. During this stage, the body undergoes complex hormonal changes that prepare the reproductive system for future fertility. One of the most visible and significant signs of puberty is the onset of menstruation, also known as menarche. Menarche is not simply the beginning of monthly bleeding; it reflects the gradual activation of the hypothalamic–pituitary–ovarian axis and the development of cyclic hormonal regulation.

The menstrual cycle is regulated mainly by the interaction of the hypothalamus, pituitary gland, ovaries, and endometrium. Gonadotropin-releasing hormone from the hypothalamus stimulates the pituitary gland to produce follicle-stimulating hormone and luteinizing hormone. These hormones regulate follicular development, ovulation, estrogen production, progesterone secretion, and cyclic changes in the uterine lining. In adult women, this process usually becomes relatively regular. However, in adolescent girls, menstrual cycles are often irregular during the first years after menarche because ovulation may not occur consistently.

The American College of Obstetricians and Gynecologists notes that the median age of menarche is approximately 12.43 years, and the mean menstrual cycle interval during the first gynecologic year is about 32.2 days. ACOG also emphasizes that

menstrual patterns in adolescents should be evaluated as a clinical marker of general health. This is important because menstrual disorders may be the first sign of endocrine disease, eating disorders, excessive physical stress, polycystic ovary syndrome, thyroid dysfunction, coagulation disorders, chronic illness, or psychological stress.

Menstrual hygiene culture is another essential component of adolescent reproductive health. It includes knowledge about menstruation, correct use of menstrual products, personal hygiene, safe disposal of used materials, emotional readiness, and the ability to seek medical help when necessary. Unfortunately, in many societies, menstruation is still surrounded by silence, shame, misinformation, and cultural restrictions. This can negatively affect girls' self-esteem, school participation, physical comfort, and long-term reproductive health.

UNICEF describes menstrual hygiene as a field that requires not only access to absorbent materials, but also knowledge, social support, private facilities, water, sanitation, disposal systems, and inclusive health education. Therefore, menstrual health should be understood as a medical, educational, psychological, and social issue at the same time.

The relevance of this topic is especially high because adolescent girls often experience their first menstruation without sufficient preparation. Lack of information may cause fear, embarrassment, poor hygiene practices, delayed medical consultation, and school absenteeism. In some regions, menstrual poverty and inadequate school sanitation further worsen the situation. UNICEF and WHO reported that less than one-third of schools globally have appropriate bins for menstrual waste in girls' toilets, while in least developed countries this figure falls to 17%. These data show that menstrual hygiene culture is not only a personal matter but also an important public health challenge.

The aim of this article is to analyze the formation of the menstrual cycle in adolescent girls and to highlight the importance of menstrual hygiene culture in protecting reproductive health, preventing gynecological problems, and improving girls' quality of life.

Materials and Methods

This article was prepared using a descriptive analytical research approach based on scientific literature, clinical recommendations, and international public health data. The methodological framework included the analysis of medical, gynecological, endocrinological, educational, and public health sources related to adolescent menstruation and menstrual hygiene.

The main sources used in the study included recommendations from the American College of Obstetricians and Gynecologists, WHO and UNICEF data on menstrual health and hygiene in schools, publications on adolescent menstrual physiology, and reports on water, sanitation, and hygiene conditions in educational institutions. Particular attention was paid to clinical indicators of normal menstrual development, warning signs of menstrual disorders, and the role of hygiene education in adolescent health.

The research focused on several key areas. First, the physiological development of the menstrual cycle was analyzed, including the role of the hypothalamic–pituitary–ovarian axis, hormonal regulation, menarche, anovulatory cycles, and maturation of menstrual rhythm. Second, normal and abnormal menstrual patterns in adolescents were reviewed from a clinical perspective. Third, menstrual hygiene culture was examined as a social and medical factor influencing girls' health, school attendance, psychological comfort, and reproductive well-being.

The article also considered global statistical data. For example, UNICEF and WHO's 2024 report on WASH in schools was used to evaluate school-based menstrual health conditions. The report provides internationally comparable estimates of school water, sanitation, hygiene, and menstrual health services up to 2023.

The analysis was conducted through comparison and synthesis of scientific information. The article does not present primary clinical data from a hospital-based patient group; rather, it summarizes existing evidence and provides a scientifically grounded discussion suitable for an academic medical article. This approach allows the

topic to be studied comprehensively, combining physiology, gynecology, adolescent medicine, hygiene education, and public health.

Results

The analysis shows that the formation of the menstrual cycle in adolescent girls is a gradual process rather than an immediate transition to regular reproductive function. After menarche, many menstrual cycles are anovulatory because the endocrine system is still developing. This means that menstrual irregularity during the first one to two years after menarche may be physiological. However, this does not mean that all irregular bleeding should be ignored. Medical evaluation is necessary when menstruation is excessively heavy, very painful, prolonged, absent for several months, or associated with symptoms such as severe weakness, dizziness, anemia, hirsutism, obesity, rapid weight loss, or signs of endocrine disease.

A normal adolescent menstrual cycle differs somewhat from the adult pattern. ACOG states that most adolescent menstrual cycles fall within a broad but clinically recognizable range, and the menstrual cycle can serve as an indicator of normal development or possible pathology. In the first years after menarche, cycle length may vary, but persistent extreme irregularity may indicate underlying health problems.

From a physiological point of view, the first menstrual cycles reflect the maturation of ovarian follicular activity and hormonal feedback mechanisms. Estrogen stimulates endometrial proliferation during the follicular phase, while progesterone stabilizes the endometrium after ovulation. When progesterone levels fall, menstruation occurs. In adolescents, insufficient luteal phase development or lack of ovulation may lead to irregular bleeding patterns.

The study also found that menstrual health is strongly influenced by general health status. Poor nutrition, iron deficiency, chronic stress, intense physical activity, eating disorders, thyroid disease, obesity, insulin resistance, and chronic systemic illness can all disturb the menstrual cycle. For example, excessive weight loss may suppress hypothalamic function and lead to amenorrhea, while obesity and insulin resistance may contribute to anovulation and polycystic ovary syndrome. Therefore, menstrual

cycle assessment provides valuable information about both reproductive and general health.

Another important finding is that menstrual hygiene culture remains insufficient in many educational environments. UNICEF and WHO reported that only 2 out of 5 schools globally, or 39%, provide menstrual health education. This means that a large proportion of girls may enter puberty without structured, science-based information about menstruation. In addition, the availability of menstrual waste disposal facilities remains limited. Only 31% of schools globally have bins for menstrual waste in girls' toilets, and this figure decreases significantly in least developed regions.

These statistics indicate that menstrual hygiene is not only a matter of individual behavior but also depends on school infrastructure, family support, health education, and public policy. A girl may know how to maintain hygiene but still face difficulties if she does not have access to clean toilets, water, privacy, disposal bins, or affordable menstrual products.

The analysis also shows that menstrual problems can influence education and psychosocial well-being. Painful menstruation, heavy bleeding, lack of privacy, fear of leakage, teasing, and shame may cause girls to miss classes or avoid school activities. Menstrual stigma can reduce self-confidence and make girls less likely to discuss health problems with parents, teachers, or doctors. As a result, treatable gynecological conditions may remain undiagnosed for a long time.

Discussion

The formation of the menstrual cycle among adolescent girls should be viewed as a sensitive and clinically meaningful stage of reproductive development. Menstruation is often treated as a private or routine issue, but from a medical perspective it reflects the function of the endocrine, reproductive, hematologic, nutritional, and psychological systems. For this reason, menstrual history should be included in routine adolescent health assessment.

A healthy menstrual cycle depends on the coordinated function of several systems. The hypothalamus must release gonadotropin-releasing hormone rhythmically, the pituitary

gland must produce adequate follicle-stimulating hormone and luteinizing hormone, the ovaries must respond by producing estrogen and progesterone, and the endometrium must undergo cyclic changes. Any disruption in this chain may lead to menstrual disorders.

In adolescent girls, menstrual irregularity is often physiological during early post-menarcheal years. However, clinicians and educators must distinguish normal maturation from warning signs. Very heavy bleeding may suggest coagulation disorders or endocrine dysfunction. Severe dysmenorrhea may be primary, caused by prostaglandin-mediated uterine contractions, but persistent or worsening pain may suggest endometriosis or pelvic pathology. Long absence of menstruation may be associated with pregnancy, hypothalamic suppression, polycystic ovary syndrome, thyroid disorders, hyperprolactinemia, or chronic illness.

Menstrual hygiene culture plays a protective role in this process. A girl who understands her menstrual cycle can recognize abnormal symptoms earlier, maintain better hygiene, reduce anxiety, and seek medical help when needed. In contrast, lack of knowledge may lead to fear, unsafe hygiene practices, and delayed diagnosis. This is why menstrual education should begin before menarche, not after the first menstruation.

Menstrual education should be medically accurate, age-appropriate, and culturally sensitive. It should explain what menstruation is, why it occurs, how long bleeding usually lasts, how to use pads or other menstrual products, how often to change them, how to wash the genital area safely, how to dispose of used materials, and when to consult a healthcare provider. Girls should also be taught that menstruation is a normal biological process, not a source of shame.

The school environment is especially important. Schools should provide clean and private toilets, water, soap, menstrual waste bins, and emergency menstrual products. According to UNICEF, menstrual hygiene programmes should include social support, knowledge and skills, facilities and services, and access to absorbent materials. Without these conditions, menstrual education alone is not enough.

The 2024 UNICEF/WHO data show that global progress is still incomplete. The fact that only 39% of schools worldwide provide menstrual health education demonstrates a major educational gap. Similarly, the lack of menstrual waste disposal bins in most schools means that many girls cannot manage menstruation comfortably and safely during school hours. This can increase stress, embarrassment, absenteeism, and reduced participation in learning.

From a public health perspective, menstrual hygiene culture should be integrated into adolescent health programmes, school medicine, family education, and primary healthcare. Nurses, gynecologists, pediatricians, family doctors, teachers, and parents all have roles in supporting girls during puberty. Medical workers should create a trusting environment where girls feel safe discussing menstrual concerns.

The topic is also important for Uzbekistan and other Central Asian countries, where family values, modesty, and cultural norms may sometimes limit open discussion of reproductive health. In such settings, menstrual education must be delivered carefully, respectfully, and scientifically. Mothers, female teachers, school nurses, and primary healthcare providers can become key figures in forming correct menstrual hygiene culture.

Another important issue is iron deficiency anemia. Heavy menstrual bleeding is one of the common causes of iron loss in adolescent girls. If heavy menstruation is ignored, it may lead to fatigue, reduced concentration, dizziness, poor academic performance, and decreased physical activity. Therefore, menstrual history should include questions about the number of pads used per day, duration of bleeding, presence of clots, fatigue, and symptoms of anemia.

Psychological support is also necessary. Menstruation may cause embarrassment, fear, mood changes, and anxiety, especially if the girl is unprepared. A supportive family and school environment helps normalize menstruation and reduces stigma. Girls should be encouraged to track their cycles using a calendar or digital application, but they should also understand that early cycles may be variable.

Overall, the formation of the menstrual cycle and menstrual hygiene culture are deeply connected. Physiological maturation requires medical observation, while hygiene culture requires education, infrastructure, and social support. When these elements are combined, adolescent girls are better protected from reproductive health problems and are more likely to develop confidence in understanding their own bodies.

Conclusion

The formation of the menstrual cycle is a natural but complex stage in the reproductive development of adolescent girls. Menarche indicates the beginning of reproductive maturation, but the menstrual cycle often remains irregular during the first years because the hypothalamic–pituitary–ovarian axis is still developing. Understanding this physiological process is important for distinguishing normal puberty-related changes from pathological conditions.

The menstrual cycle should be considered an important indicator of adolescent health. Abnormal bleeding, severe pain, prolonged amenorrhea, excessive menstrual blood loss, or symptoms of anemia require timely medical assessment. Early identification of menstrual disorders can help diagnose endocrine, gynecological, hematological, nutritional, and psychological problems.

Menstrual hygiene culture is equally important. It protects girls from discomfort, infection risk, shame, school absenteeism, and delayed medical consultation. Proper menstrual hygiene includes knowledge, access to menstrual products, privacy, clean water, soap, safe disposal, and supportive communication. Global statistics show that many schools still do not provide adequate menstrual health education or disposal facilities, which confirms the need for stronger public health and educational programmes.

For adolescent girls, menstrual education should begin before menarche and should involve families, schools, and healthcare professionals. It should be scientifically accurate, emotionally supportive, and culturally respectful. Girls must be taught that menstruation is a normal physiological process and that menstrual problems should not be hidden or ignored.

In conclusion, improving menstrual health among adolescent girls requires an integrated approach combining gynecological knowledge, hygiene education, school infrastructure, family support, and accessible healthcare. The formation of menstrual hygiene culture is not only a reproductive health issue but also a matter of dignity, education, gender equality, and long-term public health.

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