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Review Article

Nutrition, Menstrual Hygiene, and Menstrual Disorders in Adolescence: Evidence From Urban and Rural India

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A B S T R A C T

Background: Adolescence is a critical developmental phase marked by rapid physical, hormonal, and psychological changes. In India, menstrual hygiene practices, menstrual disorders, and nutritional status among adolescent girls remain major public health concerns, influenced by socio-cultural norms, dietary inadequacies, and disparities in access to health services.

Objective: This review aims to synthesize existing evidence on menstrual hygiene practices, menstrual disorders, and nutritional status among adolescent girls in urban and rural school settings in India.

Methods: A narrative review of literature was conducted using published studies from multiple databases, including PubMed, Scopus, and Google Scholar. Relevant articles focusing on adolescent girls, menstrual health, hygiene practices, and nutritional status in the Indian context were included.

Results: The findings indicate a high prevalence of menstrual disorders such as dysmenorrhea, irregular cycles, and menorrhagia among adolescents, often associated with poor nutritional status and anemia. Inadequate menstrual hygiene practices and limited awareness were more pronounced in rural settings due to infrastructural and socio-cultural barriers, whereas urban adolescents exhibited lifestyle-related nutritional challenges. School absenteeism, reduced quality of life, and increased risk of reproductive health issues were commonly reported outcomes.

Conclusion: The review highlights the need for integrated, school-based interventions combining nutrition education, menstrual hygiene awareness, and improved access to adolescent-friendly health services to address existing gaps and improve health outcomes among adolescent girls.

Keywords: Menstrual disorders, menstrual hygiene , school health program, adolescent well being

Introduction

Adolescence is a crucial developmental phase characterized by rapid physical growth, hormonal changes, and psychological maturation. For adolescent girls, the onset of menstruation marks a significant biological milestone, accompanied by increased nutritional requirements and heightened vulnerability to health challenges. In India, adolescents constitute nearly 21% of the total population, with adolescent girls facing disproportionate risks related to undernutrition, anemia, menstrual disorders, and inadequate menstrual hygiene practices.[11] These challenges are further shaped by socio-economic status, place of residence, cultural norms, and access to health education.

Menstrual health is an integral component of adolescent health and well-being. However, menstruation remains stigmatized in many communities, resulting in poor awareness, unhealthy practices, and delayed care-seeking for menstrual disorders. Studies from India have consistently reported a high prevalence of dysmenorrhea, irregular menstrual cycles, and premenstrual symptoms among school-going girls, often linked to poor dietary intake, anemia, stress, and inadequate hygiene practices.[10] Nutritional status, particularly iron and micronutrient adequacy, plays a pivotal role in regulating menstrual health and preventing long-term gynecological complications.

Urban–rural disparities further influence adolescent health outcomes. While urban schoolgirls may have better physical access to menstrual products and health services, they also face lifestyle-related risks such as poor dietary quality and stress. Rural adolescents, on the other hand, often encounter limited sanitation facilities, restricted nutrition awareness, and socio-cultural barriers that adversely affect menstrual hygiene and nutrition.[2] Understanding these interconnected factors in school settings is essential for designing effective, equitable adolescent health interventions.

Adolescent Period

The adolescent period (10–19 years) is divided into early (10–13 years), middle (14–16 years), and late adolescence (17–19 years), each associated with distinct biological and psychosocial changes.[13] During adolescence, girls experience accelerated growth spurts, sexual maturation, and the establishment of menstrual cycles. Approximately 20–30% of adult height and up to 50% of adult body weight are attained during this phase, necessitating adequate energy, protein, iron, calcium, and micronutrient intake.[8]

Adolescent Menstrual Disorders

Menstrual disorders are common during adolescence due to the immaturity of the hypothalamic–pituitary–ovarian axis and nutritional inadequacies.

- Dysmenorrhea refers to painful menstruation associated with uterine contractions and is one of the most frequently reported menstrual problems among adolescents.
- Menorrhagia is characterized by excessive or prolonged menstrual bleeding, often linked to anemia and hormonal imbalance.
- Oligomenorrhea denotes infrequent menstrual cycles, while amenorrhea refers to the absence of menstruation for an extended period.
- Premenstrual syndrome (PMS) encompasses a range of physical, emotional, and behavioral symptoms occurring before menstruation.
- Hypomenorrhea refers to abnormally light menstrual bleeding, characterized by reduced blood flow and/or a shorter duration of menstruation than normal. It is often associated with hormonal imbalances, low body weight, stress, excessive physical activity, or underlying endocrine disorders. In adolescents, hypomenorrhea may occur due to immaturity of the hypothalamic–pituitary–ovarian axis or nutritional deficiencies.
- Oligomenorrhea is defined as infrequent or irregular menstrual cycles, typically occurring at intervals longer than 35 days, with fewer than 8–9 menstrual cycles in a year. Among adolescent girls, oligomenorrhea is commonly observed during the early years following menarche and may be influenced by hormonal imbalance, undernutrition, stress, polycystic ovarian syndrome (PCOS), or chronic illness.

Evidence suggests that poor nutritional status, low body mass index, micronutrient deficiencies, and stress significantly increase the risk of menstrual disorders among adolescent girls.[3]

Menorrhagia was commonly observed among adolescent girls in the present study, with a higher occurrence noted during middle and late adolescence compared to the early adolescent stage. Puberty menorrhagia, characterized by excessive menstrual bleeding occurring between menarche and late adolescence, is a frequent clinical concern during this developmental period. Such excessive bleeding can significantly impair daily functioning, school attendance, and overall quality of life among adolescent girls.[12]

Menstrual Health in Urban and Rural School Settings

Menstrual health outcomes vary markedly between urban and rural schools. Rural schoolgirls often face challenges such as lack of functional toilets, inadequate water supply, limited access to sanitary products, and persistent menstrual taboos. Urban adolescents, although better resourced, may experience higher stress levels, sedentary behaviors, and unhealthy dietary patterns, influencing menstrual

regularity and pain severity.[5] These contextual differences underscore the need for school-based, location-sensitive health interventions.

Awareness and Practices of Menstrual Hygiene

Menstrual hygiene management (MHM) includes the use of clean absorbents, adequate washing facilities, safe disposal, and correct hygiene practices. Studies in India report that many adolescent girls lack accurate knowledge regarding menstruation prior to menarche and rely on informal sources such as peers or family members for information.[2] Poor menstrual hygiene practices have been associated with reproductive tract infections, school absenteeism, and psychological distress.

Nutritional Status among Adolescents

Nutritional status is a critical determinant of adolescent health and menstrual function. National data indicate a high prevalence of anemia, thinness, and micronutrient deficiencies among adolescent girls in India.[6] Inadequate dietary diversity, meal skipping, and low intake of iron-rich foods are common, particularly among students from government schools and low-income households. Under nutrition during adolescence can impair menstrual regularity and increase susceptibility to future reproductive health problems.

Adolescent Food Habits -Adolescent food habits are influenced by family practices, school environments, peer pressure, and media exposure. Common dietary behaviors include irregular meals, low fruit and vegetable consumption, and increased intake of energy-dense, nutrient-poor foods.[9] Urban adolescents often consume more processed foods, while rural adolescents may have monotonous diets with limited diversity. These patterns directly affect growth, nutritional status, and menstrual health.

Menstrual Hygiene and Nutrition Interlinkages

Adequate nutrition supports hormonal balance, hemoglobin levels, and immune function, all of which are essential for healthy menstruation. Iron deficiency anemia is strongly associated with fatigue, heavy menstrual bleeding, and reduced academic performance.[1] Integrating nutrition education with menstrual hygiene awareness can significantly improve health outcomes among adolescent girls.

School Health Programs

The School Health Programme under Ayushman Bharat, along with Rashtriya Kishor Swasthya Karyakram (RKSK) and Weekly Iron and Folic Acid Supplementation (WIFS), aims to address adolescent nutrition, menstrual health, and lifestyle behaviors through schools.[7] Schools serve as effective platforms for delivering health education, screening, and referrals, particularly for adolescent girls.

Schools serve as a key platform for the delivery and strengthening of public health services in India, given their direct and sustained access to adolescent populations. The study should be focused on the availability of health services in government schools. Local institutions such as schools, Panchayats, and Primary Health Centres play a crucial role in ensuring effective program coverage. Periodic assessment of adolescent health issues and systematic monitoring are essential to optimize utilization of existing health services and improve adolescent health outcomes in India.[12]

Emerging Menstrual Practices Among Adolescents

Recent years have seen increased adoption of menstrual cups, reusable cloth pads, and biodegradable sanitary products, particularly in urban settings. While these practices offer environmental and economic benefits, proper education and cultural acceptability are essential for safe and sustained use.[11]

Future Gynecological Issues Linked to Adolescent Practices

Unaddressed menstrual disorders, chronic under nutrition, and poor hygiene practices during adolescence may predispose women to long-term gynecological issues such as polycystic ovarian syndrome (PCOS), infertility, endometriosis, and recurrent reproductive tract infections. Early identification and preventive interventions during school years are therefore critical.[8]

Adolescent girls represent a nutritionally and biologically vulnerable population, particularly during the onset and establishment of menstruation. Despite improvements in maternal and child health indicators, adolescent menstrual health and nutrition continue to receive comparatively limited attention within public health research and program implementation in India. Menstrual disorders, inadequate menstrual hygiene practices, and poor nutritional status often coexist during adolescence and can adversely affect physical health, psychological well-being, academic performance, and quality of life. These challenges are further compounded by socio-cultural taboos surrounding menstruation, limited nutrition awareness, and disparities in access to health resources.

Urban–rural differences significantly influence adolescent health outcomes. While urban school settings may offer better access to menstrual products and health information, adolescents are increasingly exposed to unhealthy dietary patterns, stress, and sedentary lifestyles. In contrast, rural schoolgirls frequently encounter infrastructural limitations, restricted sanitation facilities, lower dietary diversity, and

reduced access to adolescent-friendly health services. Such contextual variations highlight the importance of examining menstrual health and nutritional status through an urban–rural lens.

Schools serve as a critical platform for reaching adolescent girls with preventive health services, nutrition education, and menstrual hygiene interventions. However, evidence on the effectiveness and coverage of school-based programs remains fragmented. A comprehensive synthesis of existing literature is therefore essential to identify gaps in awareness, practices, and service utilization related to menstrual hygiene and nutrition. Understanding these interconnected factors can inform policy, strengthen school health programs, and guide targeted interventions aimed at improving adolescent health outcomes and preventing long-term gynecological and nutritional complications.

Methods

This review article adopted a narrative approach to synthesize existing literature on menstrual hygiene, menstrual disorders, and nutritional status among adolescent girls in India. A comprehensive search of electronic databases, including PubMed, Scopus, and Google Scholar, was conducted to identify relevant studies published in English.

Search terms included combinations of keywords such as “adolescent girls,” “menstrual hygiene,” “menstrual disorders,” “nutrition,” “anemia,” “urban,” “rural,” and “school health.” Studies focusing on school-going adolescent girls in the Indian context were prioritized.

Inclusion criteria comprised original research articles, review papers, and national reports addressing menstrual health, hygiene practices, and nutritional status. Studies not specific to adolescents or lacking relevance to the Indian setting were excluded.

Relevant data were extracted and thematically analyzed to identify key patterns related to menstrual health outcomes, hygiene practices, nutritional determinants, and urban–rural disparities.

Results

The review of literature revealed several key themes related to menstrual health, hygiene practices, and nutritional status among adolescent girls in India.

A high prevalence of menstrual disorders, including dysmenorrhea, menorrhagia, oligomenorrhea, and premenstrual syndrome, was consistently reported across studies. These conditions were often associated with poor nutritional status, particularly iron deficiency anemia, low dietary diversity, and inadequate micronutrient intake.

Menstrual hygiene practices varied significantly between urban and rural settings. Rural adolescent girls frequently faced challenges such as lack of access to sanitary products, inadequate water and sanitation facilities, and persistent cultural taboos, leading to poor hygiene practices. In contrast, urban adolescents had relatively better access to menstrual products but were more likely to experience lifestyle-related issues such as unhealthy dietary patterns and stress.

Limited awareness regarding menstruation prior to menarche was a common finding, with many girls relying on informal sources of information. Poor menstrual hygiene and inadequate nutrition were linked to adverse outcomes such as reproductive tract infections, school absenteeism, reduced academic performance, and diminished quality of life.

School-based health programs, including iron supplementation and menstrual hygiene initiatives, were identified as important platforms for intervention; however, gaps in implementation, coverage, and monitoring were evident.

Conclusion

Adolescent girls’ menstrual health, hygiene practices, and nutritional status are deeply interconnected and shaped by socio-economic, cultural, and environmental factors. Urban–rural disparities in school settings further influence access to resources and health outcomes. Strengthening school-based health programs, improving nutrition literacy, and normalizing menstrual health education are essential to promote adolescent well-being and prevent long-term gynecological complications. A comprehensive, integrated approach targeting both nutrition and menstrual health is vital for empowering adolescent girls and improving public health outcomes.

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