



DETERMINANTS OF SANITATION AND MENSTRUAL HYGIENE ADHERENCE AMONG FEMALE STUDENTS IN COASTAL NORTH SUMATERA INDONESIA

Evi Naria¹✉, Indra Chahaya¹, Rusmalawaty¹, Novita Olivia Sinurat¹, Raihana Atika¹, Ardin Hermansyah Siagian¹

^{1,2}Public Health, Faculty of Public Health, Universitas Sumatera Utara, Sumatera Utara, Indonesia

Abstrak

Kebersihan menstruasi pada wanita di wilayah pesisir yang tidak memenuhi standar kesehatan dapat meningkatkan risiko infeksi saluran reproduksi, seperti keputihan, kandidiasis, infeksi jamur, dan kanker serviks. Keterbatasan fasilitas sanitasi, kurangnya informasi, dan kebiasaan higiene yang buruk turut memengaruhi praktik kebersihan menstruasi. Penelitian ini bertujuan menganalisis faktor predisposisi, penguat, dan pemungkin yang berhubungan dengan praktik kebersihan menstruasi pada siswi di daerah pesisir. Metode: Penelitian observasional dengan desain cross-sectional dilakukan di Kota Medan dan Kabupaten Batubara pada 300 siswi SMP yang sudah mengalami menstruasi. Variabel meliputi usia menarche, sumber informasi, dan pengetahuan (predisposisi); dukungan keluarga dan larangan menstruasi (penguat); serta ketersediaan air bersih, sabun, dan tempat sampah (pemungkin). Analisis menggunakan tabel silang dan uji Chi-square. Hasil dan Pembahasan: Sebanyak 56% mengalami menarche setelah usia 12 tahun, 94,3% memperoleh informasi dari keluarga, dan 52% memiliki pengetahuan baik; seluruhnya berhubungan signifikan dengan praktik kebersihan menstruasi ($p = 0,005$). Dukungan keluarga juga menunjukkan hubungan signifikan ($p = 0,014$). Meskipun ketersediaan air bersih (93,7%), sabun (81,7%), dan tempat sampah (81,7%) cukup tinggi, praktik kebersihan menstruasi yang buruk tetap ditemukan pada 86,7% siswi. Kesimpulan: Pengetahuan sebagai faktor predisposisi dan dukungan keluarga sebagai faktor penguat perlu diperkuat untuk meningkatkan praktik kebersihan dan sanitasi menstruasi.

Kata Kunci: Wilayah pesisir, Kebersihan Menstruasi, Sanitasi

Abstract

Service quality is a key determinant of patient satisfaction and loyalty. While extensive evidence exists in hospital settings, findings in primary care remain fragmented, particularly in contexts undergoing health financing reforms. This review aims to synthesize empirical evidence on the relationships between SERVQUAL dimensions, patient satisfaction, and patient loyalty in primary care settings.

Methods: A narrative review was conducted on 34 primary empirical studies published between 2020 and 2025. Studies examining SERVQUAL dimensions—tangibles, reliability, responsiveness, assurance, and empathy—in relation to satisfaction and loyalty were included. Data were extracted and synthesized narratively, supported by an evidence frequency mapping. Responsiveness, empathy, and tangibles consistently demonstrated strong associations with patient satisfaction. Satisfaction frequently mediated the relationship between service quality and loyalty, whereas direct effects of service quality on loyalty were inconsistent. Reliability and assurance showed variable effects across contexts. Most studies employed cross-sectional designs and SEM-PLS analytical approaches. Evidence supports a service quality–satisfaction–loyalty pathway in primary care. Contextual and financial factors, such as institutional financing models, may moderate these relationships and warrant further investigation using longitudinal and context-sensitive designs.

Keywords: *patient satisfaction; patient loyalty; primary care; service quality; SERVQUAL.*

INTRODUCTION

Menstrual health and hygiene are crucial aspects in women welfare, including for women who live in coastal areas. Menstruation is a natural biological process that marks the beginning of puberty in female body when bleeding occurs due to the shedding of the uterine lining (endometrium) which typically happens in monthly cycle (Rozy et al., 2022). The typical menstrual cycle is 28 days with a normal range from 21 to 35 days and menstrual period can last for 3 to 7 days (Thiyagarajan et al., 2024). Around 55% of women in Indonesia have poor personal hygiene behavior during menstruation. This potentially increase the risk of reproductive tract infections such as vaginal discharge, candidiasis, fungal infection, and cervical cancer (Rozy et al., 2022). However, women who live in coastal areas often face challenges in maintaining menstrual hygiene due to limited access to clean water, inadequate sanitation facilities, and lack of knowledge about menstrual hygiene (Awalia et al., 2023).

A study by the World Health Organization (2022) shows that low awareness of menstrual hygiene can increase the risks of reproductive tract infections. In some cases, social stigma around menstruation also inhibits women, especially adolescent girls, from accessing the health information and service they need. Various studies show that environmental and social factors significantly impact on the menstrual hygiene behavior. According to research conducted by UNICEF (2021), around 60% of adolescent girls in coastal areas face challenges in accessing adequate sanitation facilities. According to Prabhakar et al., (2025), poor hygiene was practiced by 55% of respondents of women who live in coastal area, especially those with low education level. Furthermore, based on

doctors' diagnosis, urinary tract infections occurred to 46% of respondents.

According to Sabaruddin, Sri Kubilawati (2021), the ability of adolescents to manage themselves in sanitation and hygiene during menstruation has not fulfilled the health standards. Most respondents (83%) applied poor personal hygiene during menstruation. There is a significant relationship between knowledge ($p = 0.040$), attitude ($p = 0.023$), and culture ($p = 0.019$) with personal hygiene behavior of students. Furthermore, research by Bazakare et al., (2024), the level of knowledge significantly relates to menstrual hygiene (OR: 0.132; 95% CI: [0.028–0.622]; p value: 0.010).

Various factors influencing the menstrual hygiene behavior and practice have been identified, including predisposing, reinforcing, and enabling factors (Andani, 2021). Predisposing factors include aspects of individual knowledge, attitude, and behavior towards menstrual hygiene practice. Lack of knowledge of hygiene practice can lead to unhealthy habits during menstruation (Qolbah et al., 2024). Knowledge of menstrual hygiene includes the knowledge about how often the menstrual pads should be changed and proper hand washing before and after changing the pads. Reinforcing factors involve support from family, peers, and educators in developing healthy behavior. According to Safira & Devy (2023), social support from parents and teachers is vital in developing a better understanding of the importance of menstrual hygiene. Other reinforcing factors include restrictions and myths in several cultures or areas during menstruation. According to Rahmawati & Andalas (2022), one of the myths developed in society is that female are prohibited to wash hair during the menstruation.

Enabling factors are also important factors in menstrual hygiene, including the

access to sanitation and clean water, privacy, culture, and economy (Pednekar et al., 2022). Lack of access to proper sanitation facilities, sufficient toilets, and menstrual waste disposal can increase health risk (Al-Mamun et al., 2025). Besides increasing the risk of health problems, poor menstrual hygiene practice also negatively impacts on women's mental well-being and female students' academic achievement (Ahmed et al., 2021). The students are reluctant to go to school due to discomfort and lack of access to menstrual hygiene products within school. The major challenges to improve understanding and implementation of good hygiene practice are lack of education and discussion chance about menstruation health.

The implementation of menstrual hygiene has significant impact on the reproductive health of adolescent girls, and even poses health risks to women living in coastal areas. This study aimed to analyze the relation of predisposing, reinforcing, and enabling factors towards the implementation of menstrual hygiene practice. The results of this study are expected to provide effective recommendations and strategies in improving menstrual hygiene awareness and adequate facilities to create a healthier and friendlier environment for students during menstruation. In addition, the result can be used as a basis for creating more inclusive policies related to menstrual hygiene management in coastal areas so that adolescent girls can undergo menstruation safely, comfortably, and healthily.

METHOD

This study was an observational study with a cross-sectional design aimed at determining the relationship of predisposing, reinforcing, and enabling factors towards the menstrual hygiene practice of female students in coastal areas. The study was located in two coastal areas

in North Sumatera namely Medan City and Batubara Regency where sanitation in those two areas have not fulfilled the health standards. The research subjects were determined purposively, specifically the female students of Junior High Schools (SMP) who had experienced menstruation. The number of respondents was 300 female students from schools in the coastal areas. The name of the schools are as follows.

1. SMP N 26 Belawan, 75 female students
2. SMP N 39 Labuhan Deli, 75 female students
3. SMP N 3 Medang Deras, 75 female students
4. SMP N 2 Sei Suka, 75 female students.

The primary data in this study were obtained by direct interviews with the female students. The predisposing variables in this study were female students' characteristics, the source of information about menstruation, knowledge about personal hygiene, and attitudes during menstruation. The reinforcing variables in this study were restrictions during menstruation and social support. The enabling variables in this study were the availability of clean water, hand soap, and dustbin. The data were analyzed using the Chi-square test at 95% CI to analyze the relationship between predisposing, reinforcing, and enabling factors with menstrual hygiene practice.

RESULT AND DISCUSSION

1. Predisposing Factors

Predisposing factors consist of student characteristics, the source of information, knowledge, and attitudes. Student characteristics include the grade level, student age, and the age of menarche. The data are shown in the following table.

Table 1 Students Characteristics

No	Characteristics	Frequency	Percentage
1	Grade level		
	Grade 7	19	6,3
	Grade 8	126	42,0
	Grade 9	155	51,7
2	Age (years)		
	12	24	7,9
	13	119	39,1
	14	141	46,4
	15	16	5,3
3	Age of Menarche		
	<12 years	130	42,7
	≥ 12 years	170	57,3

According to table 1, most respondents were female, with 30 female respondents (58.8%) compared to 21 male respondents (41.2%). As many as ten respondents in the age group 17-25 years (19.6%), as many as eight respondents in the age group 26-35 years (15.7%), as many as 13 respondents in the age group 36-45 years (25.5%), as many as 15 respondents in the age group 46-55 years (29.4%), as many as four respondents in the age group 56-65 years (7.8%), The table above shows that grade 9 students had experienced menstruation the most. The age of menarche mostly attained at the age of 12 years or older with percentage 57.3%. About 94.3% of respondents get information about menstruation from their families,

specifically mothers and sisters. There is only 5.7% students getting information about menstruation from other sources such as teachers, friends, and health workers, and social media.

Table 2 Sources of Information about Menstruation

Information Source	Frequency	Percentage
Family	283	94.3
Other Sources	17	5.7

The availability of information sources improves the students' knowledge about menstrual hygiene as can be seen in the following table:

Table 3 Students' Knowledge about Menstrual Hygiene

No	Attitudes	Agree	%	Disagree	%
1	Wash your hands before touching your genitals during menstruation	290	96,7	10	3,3
2	Change the menstrual pads every 4 hours or more for heavy menstruation	251	83,7	49	16,3
	Keep the hair clean by washing your hair during menstruation	207	69	93	31
4	Wear the underwear made of sweat-absorbent material	268	89,3	32	10,7
5	Before disposing pads to the dustbin, it should be washed and wrapped to prevent the spread of diseases.	293	97,7	7	2,3

No	Attitudes	Agree	%	Disagree	%
6	Do not use shared towel to dry your genital area	255	85	45	15
7	Dispose the pads into the covered dustbin	291	97	9	3
8	Wash the genital are from front (vagina) to back (anus)	130	43,3	170	56,7
9	Accessible clean water and adequate toilets facilitate the personal hygiene practice during menstruation	275	91,7	25	8,3
10	Choose the right menstrual pads with soft and flexible materials	278	92,7	22	7,3
11	After cleaning the genitals area, wash your hands with clean water and soap	255	85	45	15
12	Change the menstrual pads regularly to prevent bacterial growth and diseases in reproductive organs.	281	93,7	19	6,3

Knowledge about menstrual hygiene known by students covers the use of menstrual pads made of soft and absorbent materials (84.7%), neglecting personal hygiene during menstruation can cause infection of the reproductive organs (84%). Few students knew that genitals should be cleaned using clean water and soap is not necessary (33%) and if the menstrual pads are not changed regularly during menstruation, bacteria and fungi can easily grow (46%). The category of the students' knowledge can be seen in the following table.

Table 4 Category of Students' Knowledge

Category	Frequency	Percentage
Poor	156	52
Good	144	48

Based on the knowledge category, the number of students with poor knowledge of menstrual hygiene is 52%, higher than students with good knowledge about menstrual hygiene. Furthermore, the students' attitude towards the menstrual hygiene are as follows.

Table 5 Students' Attitude towards Menstrual Hygiene

No	Attitudes	Agree	%	Disagree	%
1	Wash your hands before touching your genitals during menstruation	290	96,7	10	3,3
2	Change the menstrual pads every 4 hours or more for heavy menstruation	251	83,7	49	16,3
3	Keep the hair clean by washing your hair during menstruation	207	69	93	31
4	Wear the underwear made of sweat-absorbent material	268	89,3	32	10,7
5	Before disposing pads to the dustbin, it should be washed and wrapped	293	97,7	7	2,3
6	Do not use shared towel to dry your genital area	255	85	45	15
7	Dispose the pads into the covered dustbin	291	97	9	3
8	Wash the genital are from vagina to anus	130	43,3	170	56,7
9	Accessible clean water and adequate toilets facilitate the personal hygiene practice during menstruation	275	91,7	25	8,3

No	Attitudes	Agree	%	Disagree	%
10	Choose the right menstrual pads with soft and flexible materials	278	92,7	22	7,3
11	After cleaning the genitals area, wash your hands with clean water and soap	255	85	45	15
12	Change the menstrual pads regularly to prevent bacterial growth and diseases in reproductive organs.	281	93,7	19	6,3

The data of the students' attitude towards menstrual hygiene shows that more than 90% of students agreed about washing hands before touching the genital area during menstruation and washing and wrapping pads before disposing them in the dustbin. They also agreed that the accessible clean water and adequate toilets can facilitate the implementation of personal hygiene during menstruation, choosing the right menstrual pads with soft and flexible materials, and changing pads regularly during menstruation to prevent the bacteria growth and diseases in the genital area.

Table 6 Categories of Students' Attitudes in the Implementation of Menstrual Hygiene

Attitude Categories	Frequency	Percentage
Good	291	97
Poor	9	3

The finding shows that 97% of students had good attitude towards menstrual hygiene. These findings were obtained based on agree or disagree questions given to the students.

2. Reinforcing Factors

Reinforcing factors contribute to the menstrual hygiene practice. Reinforcing factors in this study include restriction during menstruation and family support for

students during menstruation, as shown in the following table.

Table 7 Distribution of Family Support and Restriction during Menstruation

Reinforcing Factors	Frequency	Percentage
Getting restriction during menstruation		
Yes	246	82
No	54	18
Getting Family Support during menstruation		
Yes	253	84.5
No	47	15.5

The table above shows that 82% of students received several restrictions related to food and beverage consumption, sanitation hygiene, worship, and nature. In addition to receiving restrictions, 84.5% of students also received attention and support from their families during menstruation. The support provided by family are in the form of providing sanitation facilities, discussion or talking openly about menstruation, and providing menstrual supplies. Based on the data, the number of families who provided support to students during menstruation is higher than the number of families who did not provide support to the students during menstruation.

3. Enabling Factors

Enabling factors are needed to support the menstrual hygiene practice. Good menstrual hygiene practice can be

implemented by employing the accessible and adequate sanitation facilities. The sanitation facilities consist of clean water, soap, and dustbin.

Table 8 Availability of Sanitation Facilities in Schools

Sanitation Facilities	Frequency	Percentage
Access to clean water		
Insufficiently available	68	22,7
Sufficiently available	232	77,3
Available soap		
No	224	74,7
Yes	76	25,3
Available Dustbin		
No	47	15.7
Yes	253	84.3

The data shows that 77.3% of students had access to sufficient clean water to implement menstrual hygiene. Students used clean water at school for washing their genital area, cleaning the pads, flushing, and washing their hands. Besides clean water, soap is also needed for washing hands after cleaning their genital area. However, 74.7% of students stated that soap was not available in school toilets. Available of soap in school toilets was stated by 25.3% of students. The available soap was shared by all female students at the school. Furthermore, the students also need dustbin to support good menstrual hygiene practice. Most schools provided dustbin to collect waste of menstrual hygiene activities. Data shows that 84.3% of students confirmed that dustbin are available in school toilets and could be used to dispose the menstrual pads.

4. The Implementation of Menstrual Hygiene

The implementation of menstrual hygiene includes cleaning the genitals with clean water, changing underwear and pads regularly, washing hands before and after cleaning the genital area, washing the genital area from front to back, wearing underwear made of sweat-absorbent material, wrapping pads in paper or plastic before disposing them in the dustbin, changing menstrual pads every 4 hours or more for heavy menstruation, and bathing twice a day. The implementation of sanitation and menstrual hygiene of students can be seen in the following table.

Table 9 Category of the Implementation Menstrual Hygiene Practice istribution of Family Support and Restriction during Menstruation

Sanitation Facilities	Frequency	Percentage
Access to clean water		
Insufficiently available	68	22,7
Sufficiently available	232	77,3
Available soap		
No	224	74,7
Yes	76	25,3
Available Dustbin		
No	47	15.7
Yes	253	84.3

The table shows that 86.7% of students applied poor menstrual hygiene and only 13.3% of students applied good personal hygiene. The data indicates that most students in coastal area applied poor menstrual hygiene.

5. Relationship between Predisposing, Reinforcing, and Enabling Factors with the Implementation Menstrual Hygiene Practice

The analysis of the relationship between predisposing, reinforcing, and enabling factors with the menstrual hygiene practice of junior high school students in the coastal

areas in North Sumatera using the Chi-square Test at 95% CI can be seen in the following table.

Table 10 Analysis of Predisposing Factors on Menstrual Hygiene Implementation

Predisposing Factors	Implementation				Frequency	%	P value
	Good	%	Poor	%			
The age of menarche							
<12 years	17	13.07	113	86.92	130	100	0.909
≥ 12 years	23	13.52	147	86.47	170	100	
Total	40		260		300		
Information Source							
Family	38	13.42	245	86.57	283	100	0.759
Other	2	11.76	15	88.23	17	100	
Total	40		260		300		
Knowledge level							
Good	11	7.63	133	92.36	144	100	0.005
Poor	29	18.58	127	81.41	156	100	
Total	40		260		300		
Attitude Category							
Good	0	0	9	100	9	100	0.613
Poor	40	13.74	251	86.25	291	100	
Total	40		260		300		

Table 11 Analysis of Reinforcing Factors on Menstrual Hygiene Implementation

Reinforcing Factors	Implementation				Frequency	%	P value
	Good	%	Poor	%			
Receiving restriction during menstruation							
Yes	31	12.60	215	87.39	246	100	0.426
No	9	16.66	45	83.33	54	100	
Total	40		260		300		
Receiving family support							
Yes	1	2.1	46	97.9	47	100	0.014
No	39	15.4	214	84.6	253	100	
Total	40	13.3	260	86.7	300		

Reinforcing factors that are significantly related to the menstrual hygiene practice is family support (p=0.014). Another factors, restrictions during menstruation, was not

significantly related to the menstrual hygiene practice (p=0.426). Furthermore, family support and attention was shown by providing sanitation facilities, discussing

openly about menstruation, and providing menstrual supplies.

Table 12 Analysis of Enabling Factors on Menstrual Hygiene Implementation

Enabling Factors	Implementation				Frequency	%	P Value
	Good	%	Poor	%			
Access to clean water							
Insufficiently available	7	10.29	61	89.70	68	100	0.402
Sufficiently available	33	14.22	199	85.77	232	100	
Total	40		260		300		
Availability of Soap							
Yes	30	13.39	194	86.60	224	100	0.958
No	10	13.15	66	86.84	76	100	
Total	40		260		300		
Availability of dustbin							
Yes	6	12.76	41	87.23	47	100	0.901
No	34	13.43	219	86.56	253	100	
Total	40		260		300		

The enabling factors in menstrual hygiene practice of students, availability of clean water ($p=0.402$), the availability of soap (0.958), and the availability of dustbins ($p=0.901$), did not significantly relate to the implementation of menstrual hygiene.

The number of students who did not implement good menstrual hygiene are higher than students who implement good menstrual hygiene. The predisposing factors related to the menstrual hygiene practice is students' knowledge of sanitation and menstrual hygiene ($p = 0.005$). Students who had poor knowledge of menstrual hygiene implemented poor menstrual hygiene (92.36%).

Good knowledge is essential for the implementation of good menstrual hygiene to make students confident in implementing good menstrual hygiene and make them more comfortable and healthy during menstruation. This is supported by Ruspita et al., (2022), found a significant relationship between knowledge and menstrual hygiene behavior among adolescent girls in Pelalawan, with a p-

value of 0.009 ($p \leq 0.05$). Similarly, Widarini et al., (2023) reported that 71.59% of adolescent girls with good knowledge also demonstrated good personal hygiene practices during menstruation. This findings are relevant to Andani (2021), which also found that there was a relationship between students' knowledge and personal hygiene behavior during menstruation.

Students' knowledge about menstrual hygiene is generally obtained from their families, especially from mothers. However, there are still many students who have poor knowledge of menstrual hygiene which indicates that families also have poor knowledge about menstrual hygiene or perhaps because menstruation is taboo topic to talk about in the families. Ishimwe Bazakare (Bazakare et al., 2024), analyzed multivariable related to menstrual hygiene practices and found the related factors were maternal education ($p = 0.005$) and level of knowledge about menstrual hygiene ($p = 0.010$).

Furthermore, students need to get more information from other sources to improve their knowledge. Students experience menstruation at the age of 12 to 15 years, while a woman's menstrual period can reach the age of 50 years. Therefore, knowledge about menstrual hygiene is crucial to be improved.

The students' age, the sources of information, the attitudes of the students, restriction during menstruation, the access to clean water, the availability of soap and dustbin were not significantly related to the implementation of menstrual hygiene. Variables that are not significant to the menstrual hygiene practice can occur due to several factors such as the resemblance of the characteristics and age of the students which causes low data variability. Although those variables were not significant, the enabling factors which consist of the access to clean water, the availability of soap dustbin are indeed very much needed to support the implementation of menstrual hygiene.

The access of clean water and soap is also very crucial for implementing menstrual hygiene. In the coastal area, clean water is sufficiently available so that it is very possible to improve better menstrual hygiene practice. This finding supported by Qolbah et al., (2024), that there was no relationship between school sanitation facilities and menstrual hygiene behavior in students, although 52.8% of students stated that school provided adequate sanitation facilities.

Although this study was conducted in coastal areas of North Sumatera, Indonesia, the findings resonate with broader global research on menstrual hygiene among adolescent girls. For example, Alam et al., (2022), showed that hygiene education

programs significantly improved menstrual hygiene practices in schools across Bangladesh. In coastal areas similarly affected by infrastructure and water access challenges, Rakib (2024) found that environmental pressures led to risky hygiene behaviors. These parallels suggest that while socio-cultural contexts vary, the need for comprehensive support—through education, family involvement, and facility improvement—is a consistent theme across regions.

Recent studies further support our findings on the importance of knowledge, family support, and access to sanitation in menstrual hygiene practices. Alam et al., (2022) demonstrated that school-based hygiene interventions significantly improved menstrual hygiene behaviors among both urban and rural adolescent girls in Bangladesh. Similarly, Sommer, Utami, and Sommer et al., (2022) highlighted that lack of female-friendly facilities and menstrual supplies impeded menstrual hygiene. In coastal Bangladesh, Rakib (2024) reported that climate-induced water scarcity and saline intrusion increased risky menstrual hygiene practices among girls. A systematic review by Anbesu & Asgedom (2023) found that only 45 % of adolescent girls in sub-Saharan Africa practiced good menstrual hygiene, with strong associations to maternal education and access to resources. Finally, Ha & Alam (2022) identified significant urban–rural disparities in Bangladesh, emphasizing that rural girls with better menstrual hygiene practices were more likely to have educated mothers and access to hygienic facilities both at home and at school.

CONCLUSION

This study concludes that: 1) knowledge as a predisposing factor and family support as

a reinforcing factor significantly relate to the menstrual hygiene practice of students in the coastal areas of North Sumatera; 2) predisposing factors (age, sources of information, and attitudes), reinforcing factors (restrictions during menstruation), and enabling factors (access to clean water, the availability of soap, and dustbins) do not significantly relate to the menstrual hygiene practice of students in the coastal areas of North Sumatera; 3) the number of students who apply poor menstrual hygiene is higher than those who apply good menstrual hygiene; 4) an attempt to improve menstrual hygiene practice can be done by providing education about menstrual hygiene to female students; and 5) access to adequate sanitation facilities is needed to support the implementation of good menstrual hygiene.

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