

## Research Paper

# Assessing the availability and necessity of menstruation-friendly toilets in public and private sector sites in Kathmandu, Nepal

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## ABSTRACT

Much of the world's public toilet infrastructure does not consider the needs of menstruators. Nepali menstruators, 18–52 years old, were surveyed at 40 different sites in three major cities in Nepal. During a random site visit, 20 eligible participants at each site were selected by convenience sampling to complete a quantitative survey assessing the importance of the eight aspects of a menstruation-friendly toilet, as outlined by the government of Nepal. Only one of 40 of the toilets assessed met all eight indicators of a menstruation-friendly toilet. None of the survey participants felt comfortable using a public toilet when menstruating, and 88.8% reported facing challenges using public toilets when menstruating.

**Key words:** menstruation, public health, toilet, WASH, women's health

## HIGHLIGHTS

- This research focuses on public toilet facilities for Nepali menstruators.
- Study methods (1) polled 761 Nepali menstruators and (2) assessed 40 toilets across the Kathmandu valley.
- Findings indicate that 0% of menstruators felt comfortable using a public toilet when menstruating.
- A total of 88.8% of Nepali menstruators faced challenges using public toilets when menstruating.
- Perceived barriers were confirmed by observations.

## BACKGROUND

Menstruation is experienced by most individuals assigned female at birth (although they may identify as women, girls, men, boys, non-binary, or other) for several decades of their lives. Menstrual health is essential to gender equality and an important component for progressing toward the sustainable development goals outlined by the United Nations (Loughnan *et al.* 2020; Sommer *et al.* 2021). Menstrual health is defined as a state of complete mental, social, and physical well-being while menstruating (Hennegan *et al.* 2021). However, many menstruators, especially in low- and middle-income countries (LMICs), face challenges in achieving menstrual health.

Many studies on menstrual health have recently been conducted outside of the household, such as in healthcare facilities and schools, with some studies also looking at workplaces and public spaces. In India and Uganda, one study examined six dimensions of water, sanitation, and hygiene (WASH) in healthcare facilities (Kohler *et al.* 2019). Respondents in both countries faced challenges with waste disposal and a lack of privacy, and none of the menstruating respondents in the study felt comfortable using the toilet during their hospital stay (Kohler *et al.* 2019). The quality of available sanitation amenities shapes experiences in managing menstruation. Another study among LMICs reported that the absence of safe, clean

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spaces outside the home to manage menstruation reduced confidence to travel outside the home and increased distress and shame among women (Hennegan *et al.* 2019).

One study in Nepal assessed 12 schools across five provinces and reported that only three had waste disposal facilities, leading the girls in the other schools to abandon their menstrual materials in streams or other secluded places (Morrison *et al.* 2019). Another study assessed schools in the Dhanusha and Chitwan districts of Nepal and found an increased rate of health issues among students with poor WASH facilities, leading to poor attendance rates and academic performance (Sharma & Adhikari 2022). The intersection of WASH facilities and menstruation has also been reported in Nepali schools, leading to UNICEF implementation projects like WASH in Schools (WinS) (Morrison *et al.* 2018). However, little research has been performed to assess WASH facilities in public spaces, which are crucial for menstruators' daily activities.

The intersection of WASH facilities and menstruation has never been studied at publicly funded sites such as hospitals, banks, and government office buildings in Nepal. In addition, this research also assesses toilet facilities in privately funded hospitals, banks, and restaurants to evaluate whether they are 'menstruation-friendly.' As the number of Nepali women in the workplace is steadily increasing, it is essential to study the infrastructure of toilets in public spaces (Schmitt *et al.* 2021). This includes infrastructure for menstruators to wash their hands, change menstrual materials, and dispose of used materials (Hennegan *et al.* 2021).

A 'menstruation-friendly toilet,' as defined by the National Health Training Center of Nepal and endorsed by the government of Nepal manual (Menstrual Hygiene Management Reference Manual 2021), has eight basic components: working lights, bathrooms separated by sex, proper ventilation, taps with running water, working doors and locks, soap, hooks to hang bags, and a covered dustbin to throw away used pads. These indicators are considered effective and applicable for individuals across the diverse regions of Nepal (Menstrual Hygiene Management Reference Manual 2021). The Nepali government recommends, but does not require, the implementation of these facilities across the seven provinces of Nepal (Menstrual Hygiene Management Reference Manual 2021). Despite government recommendations, there is no documented evidence of the availability or necessity of menstruation-friendly toilets in Nepal. Studies have shown that a lack of awareness regarding menstrual health and hygiene, inadequate WASH facilities, no reproductive health education, and culturally restrictive practices make managing menstruation a challenge for Nepali women (Budhathoki 2019; Sharma *et al.* 2022).

There is a severe shortage of public sanitation facilities in Nepal, and most of them are typically in poor sanitary condition (Budhathoki *et al.* 2017; Bhatt *et al.* 2019). It is common for Nepali people to avoid drinking water for long periods of time to avoid using an unsanitary public toilet (Devkota 2021). In addition, menstruators, specifically in LMICs, often use menstrual products for longer than recommended since very few toilets in schools and workplaces have trash cans to throw away used products (van Eijk *et al.* 2021). These can be detrimental practices to the health of menstruators, and they point to the necessity of public health interventions.

This study assessed whether toilets in banks, hospitals, government offices, and restaurants in the Kathmandu Valley of Bagmati Province had the eight basic facilities endorsed by the government of Nepal to make them menstruation-friendly. In addition, this study assessed the public's perception of whether the eight basic facilities are essential to making a toilet menstruation friendly.

## METHODS

### Participants

Twenty participants were selected by convenience sampling at each of the 40 different sites in the Kathmandu Valley, which contains three major cities in Nepal: Kathmandu, Bhaktapur, and Lalitpur. The 40 different sites consisted of public and private banks, restaurants, public and private hospitals, and government offices. These sites were strategically selected to represent common destinations that menstruators would visit, and they were spread out geographically for comprehensive coverage across the three major cities. These sites were also chosen to assess potential differences between publicly funded and privately funded sites. The number of sites allocated for each city was based on the population size of the city (Table 1).

The following women were excluded from the survey: (a) postmenopausal, (b) not of native Nepali origin, and (c) employees at the site. We excluded postmenopausal women because this study aimed to gather data on menstruation-related experiences. We only surveyed individuals of native Nepali origin to gain an understanding of the specific challenges faced by the population locally. We excluded employees from the site because we wanted to capture the experiences of

**Table 1** | The number of toilets ( $N = 40$ ) studied by the type of site in three cities across Kathmandu Valley (Kathmandu ( $N = 20$ ), Bhaktapur ( $N = 8$ ), and Lalitpur ( $N = 12$ ))

	<b>N</b>	<b>Kathmandu</b>	<b>Bhaktapur</b>	<b>Lalitpur</b>
Private bank	6	3	1	2
Public bank	4	2	1	1
Private hospital	7	4	1	2
Public hospital	4	2	1	1
Government office	9	4	2	3
Restaurant	10	5	2	3

the general menstruating population who would visit a ‘public toilet’ outside of the home. All data were collected, stored, and managed in the Kobo Toolbox database, a free and open-source platform ([KoboToolBox](#)). Approval for the study was obtained from the Ethical Review Board at the Nepal Health Research Council (Ref# 4230, Protocol Registration # 256/2022 P) and the University of Alabama at Birmingham (IRB #300001449).

## Data collection

### Observational checklist (Supplementary material, S1)

Trained data enumerators assessed 40 different toilets using an observational checklist, and eight basic indicators were assessed. These eight indicators qualify a ‘menstruation-friendly toilet,’ as defined by the National Health Training Center of Nepal and endorsed by the government of Nepal ([Menstrual Hygiene Management Reference Manual 2021](#)). If toilets were separated by sex, data enumerators only assessed the women’s toilet. Observational checklist responses were mainly dichotomous. Some of the responses required follow-up questions to ensure that the facility was truly accessible to the general public. For example, the checklist asked, ‘Is there a light present? If it is present, is it working?’ When assessing, ‘Is there a dustbin to throw away used pads?’ The checklist also asked, ‘Does it have a lid?’ and ‘is it maintained?’ These follow-up questions also allowed us to assess the cleanliness and maintenance of each of the eight indicators. The data enumerators used their best judgment to complete the observational checklist. Upon completion of the observational checklist, data enumerators were asked to upload a picture of the toilet on Kobo Toolbox, which was reviewed for accuracy by another staff member.

Immediately after completion of the menstruation-friendly toilet observational checklist, data enumerators utilized convenience sampling to recruit participants for the survey. The first 20 women who walked through the main entrance of the site and were not employed at the site were asked to complete a survey that was collected on password-protected tablets. The data enumerators explained the purpose of the study and obtained consent from participants before the survey was distributed. The data collection at each site was typically done in 1 day, but some smaller sites were visited multiple times until 20 unique survey responses were collected.

### Questionnaire (Supplementary material, S2)

Basic demographic information of the participants, including age and district of origin, was collected. The survey questionnaire collected information about how likely menstruators were to avoid a toilet outside of their home when menstruating, given that one of the eight components of a menstruation-friendly toilet was missing. Questionnaire response options were provided on a Likert scale. For example, the survey asked, ‘How likely are you to avoid a public toilet when menstruating if there is no running water?’ Respondents chose from three options: ‘I would avoid the toilet; I don’t know; or I would still use the toilet.’ This helped in assessing the relative importance of each of the eight components of a menstruation-friendly toilet. Participants were also asked an open-ended question about other factors that would make them avoid using the toilet when menstruating.

## Analysis

The data from the observation checklist and the questionnaire were exported from Kobo Toolbox into two separate Excel files. Both datasets were then cleaned by checking for any duplicate entries or missing values. As some of the smaller sites

included in the study were visited over multiple days, multiple observational checklists were conducted for the same sites. However, the most recently collected observational checklist was utilized for data analysis as it would represent the most recent status of the toilet. Further, data visualization was used to identify trends and outliers for the observational checklist and questionnaire data. The availability of each of the eight indicators of a menstruation-friendly toilet was compared among Kathmandu, Bhaktapur, and Lalitpur to identify trends across the three cities. The availability of these indicators was also compared between publicly funded and privately funded sites in Kathmandu Valley to determine if different funding sources contributed to the availability of menstruation-friendly toilet facilities. Comparisons between groups were conducted using Fisher's exact test and a two-tailed probability test using PRISM v10. Eight hundred total responses were collected from the questionnaire (20 from each site), but 39 participants were not included as the responses were deemed incomplete. Responses from 761 participants were analyzed.

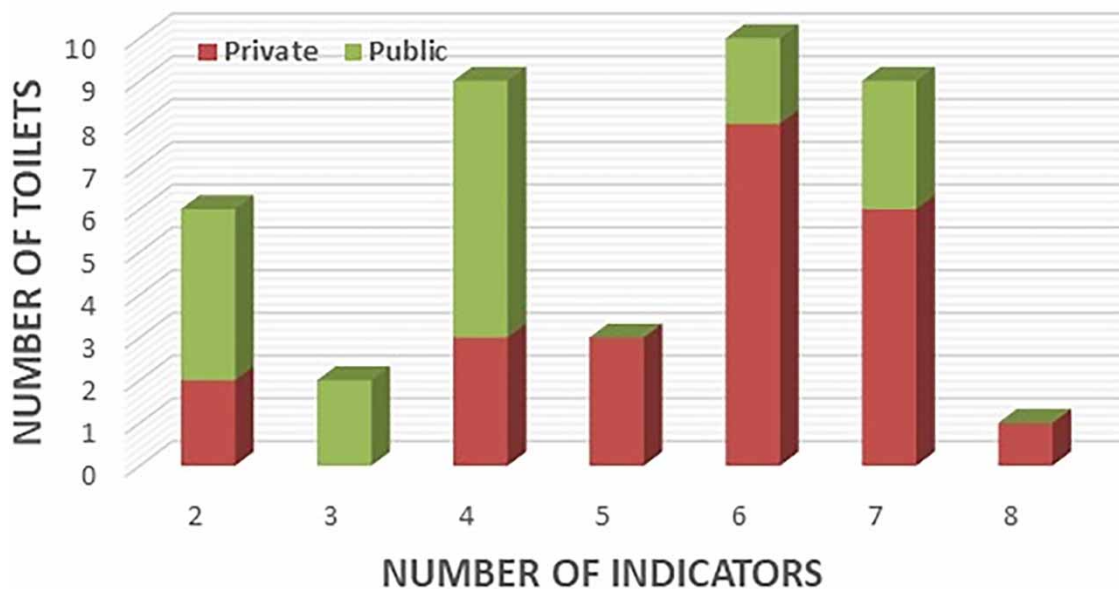
## RESULTS

### Observational checklist

Of the 40 sites chosen, there were 23 privately funded sites and 17 publicly funded sites assessed across Kathmandu, Bhaktapur, and Lalitpur (Table 1). Only one toilet had all eight menstruation-friendly indicators, whereas 17 of the toilets had four or fewer of these indicators (Figure 1). Only half of these toilets had dustbins, soap to use, and an opening or window for ventilation, and even fewer toilets had hooks to hang bags (Table 2). In general, private sector sites tended to have more of the eight components present in their toilets compared to public sector toilets (Table 2 and Figure 1). Specifically, private sector sites had a higher percentage of toilets that had soap and dustbins to throw away pads than public sites ( $p$ -value  $\leq 0.005$ ). In addition, there were statistically significant differences in several facilities in toilets in the three districts (Table 3). Lalitpur (91.6%) had more toilets that were separated by sex than in Kathmandu (70%) and Bhaktapur (37.5%) ( $p$ -value  $\leq 0.03$ ). On the other hand, Bhaktapur (100%) toilets were more likely to have working locks than in Lalitpur (83.3%) or Kathmandu (55%) ( $p$ -value  $\leq 0.03$ ).

### Questionnaire

Participants ranged from 18 to 52 years of age and 53% were 18 to 29 years of age. A total of 47.0% of participants resided in Kathmandu, 29.0% in Lalitpur, 15.0% in Bhaktapur, and 9.0% in other cities across Nepal. Among the participants in this



**Figure 1** | Number of toilets with menstruation-friendly toilet indicators present. The vertical axis represents the number of toilets ( $N = 40$ ). The horizontal axis indicates the number of menstrual-friendly toilet indicators present in the toilets.

**Table 2** | The assessment of menstruation-friendly facilities across 40 different toilet sites (public and private)

	Private sites (N = 23)		Public sites (N = 17)		p-Value*
	N	%	N	%	
Toilets are separated by sex	16	69.9	12	70.6	1.0
Toilets have working locks	17	73.9	12	70.6	1.0
Toilets have working doors	22	95.7	17	100.0	1.0
Toilets have proper ventilation with windows	10	43.5	8	47.1	0.82
Toilets have working lights	17	73.9	10	58.8	0.31
Toilets have taps with running water	22	95.7	13	76.5	0.14
Toilets have soap	17	73.9	5	29.4	0.005
Toilets have hooks to hang bags	9	39.1	4	23.5	0.33
Toilets have covered dustbins to throw away used pads	17	73.9	5	29.4	0.005

\*2X2 two-tailed probability using the Fisher's exact test.

**Table 3** | The assessment of menstruation-friendly facilities across 40 different toilet sites in Kathmandu (N = 20), Bhaktapur (N = 8), and Lalitpur (N = 12)

	Kathmandu		Bhaktapur		Lalitpur		p-Value*
	N	%	N	%	N	%	
Toilets are separated by sex	14	70.0	3	37.5	11	91.6	0.03
Toilets have working locks	11	55.0	8	100	10	83.3	0.04
Toilets have working doors	19	95.0	8	100	12	100	1.0
Toilets have proper ventilation with windows	10	50.0	5	62.5	9	75.0	0.40
Toilets have working lights	12	60.0	4	50.0	11	91.6	0.10
Toilets have taps with running water	17	85.0	7	87.5	11	91.6	1.0
Toilets have soap	10	50.0	5	62.5	9	75.0	0.40
Toilets have hooks to hang bags	14	70.0	4	50.0	10	83.3	0.28
Toilets have covered dustbins to throw away used pads	13	65.0	7	87.5	8	66.7	0.59

\*2X3 two-tailed probability using the Freeman-Halton extension to Fisher's exact test.

survey, 77.0% used disposable pads to manage their menstruation; 18.0% used cloth; 4.0% used menstrual cups; and 1.0% used tampons.

Among the 761 participants who completed the entire questionnaire, 676 (88.8%) said that they had faced challenges using a public toilet outside their home while menstruating. The main challenges that participants reported were no place to dispose of used products, the absence of soap, and no running water. None of the participants stated that they felt comfortable using a public toilet when menstruating.

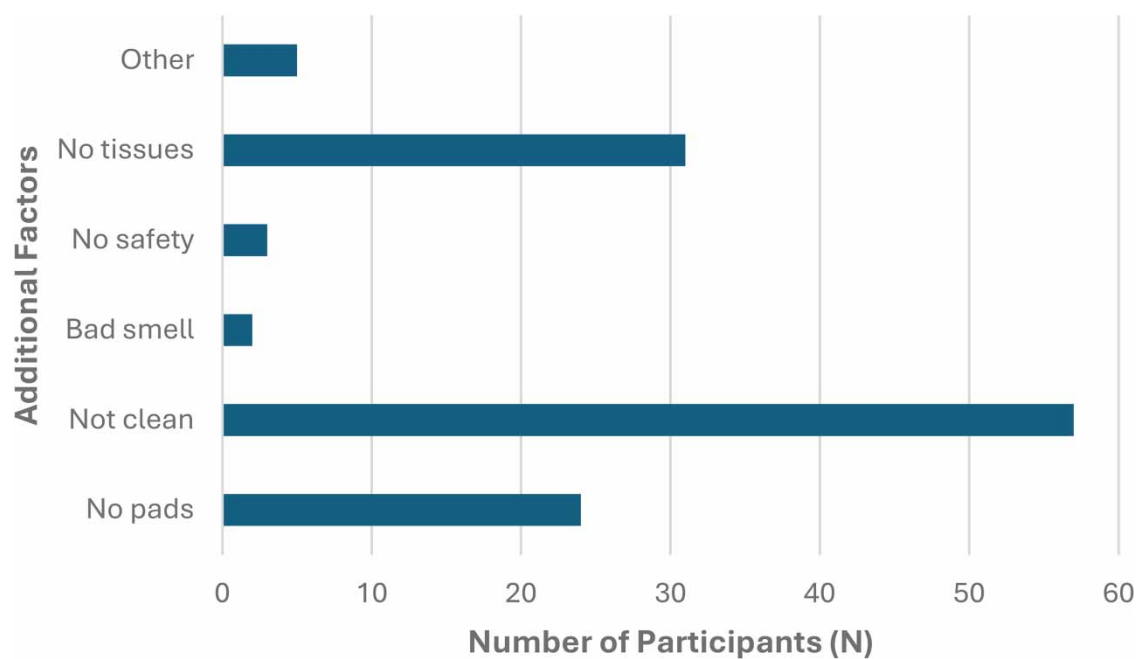
These challenges corresponded with the rankings of the importance of the facilities of menstruation-friendly toilets. Most of the participants (94.2%) stated that they would avoid the toilet if it did not have working doors and locks (Table 4). The majority of participants also stated that they would avoid the toilet if the taps did not have running water (94.1%) and if the toilets did not have soap (83.0%). In addition, 77.7% of participants said that they would avoid the toilet if it did not have covered dustbins to dispose of used pads (Table 4).

Several of the responses also differed by age group. Participants were split into three age groups: ages 18–29 (N = 407), ages 30–40 (N = 248), and ages 41–52 (N = 106). The oldest age group was less likely to report challenges using a public toilet outside their home (82%) compared to participants ages 30–40 (91%) and 18–29 (89%) (p-value ≤ 0.05).

In addition to the eight menstruation-friendly indicators surveyed, participants indicated several other factors and barriers that would make them avoid the toilet (Figure 2). The most common factors were if the toilet was not clean or did not have tissues.

**Table 4** | Challenges and barriers for using public toilets

	I would still use the toilet		I don't know		I would avoid the toilet	
	N	%	N	%	N	%
Toilets are not separated by sex	275	36.1	23	3.0	463	60.8
Toilets do not have working doors and locks	23	3.0	21	2.8	717	94.2
Toilets do not have proper ventilation with windows	330	43.3	62	8.1	369	48.4
Toilets do not have working lights	191	25.1	27	3.5	543	71.3
Toilets do not have taps with running water	35	4.6	10	1.3	716	94.1
Toilets do not have soap	99	13.0	30	3.9	632	83.0
Toilets do not have hooks to hang bags	405	53.2	71	9.3	285	37.5
Toilets do not have covered dustbins to throw away used pads	126	16.6	43	5.6	592	77.7

**Figure 2** | Other factors apart from the eight indicators that the participants would avoid using public toilets. The x-axis is the number of participants who indicated the factor(s), and y-axis show the additional factors that the participants answered. Six hundred forty-two of the 761 participants polled did not suggest any other factors.

## DISCUSSION

Many participants face challenges when using a public toilet when menstruating, and no participants reported feeling comfortable using a public toilet when menstruating. Participants in this study thought that the presence of working doors and locks, taps with running water, and the presence of soap were the three most important factors in their decision to use a public toilet when menstruating. The perceived barriers to using a toilet when menstruating that were reported in the questionnaire were consistent with findings from the observational checklist. The study provides insights on a variety of factors that will help improve toilets to serve menstruators in the Kathmandu Valley.

There were noticeable differences between toilets at the publicly funded and privately funded sites. Private sector sites had more of the eight facilities present than public sector sites (Table 2 and Figure 1). This may be because patients in private sector hospitals in Nepal typically possess a higher level of education (Kharal *et al.* 2020) and pay more out-of-pocket



costs to the hospitals. Likewise, private banks are also held accountable by clients who pay more for their services, so these banks are incentivized to provide better public infrastructure services. Restaurants may see an increase in customers when they provide better toilet facilities. These findings suggest a relationship between clients' demand and better menstruation-friendly facilities at private sector sites. Disparities in the prevalence of poor public toilet infrastructure could also be due to a lack of resources at certain public sites in the Kathmandu Valley. The Nepali government could begin improving publicly funded toilets by increasing access to working doors and locks, taps with running water, and soap, facilities that participants deemed most important.

Since this study was only conducted in the Kathmandu Valley, these results cannot be generalizable to Nepal as a whole. The majority of Nepalese (78.0%) live in rural areas (WorldBank 2023), so this study is unable to generalize the state of menstruation-friendly toilets to other regions and provinces in Nepal. However, the Bagmati Province of Nepal has the highest human development index (HDI) in the country (Dulal 2023), so these results imply the demand for even greater improvements in public toilet infrastructure in provinces with lower HDIs. Areas with lower HDIs, in Nepal and globally, likely need increased support to improve public toilet infrastructure for menstruators.

In addition, sites for assessing toilet infrastructure were chosen strategically based on their geographic location around Kathmandu, Bhaktapur, and Lalitpur, rather than randomly. This was done to ensure that the toilets assessed provided comprehensive coverage across the three major cities. This may introduce bias into the study as the toilets being assessed and the participants surveyed from the sites may not represent the Kathmandu Valley as a whole. However, this study consisted of a large sample size ( $N = 761$ ) from a wide age range and various demographic backgrounds.

Furthermore, some of the smaller sites included in the study were visited over multiple days, so multiple observational checklists were completed for the same toilet. This may introduce bias into the study as cleaning staff could have serviced the toilet between site visits. However, the most recently collected observational checklist was utilized for data analysis, as it represented the most current status of the toilet.

Improving public toilet infrastructure in Nepal would also be a step toward achieving greater gender equity for Nepali women. Power hierarchies and socio-cultural norms consistently leave Nepali women vulnerable to inequality and violence (Dahal *et al.* 2022). Keeping girls in school and women in the workforce is a crucial step toward reducing gender inequalities (Sharma *et al.* 2022; Khanal *et al.* 2023). Extensive gaps in women's education and employment reduce the economic growth of a country (Klasen & Lamanna 2009) and individual and household incomes. Improvements in public toilet facilities may help more women feel comfortable participating in the public sphere when menstruating and have significant impacts on their economic independence. Economic independence positively affects women's livelihoods and well-being and provides them with greater decision-making power within the home (Gibbs *et al.* 2020). Globally, women in LMICs face higher levels of gender inequality, limiting their educational, social, and economic opportunities (Ma *et al.* 2022). Improving public toilet infrastructure in Nepal and other LMICs may be a step toward creating more inclusive public spaces for women. In addition, Nepali women have historically been underrepresented in WASH facility development and policies (Kohler *et al.* 2019), and this research may provide the basis for Nepali women to advocate for menstruation-friendly toilet facilities across the country.

For improvements in public toilet facilities to be most impactful for all menstruators across Nepal, these interventions must be combined with efforts to decrease the stigma surrounding menstruation in Nepal. Even if these public infrastructure interventions were implemented, many women may still choose not to participate in the public sphere and may prefer to use toilets within their own homes (Mukherjee *et al.* 2020). These stigmas may also be culturally embedded. A study done among secondary school students in Chitwan, Nepal, demonstrated that of the 400 menstruators surveyed, almost 99.5% had experienced some form of cultural restriction during their menstrual period, including school absenteeism (Khanal *et al.* 2023). In addition, stigma surrounding menstruation is not only limited to LMICs; high-income countries typically have quality public toilet infrastructure, but significant stigma around menstruation is still present (Barrington *et al.* 2021). Further research must also be conducted globally to assess barriers to emotional and mental comfort when using a public toilet during menstruation.

Many of the initiatives for improved access to toilets in Nepal have been led by owners of local businesses, who have offered their toilet facilities for the general public to use. This research could be used to educate business owners on ways to make their toilets menstruation friendly. For example, educating business owners to nail a hook onto their bathroom doors is a low-maintenance intervention that could improve the well-being of menstruators. In addition, leaders in the public sector could provide monetary incentives, like tax deductions, for local businesses that work to make their toilets

more menstruation-friendly. If all the menstruation-friendly facilities across Kathmandu Valley were put on a collective map, these businesses could also receive more customers, providing further incentive. This research also provides an outline for individuals building public toilets in Nepal and globally. City planners can better understand what menstruators value in a public toilet, and they can utilize the menstruation-friendly toilet checklist independently. Regarding public toilet maintenance, there are demands to improve the working conditions and financial well-being of sanitation workers in Nepal (Black *et al.* 2019). Currently, people who work sanitation-related jobs in Nepal are seen as lower caste. Decreasing the stigma around sanitation jobs in Nepal will increase the potential for better public toilet maintenance.

Future research in Nepal could assess the impacts of improved public toilets and any changes in the well-being and comfort of menstruators before and after intervention. This research could be utilized on a global scale, measuring factors such as workplace productivity, mental health, and school attendance before and after the implementation of improved WASH infrastructure (Sharma & Adhikari 2022). Further research must also be done to ensure that the criteria given by the government of Nepal meet the diverse needs of Nepali menstruators, across culture, geographic region, and socioeconomic status. This research is an important step toward policy change. For menstruation-friendly toilet infrastructure to be widespread across Nepal, this research must be used to implement a nationwide monitoring and evaluation framework for menstruation-friendly toilets. The Nepali government outlines recommendations for menstruation-friendly toilets (Menstrual Hygiene Management Reference Manual 2021), but little has been done to ensure consistency and quality across the Kathmandu Valley. This disparity in policy and practice points to the need for an increased investment in menstruation-friendly toilets. Local governments could implement regular assessments of public toilets to ensure compliance with menstruation-friendly standards.

Worldwide, this research may also be utilized to encourage other LMICs to implement menstruation-friendly toilet infrastructure that matches their geographical and cultural context. In LMICs, the presence of locks or lights greatly influences whether menstrual management practices can be comfortably undertaken (Hennegan *et al.* 2019), pointing to privacy as a major concern for menstruators. A study conducted among adolescents in public schools in Malawi confirmed this concern, showing that students who perceived a lack of privacy in school toilets had more than twice the odds of being absent during menstruation (Grant *et al.* 2013). Additional priorities for menstruators can be discovered by replicating and tailoring the methods of this study to other local settings and cultures. Conducting similar research projects in different environments will allow policymakers and local leaders to tailor their menstruation-friendly interventions accordingly.

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## AUTHORSHIP CONTRIBUTION

PL and SS contributed to the conception of the study, designed the study and survey, and supported the implementation and data collection. PL, SS, and PEJ helped interpret the data and finalize the results and findings. EEM and ER led the survey question and protocol development, and EEM led the collection of the data. JK and RC managed the study and assisted with survey development and collection of the data. EEM analyzed the data and wrote the first draft of the manuscript. PL, SS, and PEJ assisted with the analysis and result tabulations. All authors reviewed the manuscript.

## DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

## CONFLICT OF INTEREST

The authors declare there is no conflict.



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