



**THE RELATIONSHIP BETWEEN MENSTRUAL HYGIENE KNOWLEDGE AND
BEHAVIOR WITH LEUCORRHOEA (FLOUR ALBUS) INCIDENCE AMONG
ADOLESCENT**

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ABSTRACT

Adolescence represents a critical developmental stage characterized by substantial physiological transformations, including the commencement of menstruation, which heightens susceptibility to reproductive health problems such as abnormal leucorrhoea (flour albus). This research sought to investigate the association between knowledge and menstrual personal hygiene practices with the occurrence of leucorrhoea among female adolescents at SMP Muhammadiyah 5 Surakarta. Method: Utilizing a quantitative analytical method with a cross-sectional study design, the research recruited 109 participants through stratified random sampling. Data collection employed validated and reliable questionnaires, and subsequent analysis was conducted using univariate and bivariate statistical techniques, specifically the Chi-Square test. The results demonstrated a significant relationship between knowledge level ($P = 0.002$) and personal hygiene behavior ($P = 0.001$) with the incidence of leucorrhoea. Although most respondents exhibited good knowledge and hygiene practices, some still experienced abnormal leucorrhoea, suggesting the influence of other factors, such as environmental conditions and hygiene implementation.

Keywords: adolescents; hygiene; knowledge; leucorrhoea; menstruation

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INTRODUCTION

Adolescence represents a critical transitional phase from childhood to adulthood, during which significant physiological, psychological, and social changes occur. Adolescents' knowledge is crucial in shaping their health behaviours. Limited knowledge can make them more vulnerable to adopting poor personal hygiene practices, which may lead to reproductive health issues such as pathological leucorrhoea (Kurnia et al., 2023). One of the significant physiological developments in adolescent girls is the onset of menstruation, marking the beginning of reproductive capability. Although menstruation is a normal biological process, it is often accompanied by various menstrual disorders such as lower abdominal pain, irregular cycles, and prolonged or heavy bleeding (Armayanti et al., 2021). Beyond these common complaints, menstruation also exposes adolescents to a higher risk of reproductive health problems, notably excessive or pathological vaginal discharge known as leucorrhoea (flour albus). Inadequate personal hygiene during menstruation significantly increases the risk of infections affecting the reproductive tract, leading to complications if not properly managed (Palupi et al., 2020; Windari et al., 2024).

Leucorrhoea (flour albus) refers to the discharge of non-bloody vaginal fluid and is one of the most frequently reported reproductive health issues among adolescent girls. Based on data from the World Health Organization (WHO), approximately 75% of Indonesian women have experienced leucorrhoea, and 45% reported recurrent episodes. Furthermore, the Indonesian Ministry of Health (Kemenkes) estimates that around 62.5% of adolescent girls have

experienced leucorrhoea, with more than 40% of these cases attributed to inadequate menstrual hygiene practices. Several studies corroborate that between 50% and 80% of adolescent girls experience either physiological (normal) or pathological (abnormal) leucorrhoea, often exacerbated by poor hygiene behaviours during menstruation (Armini & Lestari, 2022). Abnormal leucorrhoea not only indicates possible reproductive tract infections but can also contribute to broader health issues such as urinary tract infections (UTIs), which, if left untreated, may progress to more severe complications like kidney infections (Dewi & Donna, 2023; Sari et al., 2022).

Maintaining optimal personal hygiene during menstruation is thus essential to preventing leucorrhoea and its associated complications. However, based on the Indonesian Demographic and Health Survey (SDKI), adolescent girls' menstrual hygiene behaviour remains suboptimal, with a reported 66.6% demonstrating inadequate practices. Factors contributing to poor hygiene include limited access to menstrual health education, cultural taboos surrounding reproductive health discussions, and insufficient environmental sanitation (Mirghafourvand et al., 2024). In many communities, menstruation remains a sensitive topic, often preventing adolescents from receiving adequate information and support. Educational interventions from families, schools, and communities are therefore vital to creating an environment where adolescent girls can openly access accurate reproductive health information (Kusumaningrum et al., 2024). Additionally, peer influence plays a critical role in shaping adolescents' hygiene behaviours, making peer education an effective strategy for improving menstrual hygiene practices (Arifah et al., 2021; Khanal et al., 2023).

Empirical studies reinforce the link between menstrual hygiene knowledge and the prevention of leucorrhoea. A study conducted by (Diana et al., 2023) at SMP Muhammadiyah 5 Yogyakarta demonstrated that adolescent girls with lower levels of menstrual hygiene knowledge had a significantly higher risk of experiencing abnormal leucorrhoea. Similarly, (Djuwitaningsih et al., 2023) found that insufficient understanding of reproductive hygiene is strongly associated with an increased incidence of infections leading to leucorrhoea. (Pemiliana, 2019) reported that students who practiced good personal hygiene had significantly lower rates of leucorrhoea, with a statistical significance of $p = 0.032$. (Susanti & Lutfiyati, 2020) further affirmed that higher knowledge levels are positively correlated with better menstrual hygiene behaviours, thereby reducing the risk of infection. The selection of SMP Muhammadiyah 5 Surakarta as the research site was based on preliminary survey findings involving 15 students. Interviews indicated that although the majority of students understood the importance of maintaining hygiene during menstruation, a minority (3 to 4 students) demonstrated insufficient knowledge, particularly regarding the prevention of leucorrhoea. While most students reported changing their sanitary pads regularly, only about half paid adequate attention to genital hygiene and the cleanliness of underwear. Moreover, nearly all students admitted to having experienced leucorrhoea, with nine respondents describing symptoms such as itching, irritation, or unpleasant vaginal odours.

Considering the high prevalence of leucorrhoea among adolescents and the crucial role of menstrual hygiene in its prevention, this study was conducted to explore "The Relationship Between Knowledge and Personal Hygiene Behavior During Menstruation and the Incidence of Leucorrhoea (Flour Albus) Among Adolescent Girls" at SMP Muhammadiyah 5 Surakarta. The findings are expected to inform future health education interventions aimed at promoting healthy reproductive behaviours among adolescents.

METHOD

This study employed an analytical quantitative research design with a cross-sectional approach. The study population consisted of all female students at SMP Muhammadiyah 5 Surakarta for the 2024/2025 academic year, totalling 150 students. Ethical approval was obtained from the

Health Research Ethics Committee of Universitas Muhammadiyah Surakarta (Approval No. 997/KEPK-FIK/III/2025). Stratified random sampling based on grade levels was used to determine the sample, resulting in 109 respondents, with the sample size calculated using the Lameshow formula and a 5% margin of error. The sampling was conducted from Class A to Class D. However, the exclusion group in this study was Class B, which consisted entirely of male students and thus did not meet the criteria for female student participants. The school facilitated the data collection process by allowing the researcher to conduct the study during guidance and counseling lesson hours over the course of one week. The research was carried out from February to April 2025. Data were collected using structured questionnaires tested for validity and reliability, with validity confirmed by a correlation coefficient greater than 0.294 and reliability confirmed by Cronbach's alpha values exceeding 0.6. The instrument measuring knowledge comprised 12 validated items, demonstrating a Cronbach's alpha coefficient of 0.712. The questionnaire assessing personal hygiene behavior during menstruation included 14 validated items with a Cronbach's alpha of 0.718. Meanwhile, the instrument evaluating the incidence of leucorrhoea consisted of 8 validated items, achieving a Cronbach's alpha value of 0.658. Data analysis included univariate and bivariate methods. Univariate analysis was used to describe the distribution of each variable. In contrast, bivariate analysis was conducted using the Chi-Square test to examine the relationships between the independent and dependent variables.

RESULT

Table 1.
Frequency Distribution of Respondents Based on Knowledge Level, Personal Hygiene Behavior during Menstruation, and Incidence of Leucorrhoea

Variable	Category	f	%
Knowledge	Good	69	63.3
	Moderate	27	24.8
	Poor	13	11.9
Personal Hygiene Behavior	Good	59	54.1
	Moderate	37	33.9
	Poor	13	11.9
Incidence of Leucorrhoea	Normal	66	60.6
	Abnormal	43	39.4

Based on table 1, the majority of respondents (63.3%) demonstrated a good level of knowledge, while 54.1% exhibited good personal hygiene behavior during menstruation. Regarding the incidence of leucorrhoea, 60.6% experienced normal conditions, whereas 39.4% experienced abnormal leucorrhoea.

Table 2.
Relationship between Knowledge Level and Incidence of Leucorrhoea

Knowledge	Incidence of <i>Flour Albus</i>						<i>P-value</i>
	Normal		Abnormal		Total		
	f	%	f	%	f	%	
Good	39	35.8	30	27.5	69	63.3	0.002
Moderate	23	21.1	4	3.7	27	24.8	
Poor	4	3.7	9	8.3	13	11.9	

Table 3.
Relationship between Personal Hygiene Behavior during Menstruation and Incidence of Leucorrhoea

Personal Hygiene Behavior	Incidence of <i>Flour Albus</i>						<i>P-value</i>
	Normal		Abnormal		Total		
	f	%	f	%	f	%	
Good	45	41.3	14	12.8	59	54.1	0.001
Moderate	16	14.7	21	19.3	37	33.9	
Poor	5	4.6	8	7.3	13	11.9	

Table 2 illustrates that respondents with a good level of knowledge were more likely to experience normal leucorrhoea (35.8%). Conversely, 8.3% of individuals with poor knowledge exhibited abnormal leucorrhoea. The Chi-Square analysis produced a p-value of 0.002, confirming a statistically significant association between knowledge level and the incidence of leucorrhoea. Table 3 indicates that adolescents who maintained good personal hygiene during menstruation were likelier to experience normal leucorrhoea (41.3%). Conversely, those with moderate and poor hygiene behaviors exhibited higher proportions of abnormal leucorrhoea. The association between personal hygiene behavior and the incidence of leucorrhoea was statistically significant ($P = 0.001$).

DISCUSSION

Knowledge

The results of this research demonstrate a significant association between knowledge levels and the occurrence of flour albus (leucorrhoea) among adolescent girls. Participants possessing a good level of knowledge (63.3%) showed a reduced incidence of abnormal flour albus, as evidenced by a statistically significant p-value of 0.002. This result aligns with previous studies suggesting that knowledge positively influences preventive health behaviors during menstruation (Diana et al., 2023; Permatasari & Sulastri, 2021). Adolescents who understand the importance of menstrual hygiene are more likely to adopt appropriate practices, such as regular changing of sanitary pads, cleaning the genital area with clean water, and avoiding the use of irritant products (Windari et al., 2024). These practices are crucial for maintaining the natural vaginal flora and preventing infections that manifest as abnormal flour albus.

Most respondents had sufficient basic knowledge of menstrual hygiene, including pad use and underwear cleanliness. About 80% knew the ideal time to change pads, but 40% lacked understanding of genital cleaning and the risks of scented products. These findings highlight knowledge gaps that require health education, as knowledge plays a key role in shaping hygiene behavior (Astuti et al., 2023; Joshi & Mendhe, 2020). Nevertheless, despite a generally high level of knowledge, some respondents still reported abnormal flour albus. This discrepancy suggests that knowledge alone does not guarantee proper behavior. Environmental factors, such as the availability of sanitation facilities, hormonal changes during adolescence, and cultural taboos around discussing reproductive health, may hinder the application of knowledge (Hanipah & Nirmalasari, 2021). Moreover, social support systems, particularly family and peers, are vital. Adolescents lacking open communication channels with parents or educators may hesitate to seek information or assistance when facing reproductive health issues (Kusumaningrum et al., 2024). Therefore, reproductive health education must be comprehensive, combining cognitive knowledge with behavioral reinforcement and psychosocial support.

(Mallick et al., 2024) emphasized that menstrual health education introduced prior to menarche effectively shapes adolescents' knowledge and hygienic behaviors. This educational approach contributes to the prevention of conditions such as leucorrhoea, particularly by promoting awareness regarding the appropriate frequency of changing sanitary pads and maintaining underwear hygiene. In line with (Khanal et al., 2023), structured health education programs integrated into school curricula can substantially enhance menstrual hygiene knowledge and practices among adolescents. Additionally, community-based interventions that normalize discussions on reproductive health could help bridge the gap between knowledge and behavior. Future initiatives should prioritize strengthening both informational access and practical support systems to ensure that knowledge translates into consistent hygienic practices.

Personal hygiene behavior

This study found that 54.1% of respondents practiced good menstrual hygiene, with 41.3% experiencing normal leucorrhoea. Habits like regular pad changes, proper genital care, and

drying underwear in open air helped prevent abnormal discharge. In contrast, those with moderate or poor hygiene had higher rates of abnormal leucorrhoea (19.3% and 7.3%) due to inconsistent hygiene practices and unhealthy lifestyles. Chi-Square analysis showed a significant association between hygiene behavior and abnormal leucorrhoea ($p = 0.001$), underscoring its role in preventing reproductive tract infections.

These findings corroborate prior studies emphasizing that hygienic practices during menstruation significantly reduce the risk of vaginal infections (Susanti & Lutfiyati, 2020; Zode et al., 2025). Maintaining genital hygiene, including the frequent replacement of sanitary pads, washing with clean water, and wearing breathable cotton underwear, plays a pivotal role in preventing the development of infections such as leucorrhoea (Raisa & Fatmarizka, 2023). Improper menstrual hygiene can create an environment conducive to microbial growth, leading to irritation, discharge, and secondary infections (Belayneh & Mekuriaw, 2019). However, like knowledge, positive hygiene behaviour alone does not eliminate the risk of abnormal flour albus. Factors such as inadequate sanitation infrastructure, inconsistent hygienic practices, and hormonal imbalances can also contribute to abnormal discharge (Palupi et al., 2020). Furthermore, psychological factors like stress and embarrassment related to menstruation may deter girls from maintaining optimal hygiene (Kusumaningrum et al., 2024). Given these findings, it becomes evident that enhancing menstrual hygiene behaviour must go beyond individual education. It requires systemic interventions, such as improving access to school sanitation facilities, providing affordable sanitary products, and fostering a supportive environment where menstrual health is openly discussed and normalized (Arifah et al., 2021).

Educational institutions, especially those with Islamic values like SMP Muhammadiyah 5 Surakarta, can strategically incorporate reproductive health education into their curricula, emphasizing religious and health perspectives on personal hygiene. Family involvement is equally critical, as adolescents often model behaviours observed within the household. In conclusion, multi-sectoral strategies are necessary to effectively reduce the incidence of abnormal flour albus among adolescent girls. These should include strengthening health education, improving environmental sanitation, providing psychosocial support, and encouraging family and community engagement in reproductive health promotion.

CONCLUSION

This study concluded that both knowledge level and personal hygiene behavior during menstruation are significantly associated with the incidence of leucorrhoea (flour albus) among adolescent girls at SMP Muhammadiyah 5 Surakarta ($P = 0.002$ and $P = 0.001$, respectively). Although the majority of respondents demonstrated good knowledge and hygiene practices, a notable proportion still experienced abnormal leucorrhoea, indicating the influence of additional factors such as environmental conditions and the consistency of hygiene implementation. These findings emphasize the need for continuous reproductive health education and the creation of supportive environments both at school and within families.

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