

Original Article

Menstrual Health Literacy and Delay in Care-Seeking Among Adolescents with Heavy Menstrual Bleeding

Saba Naz¹, Madiha Saleem², Maryam Jamal³, Dr Monica Punshi⁴, Aisha⁵, Tanzeela Ahmad⁶, Nadia Farooq⁷

¹ MSN, MPH, MSc Psychology, Riphah College of Nursing, Riphah International University, Islamabad, Pakistan

² MSN, BSN, RM, Lecturer, Dow University of Health Sciences, Karachi, Pakistan

³ FCPS Obstetrics and Gynecology, Federal General Hospital, Islamabad, Pakistan

⁴ Consultant Obstetrician and Gynaecologist and Public Health Expert, C.W.M.O. (BPS-19), Dr Ruth K.M. Pfau Civil Hospital; Consultant Gynaecologist, Altamash General Hospital, Karachi, Pakistan

⁵ Bahria University of Medical and Dental College, Karachi, Pakistan

⁶ Consultant, Department of Obstetrics and Gynaecology, Iqra Medical Complex, Johar Town, Lahore, Pakistan

⁷ Doctor of Pharmacy, University of Central Punjab (UCP), Lahore, Pakistan

*Corresponding author: Nadia Farooq, nadiafarooq594@gmail.com

“Cite this Article” | Received: 13 April 2025; Accepted: 27 November 2025; Published: 30 December 2025.

ABSTRACT

Background: Adolescents may normalize heavy menstrual bleeding or lack sufficient knowledge to recognize symptoms requiring professional assessment, resulting in delayed consultation and continued functional impairment. **Objective:** To assess the association between menstrual health literacy and delayed care-seeking among adolescents with heavy menstrual bleeding and to explore the contextual barriers underlying delay. **Methods:** A sequential explanatory mixed-methods study was conducted among 186 adolescent girls aged 12–19 years recruited from selected schools, outpatient clinics, and community settings in Islamabad. A structured questionnaire assessed menstrual health literacy, bleeding symptoms, school absence, and care-seeking. Delay was defined as consultation more than 30 days after symptom recognition. Associations were examined using chi-square testing and logistic regression, followed by semi-structured interviews and thematic analysis. **Results:** Delayed care-seeking was reported by 112 participants (60.2%). Delay increased from 33.3% in the high-literacy group to 57.4% in the moderate-literacy group and 77.6% in the low-literacy group ($\chi^2=22.52$, $p<0.001$). Compared with high literacy, the adjusted odds of delay were greater with moderate literacy (OR=2.18; $p=0.031$) and low literacy (OR=4.91; $p<0.001$). Prolonged bleeding, clots, school absence, and weakness or fatigue were more frequent among delayed presenters. Interviews identified embarrassment, normalization of bleeding, family advice to wait, school-related concerns, and discomfort with healthcare consultation. **Conclusion:** Lower menstrual health literacy was associated with delayed care-seeking, while family, school, and healthcare barriers further influenced consultation. **Keywords:** Adolescents; care-seeking delay; heavy menstrual bleeding; menstrual health literacy; mixed methods; school health.

EDITORIAL INFORMATION

Author Contributions: Concept: SN, MP; Design: SN, MP, TA, NF; Data Collection: MS, MJ, A, TA; Analysis: SN, MS, MJ; Drafting: SN, MS, MJ, MP, A, TA, NF.

Ethical Approval: Advanced International Hospital, Islamabad, Pakistan

Informed Consent: Written informed consent was obtained from all participants

Conflict of Interest: The authors declare no conflict of interest; **Funding:** No external funding; **Data Availability:** Available from the corresponding author on reasonable request; **Acknowledgments:** N/A.

INTRODUCTION

Menstrual health encompasses the physical, psychological, and social dimensions of menstruation, including access to accurate information, appropriate menstrual products and facilities, dignity, supportive environments, and timely healthcare. It is therefore broader than menstrual hygiene alone and represents an important public-health and human-rights concern, particularly during adolescence, when menstrual knowledge and health-related behaviours are still developing (1,2). Menstrual health literacy refers to an individual's ability to access, understand, evaluate, and apply information concerning menstruation and menstrual disorders. Among adolescents, adequate literacy is essential for distinguishing expected menstrual variations from symptoms that may require clinical assessment and for

developing the confidence to discuss menstrual concerns with family members, teachers, and healthcare professionals (3,4).

Heavy menstrual bleeding is generally defined as menstrual blood loss that adversely affects physical, emotional, social, educational, or daily functioning. In adolescents, it may present as bleeding lasting longer than seven days, frequent saturation of menstrual products, bleeding through clothing or bedding, night-time product changes, passage of large clots, dizziness, fatigue, or other manifestations of excessive blood loss (5-7). Although anovulatory cycles caused by immaturity of the hypothalamic–pituitary–ovarian axis are common during the initial years after menarche, heavy bleeding should not automatically be considered a normal feature of puberty. It may also be associated with inherited or acquired bleeding disorders, endocrine abnormalities, medication-related causes, or other conditions included within the PALM-COEIN classification of abnormal uterine bleeding (5-10).

The clinical and functional consequences of heavy menstrual bleeding may be substantial. Adolescents presenting with heavy menstrual bleeding have a clinically important burden of underlying bleeding disorders, and delayed assessment may prolong undetected disease (11). Persistent blood loss can cause iron deficiency and iron-deficiency anaemia, resulting in fatigue, weakness, dizziness, reduced concentration, and impaired participation in school and daily activities (12). Heavy menstrual bleeding has also been associated with depressive symptoms, social embarrassment, restrictions in physical activity, and reduced health-related quality of life (13,14). Although pictorial blood-loss assessment methods can improve the recognition and documentation of excessive menstrual bleeding, their usefulness depends on adolescents and caregivers understanding which bleeding patterns are abnormal and when professional evaluation is required (15,16).

Despite these consequences, menstrual symptoms are frequently managed without formal healthcare consultation. Adolescents may initially rely on mothers, relatives, peers, teachers, or self-management and may seek clinical care only when symptoms become severe or disrupt daily functioning. Limited symptom recognition, embarrassment, concerns about privacy, fear of examination, financial barriers, and the belief that menstrual pain or excessive bleeding is an unavoidable part of adolescence may discourage timely consultation (17,18). Menstrual health literacy may therefore influence care-seeking by affecting whether adolescents recognize warning signs, communicate their symptoms, evaluate informal advice, and decide to consult a healthcare professional.

These barriers may be particularly relevant in Pakistan, where menstruation is often treated as a private or sensitive subject. Studies conducted in Islamabad, Rawalpindi, Sindh, Quetta, Lahore, and other Pakistani settings have identified persistent gaps in menstrual knowledge, misconceptions about normal menstrual physiology, inadequate school-based education, restricted communication, and discomfort in discussing menstrual concerns (19-23). Mothers are commonly the first source of menstrual information, but limited maternal knowledge may result in abnormal bleeding being normalized or managed through advice to wait. Schools may provide guidance concerning menstrual hygiene while giving less attention to the clinical warning signs of menstrual disorders. Consequently, adolescents may learn how to manage menstrual flow without learning when the amount or duration of bleeding requires medical assessment.

Existing Pakistani research has focused predominantly on menstrual hygiene, awareness, and social practices. The relationship between menstrual health literacy and delayed care-seeking among adolescents experiencing heavy menstrual bleeding, together with the family, school, social, and health-service factors underlying that delay, remains insufficiently characterized. A sequential explanatory mixed-methods approach is appropriate for this problem because quantitative analysis can identify the relationship between literacy level and delayed consultation, while qualitative enquiry can explain the experiences and contextual influences underlying the observed pattern. Therefore, this study aimed to assess the association between menstrual health literacy and delayed care-seeking among adolescents with symptoms of heavy menstrual bleeding in Islamabad and to explore the family, social, school-related, and healthcare barriers influencing their decisions to seek professional care.

MATERIALS AND METHODS

A sequential explanatory mixed-methods study was conducted in Islamabad, Pakistan, among adolescent girls reporting symptoms suggestive of heavy menstrual bleeding. The study comprised two connected phases. The initial quantitative phase used a structured questionnaire to assess menstrual health literacy, menstrual symptoms, functional effects, and care-seeking behaviour. Quantitative findings subsequently informed the selection of participants for a qualitative interview phase designed to explain the social and contextual factors underlying delayed consultation. This design enabled the statistical pattern between literacy and care-seeking to be examined first and then interpreted in relation to participants' family, school, social, and healthcare experiences.

The quantitative phase included 186 adolescent girls recruited through purposive sampling from selected schools, outpatient clinics, and community health settings in Islamabad. Purposive recruitment was used to identify adolescents who fulfilled the study criteria and reported symptoms or functional consequences suggestive of heavy menstrual bleeding. Eligible participants were aged 12-19 years, had attained menarche, and reported at least one relevant indicator, including bleeding lasting longer than seven days, frequent menstrual-product changes, bleeding through clothes or bedding, passage of clots, weakness during menstruation, or school absence attributable to heavy menstrual flow. These indicators were based on clinically recognized features and consequences of heavy menstrual bleeding in adolescents (5,7). Girls who had not attained menarche and those with known pregnancy, severe chronic illness, or unwillingness to participate were excluded. The study evaluated self-reported bleeding symptoms and their effects rather than establishing an etiological diagnosis of abnormal uterine bleeding.

Data were collected using a structured, literature-informed questionnaire covering four domains. The first domain recorded sociodemographic characteristics, including age, educational level, school class, and family background. The second assessed menstrual history and bleeding-related characteristics, including age at menarche, menstrual-cycle duration, number of bleeding days, frequency of menstrual-product use, passage of clots, leakage onto clothing or bedding, weakness, and menstrual-related school absence. These symptom-based indicators were selected in accordance with recognized descriptions of adolescent heavy menstrual bleeding and its functional consequences (5-7,15,16).

The third questionnaire domain assessed menstrual health literacy. Items examined participants' knowledge of normal menstruation, their ability to recognize warning signs of excessive or prolonged bleeding, their awareness of symptoms associated with anaemia, and their understanding of when professional healthcare should be sought. Item responses were combined to generate an overall menstrual health literacy score, on the basis of which participants were classified into low-, moderate-, or high-literacy groups. The fourth domain evaluated care-seeking behaviour by recording when participants first recognized heavy bleeding, when they initially disclosed their symptoms to another person, whom they approached first, and when they first consulted a healthcare provider. The primary quantitative outcome was delayed care-seeking, operationally defined as an interval exceeding 30 days between the participant's recognition of heavy menstrual bleeding and her first consultation with a healthcare professional. Participants consulting within 30 days were classified as having sought care early.

After completion and preliminary analysis of the quantitative phase, participants were purposively selected for the qualitative component from the low-, moderate-, and high-literacy groups. Selection across literacy categories was intended to capture variation in symptom recognition, disclosure, family responses, school experiences, and healthcare-seeking decisions. Semi-structured individual interviews explored how participants interpreted their bleeding symptoms, whom they initially approached, the advice they received from family members, whether heavy bleeding was considered normal, how menstruation affected school participation, and whether they felt comfortable consulting a healthcare professional.

Interviews were conducted in a private and comfortable setting to facilitate confidential discussion of a sensitive health issue. Open-ended questions allowed participants to describe their experiences in their own words, while follow-up questions were used to clarify relevant responses. Each interview lasted

approximately 20-30 minutes. Detailed notes were taken, and important participant statements were documented with permission. The interview guide was applied consistently while retaining sufficient flexibility to explore experiences raised by individual participants.

Permission to undertake data collection was obtained from the relevant institutional and site authorities. The study purpose and procedures were explained to participants in clear and age-appropriate language before participation. Informed consent was obtained from participants able to provide it; for participants younger than 18 years, consent was obtained from a parent or legal guardian together with the adolescent's assent. Participation was voluntary, and participants were informed that they could decline to answer any question or withdraw without penalty. Questionnaires did not contain names or direct personal identifiers. Unique study codes were used to maintain confidentiality during data collection, data entry, analysis, and reporting.

Quantitative data were analysed using IBM SPSS Statistics version 26.0. Categorical variables were summarized as frequencies and percentages, whereas continuous variables, including age and care-seeking delay in days, were summarized using means and standard deviations. The distribution of bleeding symptoms, school absence, weakness or fatigue, and initial disclosure to the mother was compared between participants who sought care early and those who delayed consultation. The association between menstrual health literacy category and delayed care-seeking was initially assessed using the chi-square test. Multivariable logistic regression was subsequently used to estimate adjusted odds ratios for delayed care-seeking across literacy categories, with the high-literacy group treated as the reference category. Statistical significance was assessed at a two-sided p-value of less than 0.05.

Qualitative data were analysed thematically. Interview notes and documented participant statements were reviewed repeatedly to achieve familiarity with the data. Responses expressing similar meanings were coded and grouped into broader categories. Related categories were then organized into themes representing normalization of heavy menstrual bleeding, embarrassment in discussing menstrual symptoms, family influence and advice to wait, school-related barriers, and fear or discomfort associated with medical consultation. Themes were examined across the different menstrual health literacy categories to identify similarities and variations in participants' experiences.

The quantitative and qualitative components were integrated at both the sampling and interpretation stages. Quantitative literacy categories guided the selection of interview participants, while the qualitative findings were compared with the quantitative patterns of delayed care-seeking. This integrated analysis was used to explain how limited recognition of abnormal bleeding, family normalization of symptoms, embarrassment, school-related concerns, and perceived healthcare barriers contributed to delayed consultation among adolescents with different levels of menstrual health literacy.

RESULTS

A total of 186 adolescents with symptoms of heavy menstrual bleeding were included in the quantitative phase. Their mean age was 15.2 ± 1.7 years. Overall, 112 participants (60.2%) sought professional healthcare more than 30 days after recognizing their symptoms and were classified as having delayed care-seeking, whereas 74 (39.8%) sought care within 30 days.

Table 1. Participant Characteristics According to Care-Seeking Status

Characteristic	Early care-seeking, n=74	Delayed care-seeking, n=112	Total, N=186	Effect estimate (95% p-value CI)
Age, years, mean $\pm$ SD	15.4 $\pm$ 1.6	15.1 $\pm$ 1.8	15.2 $\pm$ 1.7	MD -0.30 (-0.80 to 0.20) 0.236
Bleeding >7 days, n (%)	38 (51.4)	82 (73.2)	120 (64.5)	OR 2.59 (1.39–4.81) 0.002
Passing clots, n (%)	29 (39.2)	71 (63.4)	100 (53.8)	OR 2.69 (1.47–4.92) 0.001
School absence during menstruation, n (%)	31 (41.9)	78 (69.6)	109 (58.6)	OR 3.18 (1.72–5.87) <0.001
Weakness or fatigue, n (%)	35 (47.3)	84 (75.0)	119 (64.0)	OR 3.34 (1.79–6.25) <0.001
Discussed symptoms with mother first, n (%)	56 (75.7)	91 (81.3)	147 (79.0)	OR 1.39 (0.68–2.84) 0.361

CI: confidence interval; MD: mean difference; OR: odds ratio; SD: standard deviation. The mean difference was calculated as delayed minus early care-seeking. Odds ratios represent the odds of delayed care-seeking among participants with the specified characteristic compared with those without it. The p-value for age was obtained using an independent-samples Welch t-test; categorical variables were compared using Pearson's chi-square test.

The mean age did not differ significantly between adolescents with early and delayed care-seeking, with a mean difference of -0.30 years (95% CI: -0.80 to 0.20; $p=0.236$). In contrast, bleeding-related symptoms and functional effects were more common among delayed presenters. Adolescents reporting bleeding lasting longer than seven days had 2.59 times greater odds of delayed care-seeking than those without prolonged bleeding (95% CI: 1.39–4.81; $p=0.002$). Passing clots was similarly associated with increased odds of delay (OR=2.69; 95% CI: 1.47–4.92; $p=0.001$).

School absence during menstruation was reported by 69.6% of delayed presenters compared with 41.9% of early presenters and was associated with more than threefold greater odds of delayed consultation (OR=3.18; 95% CI: 1.72–5.87; $p<0.001$). Weakness or fatigue was reported by 75.0% of delayed presenters and 47.3% of early presenters, corresponding to an OR of 3.34 (95% CI: 1.79–6.25; $p<0.001$). Most participants initially discussed their symptoms with their mothers; however, the proportion did not differ significantly between delayed and early presenters (81.3% versus 75.7%; OR=1.39; 95% CI: 0.68–2.84; $p=0.361$).

Table 2. Association Between Menstrual Health Literacy and Delayed Care-Seeking

Menstrual health literacy	Participants, n	Early care-seeking, n (%)	Delayed care-seeking, n (%)	Crude OR (95% CI)	Adjusted OR	p-value
High	42	28 (66.7)	14 (33.3)	Reference	Reference	—
Moderate	68	29 (42.6)	39 (57.4)	2.69 (1.21–6.00)	2.18	0.031
Low	76	17 (22.4)	59 (77.6)	6.94 (3.00–16.05)	4.91	<0.001
Total	186	74 (39.8)	112 (60.2)	—	—	—

CI: confidence interval; OR: odds ratio. High menstrual health literacy was the reference category. Crude ORs and 95% CIs were calculated from the reported cell counts. Adjusted ORs and corresponding p-values were retained from the reported multivariable logistic regression analysis. The overall association between literacy category and delayed care-seeking was significant: Pearson $\chi^2=22.52$, $df=2$, $p<0.001$.

Delayed care-seeking increased progressively as menstrual health literacy decreased. Delay occurred in 14 of 42 adolescents with high literacy (33.3%), 39 of 68 with moderate literacy (57.4%), and 59 of 76 with low literacy (77.6%). The overall association between menstrual health literacy and delayed care-seeking was statistically significant ($\chi^2=22.52$, $df=2$, $p<0.001$).

Compared with adolescents in the high-literacy group, those with moderate literacy had 2.69 times greater crude odds of delayed care-seeking (95% CI: 1.21–6.00). The corresponding adjusted odds ratio was 2.18 ($p=0.031$). Adolescents with low literacy had 6.94 times greater crude odds of delay than those with high literacy (95% CI: 3.00–16.05). The association remained evident in the reported multivariable analysis, in which the low-literacy group had an adjusted OR of 4.91 ($p<0.001$).

Table 3. Qualitative Themes Related to Delayed Care-Seeking

Theme	Reported participant experience
Embarrassment and restricted disclosure	Participants felt shy discussing menstrual bleeding with family members, teachers, or healthcare professionals.
Normalization of heavy menstrual bleeding	Heavy or prolonged bleeding was frequently perceived as a normal feature of adolescence or puberty.
Family influence and advice to wait	Some participants were advised by mothers or other family members to wait for their menstrual cycles to become normal.
School-related concerns	Participants feared menstrual leakage, staining their clothes, requesting leave, or disclosing menstrual difficulties to teachers.
Discomfort with healthcare consultation	Privacy concerns, fear, and discomfort in discussing menstrual symptoms discouraged professional consultation.

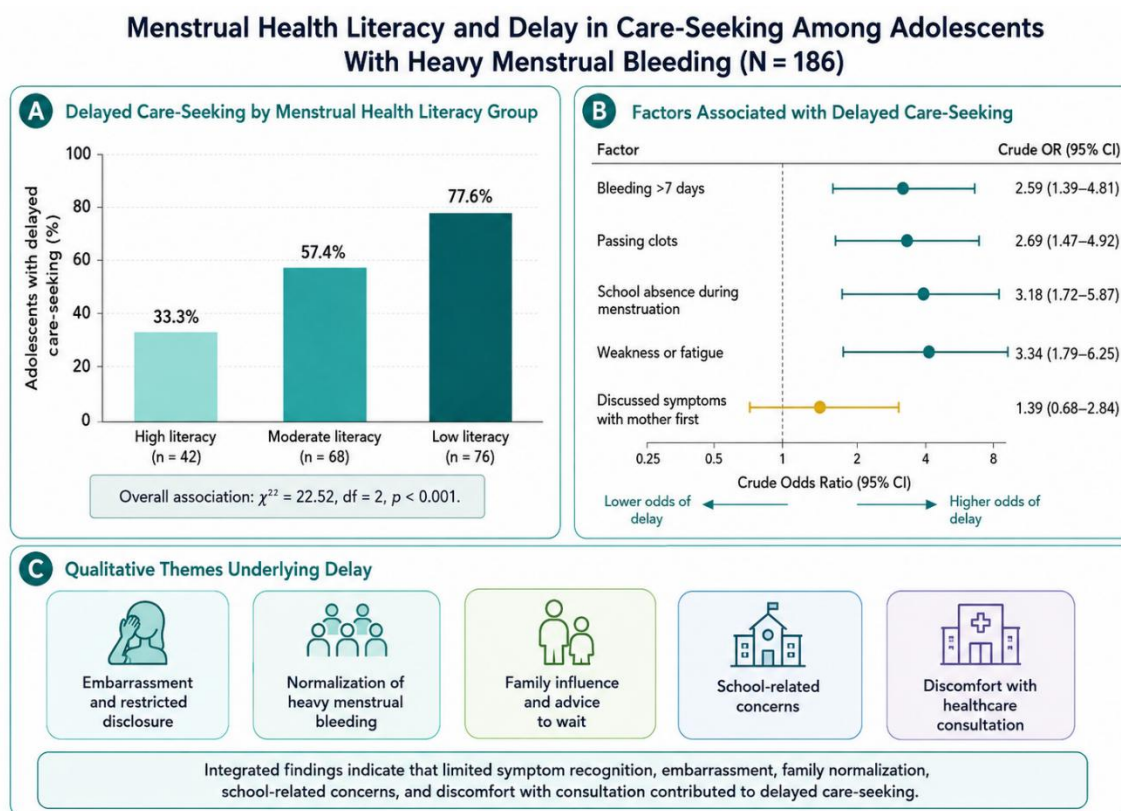
The qualitative phase provided contextual explanations for the quantitative association between literacy and delayed care-seeking. Participants who delayed consultation commonly described embarrassment when discussing menstrual bleeding and uncertainty about whether their symptoms were abnormal.

Heavy or prolonged bleeding, passage of clots, and weakness were sometimes interpreted as expected features of puberty rather than warning signs requiring assessment.

Family responses also influenced care-seeking decisions. Mothers were the most common first point of disclosure, but some participants were advised to wait for their cycles to normalize before consulting a healthcare professional. This finding was consistent with the quantitative observation that initial disclosure to the mother was common in both groups but was not independently associated with earlier consultation.

School-related concerns included fear of staining clothes, difficulty requesting leave, and discomfort discussing menstrual symptoms with teachers. Some adolescents continued managing their symptoms privately despite repeated school absence. Participants also described privacy concerns, embarrassment, and fear associated with visiting a healthcare provider.

Integration of the quantitative and qualitative findings indicated that delayed care-seeking was associated with both limited recognition of clinically important menstrual symptoms and contextual barriers to disclosure and consultation. The increasing prevalence of delay across high-, moderate-, and low-literacy groups was consistent with interview accounts showing that normalization of heavy bleeding, family advice to wait, school-related concerns, and discomfort with healthcare consultation could prevent adolescents from seeking timely professional care.



Panel A shows delayed care-seeking across literacy groups. Panel B shows crude odds ratios with 95% confidence intervals. Panel C summarizes the main qualitative barriers identified during interviews.

Figure 1 The figure shows a clear increase in delayed care-seeking as menstrual health literacy decreases, rising from 33.3% among adolescents with high literacy to 57.4% with moderate literacy and 77.6% with low literacy. Prolonged bleeding, passage of clots, school absence, and weakness or fatigue were significantly associated with greater odds of delay, whereas discussing symptoms with the mother first was not statistically significant. Qualitative findings further identified embarrassment, normalization of heavy bleeding, family advice to wait, school-related concerns, and discomfort with healthcare consultation as key barriers to timely care.

DISCUSSION

This sequential explanatory mixed-methods study identified a clear inverse relationship between menstrual health literacy and timely healthcare consultation among adolescents with symptoms of heavy menstrual bleeding. Nearly three-fifths of participants delayed seeking professional care for more than 30

days, and the proportion delaying consultation increased progressively from the high-literacy group to the moderate- and low-literacy groups. The quantitative association was reinforced by qualitative findings showing that limited recognition of abnormal bleeding, embarrassment, normalization of symptoms, family advice to wait, school-related concerns, and discomfort with healthcare consultation influenced care-seeking decisions.

The graded association across literacy categories supports the view that menstrual health literacy extends beyond factual knowledge. It includes the ability to recognize clinically important symptoms, evaluate information received from informal sources, communicate menstrual concerns, and decide when professional assessment is necessary. Previous literature has similarly shown that inadequate menstrual health literacy may leave adolescents underprepared to interpret menstrual symptoms and more dependent on family beliefs or self-management (3,4). Nevertheless, the observational design does not establish that low literacy independently caused delayed consultation. Menstrual literacy may also reflect broader differences in education, family communication, access to healthcare, socioeconomic circumstances, and previous exposure to menstrual health information.

Normalization of heavy bleeding was particularly important in explaining the observed delay. Irregular or anovulatory cycles are common during the initial years after menarche; however, prolonged bleeding, frequent saturation of menstrual products, passage of clots, and functional impairment should not automatically be attributed to pubertal development. Heavy menstrual bleeding in adolescents may be associated with ovulatory dysfunction, endocrine abnormalities, medication-related causes, and inherited or acquired bleeding disorders (5-10). A multicentre prospective cohort also demonstrated a substantial burden of bleeding disorders among adolescents presenting with heavy menstrual bleeding (11). Failure to distinguish expected menstrual variation from clinically significant blood loss may therefore postpone investigation of treatable underlying conditions.

Delayed presenters in the present study more frequently reported bleeding lasting longer than seven days, passage of clots, weakness or fatigue, and menstrual-related school absence. These findings indicate that delayed consultation occurred alongside a greater symptom and functional burden. Persistent menstrual blood loss may lead to iron deficiency and iron-deficiency anaemia, which can contribute to fatigue, weakness, reduced concentration, and limitations in daily activity (12). Heavy menstrual bleeding has also been associated with depressive symptoms and reduced health-related quality of life among adolescents (13,14). Because the present study did not include laboratory assessment or longitudinal follow-up, the reported weakness and fatigue cannot be attributed specifically to anaemia, and the temporal relationship between symptom severity and delayed care-seeking cannot be established.

School absence showed one of the strongest associations with delayed consultation. This may reflect both the severity of bleeding and the practical difficulty of managing menstruation in educational settings. Fear of leakage, visible staining, limited privacy, discomfort requesting leave, and embarrassment when speaking to teachers may encourage adolescents to remain silent rather than seek support. Menstrual health frameworks emphasize that adequate menstrual health requires not only products and hygiene facilities but also accurate information, dignity, supportive environments, and access to appropriate healthcare (1-3). School-based education should therefore distinguish routine menstrual management from warning signs requiring clinical assessment.

Most participants disclosed their symptoms to their mothers first, but maternal disclosure was not significantly associated with earlier consultation. This finding suggests that disclosure alone may be insufficient; the quality and accuracy of the response received may be more influential than the identity of the person approached. Qualitative accounts indicated that some adolescents were advised to wait for their cycles to normalize. Mothers may provide essential emotional and practical support, but their advice may also reflect their own menstrual knowledge, experiences, and socially transmitted beliefs. Menstrual education strategies should consequently include parents and caregivers rather than focusing exclusively on adolescents.

Embarrassment and discomfort with medical consultation further reinforced delayed care-seeking. Previous mixed-methods evidence has shown that adolescents may perceive menstrual symptoms as normal, feel that their concerns are dismissed, or remain dissatisfied when healthcare communication does not adequately explain symptoms and treatment options (17). Adolescent-friendly services should provide privacy, respectful communication, clear explanations, and opportunities for young patients to discuss menstrual concerns without judgement. Training healthcare professionals to enquire routinely about bleeding duration, menstrual-product saturation, clots, fatigue, school absence, and the effect of menstruation on daily activities may also improve recognition.

The integration of quantitative and qualitative findings was a principal strength of this study. The quantitative phase demonstrated a statistically significant literacy gradient, while the qualitative phase explained how knowledge, family responses, embarrassment, school experiences, and healthcare concerns shaped that gradient. This complementary use of numerical and experiential evidence is consistent with the purpose of a sequential explanatory mixed-methods design (18). Recruitment from schools, outpatient clinics, and community settings also allowed the study to capture experiences across different points of contact.

Several limitations should be considered. Purposive sampling and recruitment from selected settings in one city limit population-level representativeness and generalizability. Heavy menstrual bleeding was identified through self-reported symptoms rather than objective blood-loss assessment, clinical examination, laboratory investigation, or confirmed diagnosis. Menstrual health literacy was categorized using a literature-informed questionnaire, but the reported manuscript does not establish the psychometric properties or external validity of the scoring categories. The definition of delayed care-seeking as more than 30 days was operationally useful but may not reflect the clinical urgency of every bleeding pattern. Recall error and social-desirability bias may have affected reports of symptom onset, disclosure, and consultation. The qualitative component relied primarily on interview notes and documented statements, which may provide less interpretive depth than complete audio recording and verbatim transcription. Furthermore, the number of interview participants, saturation assessment, coding agreement, and covariates included in the adjusted regression model require fuller reporting. These limitations mean that the findings should be interpreted as evidence of association and contextual experience rather than causation.

Despite these limitations, the convergence of the quantitative and qualitative findings has practical implications. Menstrual health programmes should teach adolescents how to recognize prolonged or excessive bleeding, symptoms compatible with anaemia, and functional impairment requiring professional assessment. Parent and teacher education may improve the advice offered after initial disclosure, while confidential and adolescent-responsive healthcare services may reduce embarrassment and fear. Future research should validate menstrual health literacy measures in Pakistani adolescents, use probability-based or multicentre recruitment, incorporate clinical and laboratory assessment, and prospectively evaluate whether literacy-focused interventions shorten care-seeking delays.

CONCLUSION

Lower menstrual health literacy was associated with a progressively greater likelihood of delayed care-seeking among adolescents with symptoms of heavy menstrual bleeding in Islamabad. The delay was accompanied by prolonged bleeding, passage of clots, weakness or fatigue, school absence, and contextual barriers involving embarrassment, normalization of symptoms, family advice, school-related concerns, and discomfort with healthcare consultation. These findings indicate that timely recognition of adolescent heavy menstrual bleeding depends on both menstrual knowledge and supportive pathways for disclosure and professional assessment.

REFERENCES

1. Hennegan J, Winkler IT, Bobel C, Keiser D, Hampton J, Larsson G, et al. Menstrual health: a definition for policy, practice, and research. *Sex Reprod Health Matters*. 2021;29(1):1911618. doi:10.1080/26410397.2021.1911618.
2. Babbar K, Martin J, Ruiz J, Parray AA, Sommer M. Menstrual health is a public health and human rights issue. *Lancet Public Health*. 2022;7(1):e10-e11. doi:10.1016/S2468-2667(21)00212-7.
3. Holmes K, Curry C, Sherry, Ferfolja T, Parry K, Smith C, et al. Adolescent menstrual health literacy in low-, middle- and high-income countries: a narrative review. *Int J Environ Res Public Health*. 2021;18(5):2260. doi:10.3390/ijerph18052260.
4. Gallivan S, Kelleher S, Foley S. Measuring menstrual health literacy: development and validation of the Menstrual Health Literacy Scale. *J Health Psychol*. 2026 Mar 23:13591053261423318. doi:10.1177/13591053261423318.
5. American College of Obstetricians and Gynecologists. Screening and management of bleeding disorders in adolescents with heavy menstrual bleeding: ACOG Committee Opinion No. 785. *Obstet Gynecol*. 2019;134(3):e71-e83. doi:10.1097/AOG.0000000000003411.
6. Munro MG, Critchley HOD, Broder MS, Fraser IS; FIGO Working Group on Menstrual Disorders. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. *Int J Gynaecol Obstet*. 2011;113(1):3-13. doi:10.1016/j.ijgo.2010.11.011.
7. Borzutzky C, Jaffray J. Diagnosis and management of heavy menstrual bleeding and bleeding disorders in adolescents. *JAMA Pediatr*. 2020;174(2):186-194. doi:10.1001/jamapediatrics.2019.5040.
8. Hall EM, Ravelo AE, Aronoff SC, Del Vecchio MT. Systematic review and meta-analysis of the aetiology of heavy menstrual bleeding in 2,770 adolescent females. *BMC Womens Health*. 2024;24(1):136. doi:10.1186/s12905-024-02921-7.
9. Luiro K, Holopainen E. Heavy menstrual bleeding in adolescents: normal or a sign of an underlying disease? *Semin Reprod Med*. 2022;40(1-2):23-31. doi:10.1055/s-0041-1739309.
10. Davila J, Alderman EM. Heavy menstrual bleeding in adolescent girls. *Pediatr Ann*. 2020;49(4):e163-e169. doi:10.3928/19382359-20200321-01.
11. Zia A, Jain S, Kouides P, Zhang S, Gao A, Salas N, et al. Bleeding disorders in adolescents with heavy menstrual bleeding in a multicentre prospective US cohort. *Haematologica*. 2020;105(7):1969-1976. doi:10.3324/haematol.2019.225656.
12. Cooke AG, McCavit TL, Buchanan GR, Powers JM. Iron deficiency anaemia in adolescents who present with heavy menstrual bleeding. *J Pediatr Adolesc Gynecol*. 2017;30(2):247-250. doi:10.1016/j.jpog.2016.10.010.
13. Weyand AC, Fitzgerald KD, McGrath M, Gupta V. Depression in adolescent females with heavy menstrual bleeding. *J Pediatr*. 2022;240:171-176. doi:10.1016/j.jpeds.2021.09.007.
14. Pike M, Chopek A, Young NL, Usuba K, Belletrutti MJ, McLaughlin R, et al. Quality of life in adolescents with heavy menstrual bleeding: validation of the Adolescent Menstrual Bleeding Questionnaire. *Res Pract Thromb Haemost*. 2021;5(7):e12615. doi:10.1002/rth2.12615.
15. Magnay JL, O'Brien S, Gerlinger C, Seitz C. Pictorial methods to assess heavy menstrual bleeding in research and clinical practice: a systematic literature review. *BMC Womens Health*. 2020;20:24. doi:10.1186/s12905-020-0887-y.
16. Ko JKY, Lao TT, Cheung VYT. Pictorial Blood Loss Assessment Chart for evaluating heavy menstrual bleeding in Asian women. *Hong Kong Med J*. 2021;27(6):399-404. doi:10.12809/hkmj208743.

17. Wall KM, Erlandson MC, Gagnon MM. Seeking help for menstrual pain during adolescence: a mixed-methods retrospective survey of treatment experiences and preferences. *Womens Health (Lond)*. 2025;21:17455057251315972. doi:10.1177/17455057251315972.
18. Creswell JW, Plano Clark VL. *Designing and Conducting Mixed Methods Research*. 3rd ed. Thousand Oaks (CA): SAGE Publications; 2018.