



Differentials in self-reported health status and healthcare utilization among homeless women during the antenatal period in urban settings: Does migration status matter?

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ABSTRACT

Background: Limited studies have covered the nexus between homelessness, migration, and maternal health. However, most homeless women are migrants and have high-risk fertility behaviors. Therefore, the present study examines the variation in antenatal health and healthcare behavior among homeless women, focusing on migration status.

Methods: The present study employed a mixed-methods approach. A cross-sectional quantitative survey using Time and Location sampling (TLS) and face-to-face interviews was carried out for the quantitative component. Further, qualitative data was gathered through in-depth interviews using purposive sampling. Descriptive statistics, bivariate analysis with the Pearson chi-square test, and multivariate logistic models estimated qualitative results. Further, the thematic analysis presented qualitative findings.

Results: Out of 400 respondents, 76 % were migrants, and 57 % reported poor SRH. The likelihood of poor SRH was 1.07 times higher among migrants than non-migrants. A higher likelihood of poor SRH was found among beggars and ragpickers. Similarly, it was prevalent among the respondents who lived alone, mainly migrants. Almost 80 % of migrants reported experiencing depression. The unmet need for health visits was substantial among the study population (41 %), and it was found to be noteworthy among migrants (51 %). Several individual, socioeconomic, and structural factors were identified as barriers to healthcare utilization.

Conclusion: Poor antenatal health was substantial among homeless women, mainly migrants. Public and private healthcare visits were inadequate among homeless women who were migrants. Several individual, socioeconomic, and structural factors affected healthcare utilization. The study highlights the urgent need to introduce population-centric programs and policies to promote reproductive health among homeless women.

Introduction

Homelessness has become a critical global issue, affecting communities worldwide and the lives of countless individuals. As of 2023, a staggering 122.3 million people were identified as homeless, with exceptionally high concentrations observed in African and South Asian nations. Among these, India ranked as the sixteenth largest country in terms of its homeless population, with a heartbreaking count of 1.8 million homeless individuals (World Population Review, 2023). In India, over half of the homeless individuals reside in urban settings, particularly megacities (Office of the Registrar General and Census Commissioner, 2011). Recent studies have shown an increase in the

homeless population during the last inter-decadal census period (Sahoo and Jeermison, 2018). The escalating number of homeless people in urban areas is attributed to the influx of unskilled labor migrants and a high total fertility rate (TFR) among the homeless community (Brott and Townley, 2022; Roy and Siddique, 2018; Begun, 2015; Patra and Anand, 2008). The stream of rural-urban migration is substantial in India and is positively linked with spatial inequality in natural disasters, poverty, employment opportunity, and public services (Coleman et al., 2022). Chronic poverty, informal employment status, limited affordable housing and gender-inclusive shelter services, and social exclusion at the place of destination are common challenges among rural-urban migrants in India, which force millions of migrants to live in substandard housing

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or be homeless (Jayaram and Varma, 2020). Homeless individuals often reside under flyovers, alongside footpaths, in dumping grounds, railway platforms, bus terminals, high drains, and sheds under markets, factories, and construction sites (Sahoo and Jeermison, 2018; Office of the Registrar General and Census Commissioner, 2011). Homeless living exposes individuals to environmental pollution, extreme climate conditions, and violence (Patra and Anand, 2008). When a homeless individual is female, she faces even higher risks of multidimensional vulnerability due to the additional risk of reproductive health morbidities and sexual violence (Bhattacharya, 2022).

The demographic profile of the homeless population in India shows that 41 % of homeless individuals are female. However, 36 % of homeless individuals are female in urban settings. (Sahoo and Jeermison, 2018; Office of the Registrar General and Census Commissioner, 2011). In addition, India achieved considerable progress in maternal health and healthcare utilization (International Institute for Population Sciences and Inter City Fund, 2022), but slum dwellers and homeless women still lagged (Nambiar et al., 2023). However, limited research has covered maternal health and healthcare utilization among homeless women in the Indian context (Nambiar et al., 2023; Nambiar, 2020; Begun, 2015; Ray et al., 2001). Therefore, the present study is relevant to contextualize the issues of poor self-rated health, disease burden, and associated healthcare practice during the antenatal period to understand the nexus between health and homelessness in Indian settings. Although measuring self-rated health and self-reported diseases has reliability issues due to reporting bias based on respondents' background, space, and situation (Layes et al., 2012), it is a popular and widely used method among researchers to understand the overall health of the study population. Diagnosed-based reporting is reliable, but it is not feasible for independent researchers and doctoral students because of financial and time limitations (Vellakkal et al., 2013). However, the World Health Organization (WHO) recommended self-rated health (SRH) as a standard measure of overall health status. Therefore, considering the measurements' limitations, the present study included self-rated health as an outcome variable to understand the overall health of homeless women.

In the migration and health disciplines, the research related to physical and subjective health, healthcare utilization, and the facilitators and obstacles to accessing healthcare facilities has been widely explored (Adewole et al., 2023; Babu et al., 2022; Henriksson et al., 2020; Pardhi et al., 2020; Nabieva and Souares, 2019). Findings suggested that the relationship between health, healthcare utilization, and migration status is complex and varies depending on space, population, and contextual factors. For instance, studies on gender-dimensioned migration and health have indicated that women migrants and homeless women are more vulnerable to the burden of diseases, persecution, and violence compared to their counterparts (Henriksson et al., 2020). Similarly, pregnant women and children among displaced communities are at a greater risk of diseases and exhibit lower utilization of antenatal care, institutional delivery, and postnatal care services (Pardhi et al., 2020). Furthermore, migrant and homeless females are more susceptible to deprived livelihood, health vulnerabilities, and healthcare disparity (Babu et al., 2022; Bhattacharya, 2022; Pardhi et al., 2020). These studies also have highlighted the differentials in the burden of maternal health vulnerabilities and maternal healthcare utilization among migrant women at their destinations with their background characteristics. Although the existing evidence confirms that the majority of homeless and migrant women experience the dual burden of livelihood and health poverty at the place of destination (Roy and Siddique, 2018; Begun, 2015; Patra and Anand, 2008), the existing studies are unable to explore the nexus between health, healthcare utilization, and migration status among homeless women. Similarly, no previous studies examined the context of maternal health and healthcare utilization among homeless women in India with considering migration phenomena. To fill the above research gap, the present study considered migration status as a key explanatory variable. The study findings will help researchers and policymakers to understand the interlinkage between migration,

homelessness, and maternal health.

After existing literature review, the present study selected Kolkata Municipal Corporation (KMC) in India as a study area due to several reasons. For instance, according to the Indian Census 2011, the KMC is the second most homeless populated (69,798 persons) and top female homeless populated urban center in India (Office of the Registrar General and Census Commissioner, 2011; Rahaman et al., 2024). Moreover, the latest decadal growth of the homeless population (2001–2011) was also positive only in KMC among the mega urban centers (Roy and Siddique, 2018). Finally, high-risk fertility behavior was prevalent among homeless women (Roy and Siddique, 2018).

Methods

Research design

The present study was a cross-sectional exploratory study that adopted a mixed-method approach to collect both quantitative (cross-sectional) and qualitative data. In the first phase, a cross-sectional survey (quantitative component) was carried out, followed by in-depth interviews (qualitative component). The study was conducted in KMC from October 2022 to March 2023. The geo-referenced location of the study area is presented in Fig. 1. The study explored self-rated health and self-reported diseases during the antenatal period, healthcare utilization, and associated factors among homeless women, with a particular focus on migration.

Description of the population

In the cross-sectional section, the study population comprised homeless women within the reproductive age group (15–45 years). Homeless women are defined as women who do not reside in census-defined houses but instead live in open spaces on roadsides, pavements, hume pipes, religious places, under flyovers and escalators, unstructured tents, etc. (Office of the Registrar General and Census Commissioner, 2011). The inclusion criteria for the cross-sectional study population were as follows: experiencing at least one birth in a homeless situation within three years before the survey, being married, understanding Bengali or Hindi local language, and giving informed consent. These same criteria, along with the coexistence of poor SRH and unmet need for healthcare service, were also followed in the in-depth interviews. The study included only married women, as childbearing outside marriage is socially unacceptable and underreported in Indian society, despite its legal status (Khanna, 1997).

Sample size and sampling techniques

The sample size was estimated at 423 using the William Cochran method for the cross-sectional survey (Cochran, 1963). The estimation was based on the proportion of homeless childbearing women (50 %) in Kolkata (Roy and Siddique, 2018), with a 95 % confidence interval, an absolute precision level of 0.05, and assuming a non-response rate of 10 %. The samples were collected from 26 homeless clusters (Fig. 1) using the Time and Location sampling technique (TLS) and face-to-face interviews. The TLS technique is suitable for drawing a sample from mobile populations like homeless people, migrants, informal workers, blood donors, nomads, and other mobile populations (Karon and Wejnert, 2012). This section collected data using a structured questionnaire that included respondents' socioeconomic profile, self-reported health during the antenatal period, and healthcare utilization. Data entry was performed using CSPro 4.0 software, while analysis was conducted using Stata 14.1 software. The equation of the sample estimation (Cochran, 1963) is as follows:

$$n = \frac{Z^2 Pq}{e^2} \quad (\text{Cochran, 1963})$$

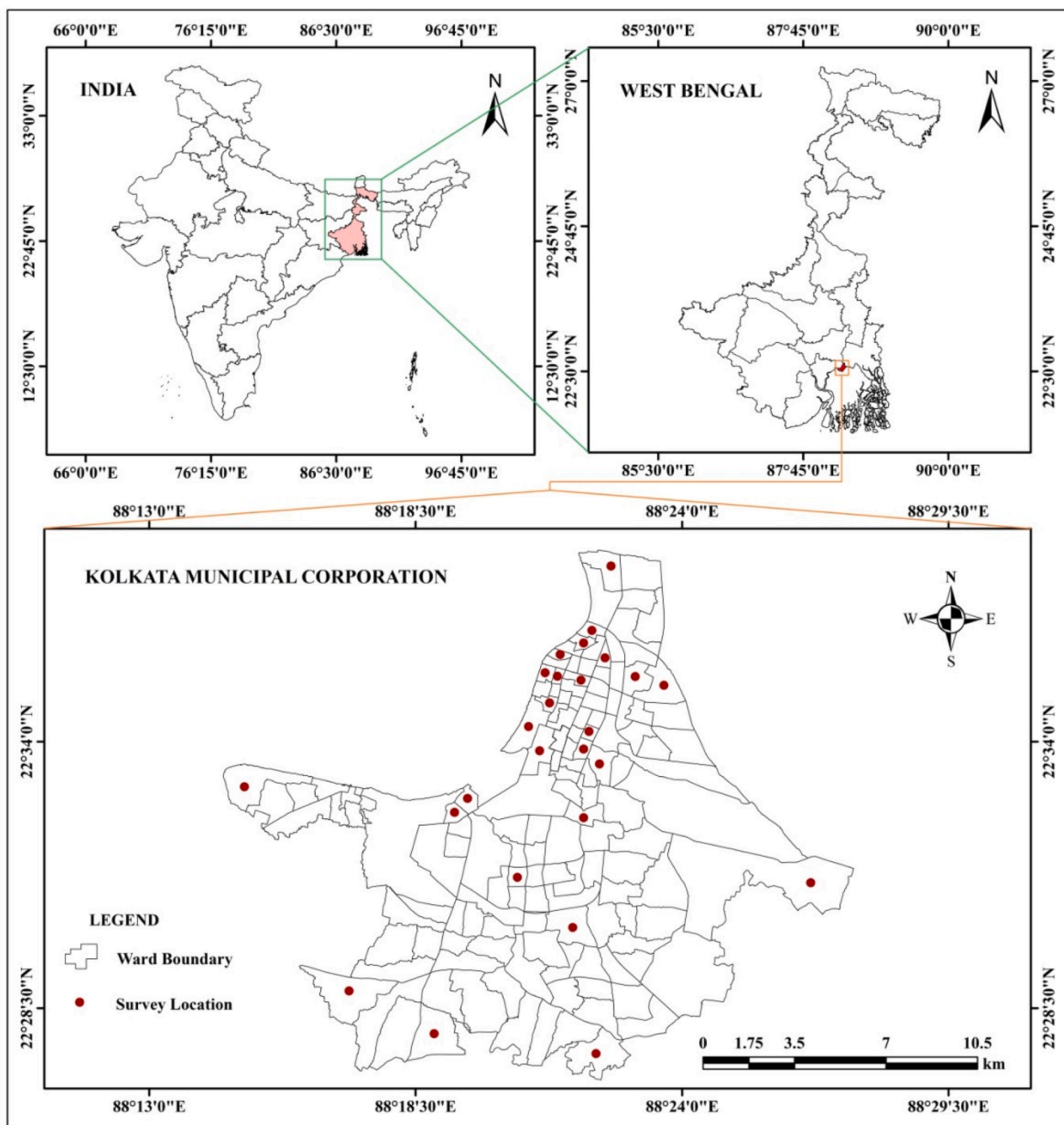


Fig. 1. Geo-referenced location of the study area.
Source- Authors.

For the qualitative component, in-depth interviews were conducted. Using the cross-sectional database of the quantitative component, we extracted the list of respondents with poor health who did not visit public or private healthcare facilities during the antenatal period. Further, we purposively interviewed the listed women, and the saturation point determined the sample size of the in-depth interview. In qualitative research, the term "saturation point" refers to the stage at which researchers stop collecting new data because no additional or relevant information is being discovered. At this point, data collection is considered complete, as sufficient information has been gathered to address the research questions and achieve the study's objectives (Flick, 2018). We used semi-structured interview manuals for the respondents' participated in-depth interviews. In order to guarantee consistency and

accuracy, the interview guide was initially drafted in English, translated into Bengali and Hindi (the regional language), and then rewind-translated and reviewed by someone else. The interview guide included open-ended questions related to healthcare-seeking attitudes and practice. Probing inquiries were necessary to gather comprehensive information related to the themes above. The interviews were scheduled in advance, and suitable places were selected to ensure maximum privacy. The interviews were conducted in regional dialects, covered 25 to 35 min per participant, and were recorded with the respondent's consent. After each interview, annotations were made, incorporating observations of participant behavior and contextual factors to ensure cross-verification of the data with the recordings.

Outcome variables

In the quantitative section, the main variable was self-rated antenatal health. Participants were asked to rate their overall health during their last pregnancy using a scale ranging from very poor to very good. The responses were categorized into two groups to simplify the analysis. Ratings of fair, poor, and very poor were classified as poor health (coded as 1), while ratings of very good and good were classified as good health (coded as 0). The present study followed previous studies to develop valid self-reported health scaling and categories (Rahaman et al., 2022; Saha et al., 2022). Further, two follow-up questions, i.e., major self-reported diseases and diseases-specific healthcare utilization, were asked of the respondents who reported fair, poor, and very poor SRH. Therefore, the study included major self-reported diseases and diseases-specific healthcare utilization as secondary outcome variables. The major self-reported diseases included gestational diabetes (no, yes), iron deficiency anemia (no, yes), sexually transmitted infections (no, yes), hyperemesis gravidarum (no, yes), preeclampsia (no, yes), difficulty with vision during daylight (no, yes), swelling of legs, body, and face (no, yes), prolonged vaginal bleeding (no, yes), depression and anxiety (no, yes), and other issues (no, yes). All self-reported diseases were measured using ad-hoc instruments following the National Family and Health Survey (International Institute for Population Sciences and Inter City Fund, 2022). The healthcare utilization was constructed based on the question- "which healthcare provider did you visits for such health problems?" Response options were: did not visit any healthcare (categorized as unmet need); district hospital/sub-district hospital, primary health center, community health center, health post/sub-centers, and Government AYUSH hospital (categorized as public health service); private hospital, private clinic, private AYUSH hospital (categorized as private health service); and non-governmental organization (NGO), trust and church-run hospital or pharmacy, mobile healthcare unit, untrained practitioners, and others (categorized as other health services). The categorization of healthcare services followed the previous study (Rahaman et al., 2022).

Explanatory variables

The key explanatory variable was migration status (non-migrants and migrants). Migrants include the respondents who reported that their last residence was outside Kolkata Municipal Corporation. Other covariates were respondent's age (15–19, 20–24, 25–34, 35 and above), marital status (currently married and ever married), age at first childbirth (below 18 years, 18–34, and 34+), parity (2 and below, 3 and more), religion (Hindu, Muslim, and other), education level (illiterate, primary, secondary and higher), household average annual income (₹25,000 and below, ₹25,001–₹49,999, ₹50,000 & above), occupation (not working, beggar, rag picker, maidservant, and other), nature of homelessness (chronic and temporary), living with family (yes or no), and number of antenatal care (ANC) visits (0, 1–3, 4 & above). Chronic homelessness indicates the respondents who were homeless since birth, whereas temporary homelessness indicates those who were temporarily homeless. Parity indicates the total number of live births delivered by a woman.

Statistical analysis

Descriptive statistics with 95 % confidence interval (CI), bivariate analysis with Pearson chi-square significance test, and binary logistic regression model were applied to present the quantitative results. Descriptive statistics showed the background characteristics of the study population. The 95 % CI for background characteristics of the study sampled population (Table 1) was estimated using the following method:

Table 1

Background characteristics of the study population included in cross sectional section, Kolkata Municipal Corporation, India, 2022–23.

Background characteristics	n	Percentage (95 % CI)
Migration status		
Non migrants	95	23.8 (19.4–28.5)
Migrants	305	76.2 (71.5–80.6)
Age group		
15–19	83	20.7 (17.6–25.4)
20–24	130	32.5 (28.0–37.3)
25–39	98	24.5 (20.7–28.8)
30–34	70	17.5 (14.3–21.4)
35 & above	19	4.8 (1.7–8.4)
Marital status		
Currently married	302	75.5 (70.7–79.9)
Ever married	98	24.5 (20.1–29.3)
Parity		
2 & below	138	34.5 (30.1–38.7)
3 & more	262	65.5 (61.3–69.9)
Religion		
Hindu	163	40.8 (36.2–45.4)
Muslim	197	49.2 (45.9–53.7)
Other	40	10.0 (8.5–12.4)
Level of education		
Illiterate	206	51.5 (46.6–56.4)
Primary level	171	42.8 (37.9–47.7)
Secondary & higher level	23	5.7 (4.0–8.2)
Household annual income		
₹25,000	171	42.8 (38.6–46.5)
₹25,001–₹49,999	181	45.2 (41.8–49.2)
₹50,000	48	12.0 (10.7–14.2)
Occupation		
Not working	73	18.3 (14.2–22.5)
Beggar	81	20.3 (16.3–24.6)
Rag picker	123	30.8 (26.4–35.2)
Maidservant	97	24.3 (19.4–28.3)
Other	26	6.5 (5.0–8.4)
Nature of homelessness		
Chronic	175	35.8 (31.4–40.2)
Temporary	225	64.2 (59.8–68.6)
Living with family		
Yes	288	72.0 (67.6–76.2)
No	112	28.0 (23.8–22.4)
Number of antenatal care visit		
0	203	50.8 (46.4–55.5)
1–3	132	33.0 (29.1–37.2)
4 & above	65	16.2 (13.7–19.3)
Total (n)	400	100

Note: CI denotes Confidence Interval; Source: Author's estimation from primary survey, 2022–23.

$$\bar{x} \pm Z \left(\frac{s}{\sqrt{n}} \right)$$

Where, \bar{x} = Sample mean, Z= Critical value from the standard normal distribution corresponding to the desired confidence level (e.g., 1.96 for a 95 % CI), S= sample standard deviation, N= sample size.

Bivariate analysis with 95 % CI and Pearson chi-square test presented the prevalence of poor SRH with background characteristics with level of significance. The equation of the Pearson chi-square test is as follows:

$$= \sum \frac{(O - E)^2}{E}$$

Where, χ^2 = chi-square test; \sum = the sum of; O = observed frequency; E = Expected frequency.

In bivariate analyses (Table 2), the 95 % CI was estimated using following method:

$$CI = \hat{p} \mp Z_{\alpha/2} .SE_{\hat{p}}$$

Where, \hat{p} = estimated proportion (i.e., poor SRH), $SE_{\hat{p}}$ = Standard error of the proportion \hat{p} , and $Z_{\alpha/2}$ =1.96.

Table 2
Prevalence of poor self-rated health (SRH) among the study population by background characteristics, Kolkata Municipal Corporation, India, 2022–23.

Background characteristics	Prevalence of poor SRH	95 % CI	Pearson χ^2 p value
Migration status			
Non-migrants	55.8	48.4–61.8	$p = 0.041$
Migrants	62.6	56.6–70.0	
Age group			
15–19	66.3	59.9–76.5	$p = 0.010$
20–24	48.7	40.5–57.3	
25–29	52.4	43.5–61.3	
30–34	55.7	46.8–65.2	
35 & above	57.4	48.2–66.6	
Marital status			
Currently married	57.2	49.2–66.1	$p = 0.037$
Ever married	62.2	53.2–70.5	
Parity			
2 & below	56.5	49.4–64.0	$p \leq 0.001$
3 & more	59.2	51.7–66.3	
Religion			
Hindu	57.1	46.6–68.6	$p = 0.071$
Muslim	58.8	47.3–69.3	
Other	57.5	45.7–69.5	
Level of education			
Illiterate	61.4	54.1–69.0	$p \leq 0.001$
Primary level	59.0	51.4–66.3	
Secondary & higher level	56.4	48.7–63.6	
Household annual income			
≤₹25,000	56.2	47.9–64.8	$p = 0.050$
₹25,001–₹49,999	45.9	37.3–55.5	
≥₹50,000	52.1	43.5–60.7	
Occupation			
Not working	56.2	46.9–65.8	$p = 0.003$
Beggar	63.0	53.4–72.2	
Rag Picker	64.2	54.9–73.5	
Maid/servant	53.6	44.2–63.0	
Other	61.5	53.0–70.8	
Nature of homelessness			
Chronic	61.9	52.5–71.3	$p \leq 0.001$
Temporary	55.9	47.4–64.5	
Living arrangement			
Living with family	54.2	45.5–63.0	$p \leq 0.001$
Alone	64.3	54.1–72.8	
Number of antenatal care visit			
0	60.1	51.6–68.9	$p \leq 0.001$
1–3	59.8	51.0–68.3	
4 & above	61.5	53.3–70.0	
Total	57.0	49.4–66.1	

Note: CI denotes Confidence Interval, SRH Self-rated health; Source: Author’s estimation from primary survey, 2022–23.

Finally, multivariable binary logistic regression determined the association between poor SRH, migration status, and other significant predictors. Further, the interaction effects (Migration status # Living arrangement) were performed, and the independent effects of migration status and living arrangement on poor SRH were estimated. The equation of the multivariate logistic regression is as follows:

$$\text{logit}(Y) = \ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 \mathcal{X}_1 + \beta_2 \mathcal{X}_2 + \beta_3 \mathcal{X}_3 + \dots + \beta_k \mathcal{X}_k$$

The regression coefficients in this equation were $\beta_1, \beta_2, \dots, \beta_k$, which showed the relative effect of migration status and other covariates on the dependent variable, i.e., poor SRH, with the coefficients changing depending on the context of the studies.

The present study employed thematic analysis, contextualizing the comprehensive findings related to attitude, practice, and barriers to healthcare service utilization. The authors performed simultaneous data analysis alongside data collection. All qualitative interviews were audio-recorded, and the field notes were transcribed verbatim into the local languages of Bengali and Hindi. Subsequently, the transcribed documents were translated into English after carefully reviewing the audio

and field notes. Each transcribed document was imported as a separate primary document into the ATLAS.ti7 software, further coded and analyzed in a new hermeneutical unit (Flick, 2018). The raw data were systematically categorized and coded into themes and sub-themes after multi-round revision of transcribed documents. Central themes were constructed based on the natural meaning of categories and were made non-repetitive (Flick, 2018). Finally, the themes that emerged after analysis were cross-checked. An inductive approach was used throughout the data analysis to identify the themes and sub-themes (Flick, 2018).

Ethical considerations

The institutional review board approved the study under the approval number IIPS/AC/MR/IO-889/2022. After systematic evaluation, the International Institute for Population Sciences provided an ethical certificate to conduct the present study. To maintain the research ethics, a participant information sheet and informed consent form were provided to the participants at the beginning of the interviews. In cases where an individual was illiterate, the documents were read out to them in a language they were familiar with, in the presence of a witness. The study maintained convenient and flexible participation and interview. To protect privacy, the study kept participants’ responses confidential and used pseudonyms in the final dataset. The study ensured a comfortable and safe interview environment.

Results

Results from quantitative measures

Background of the study participants

The study included a total sample of 400 women aged 15–45 years after excluding non-response and partial responses for analysis. Out of the total of 400 study participants, almost 76.2 % (95 % CI: 71.5–80.6) of them were migrants and currently married. One-third of participants were aged 20–24 years (32.5 %; 95 % CI: 28.0–37.3), rag pickers (30.8 %; 95 % CI: 26.4–35.2), and living alone (28 %; 95 % CI: 23.8–22.4). Most respondents reported a parity of three or more (65.5 %; 95 % CI: 61.3–69.9). Almost half of the respondents reported they are illiterate (51.5 %; 95 % CI: 46.6–56.4), Muslims (49.2 %; 95 % CI: 45.9–53.7), and chronically homeless (35.8 %; 95 % CI: 31.4–40.2). Only 16.2 % (95 % CI: 13.7–19.3) of the respondents completed a full ANC visit (at least four or more). Only 12 % (95 % CI: 10.7–14.2) of the respondents reported an annual income of ₹50,000 and above (Table 1).

Prevalence of poor SRH by respondent’s background characteristics

More than half of respondents reported poor SRH (57 %; 95 % CI: 49.4–66.1). The prevalence of poor SRH was considerably higher among migrants (62.6 %; 95 % CI: 56.6–70.0) than non-migrants (55.8 %; 95 % CI: 48.4–61.8). A similar level of poor SRH was also observed among the ever-married respondents (62.2 %; 95 % CI: 53.2–70.5), illiterates (61 %; 95 % CI: 61.0–61.7), beggars (63 %; 95 % CI: 53.4–72.2), and chronically homeless (61.9 %; 95 % CI: 52.5–71.3). However, it was extremely high among the respondents who belonged to the age group 15–19 years (66.3 %; 95 % CI: 59.9–76.5), rag pickers (64.2 %; 95 % CI: 54.9–73.5), and living alone (64.3 %; 95 % CI: 54.1–72.8) (Table 2).

Adjusted likelihood of poor SRH by respondent’s background characteristics

Migration status was significantly associated with poor SRH (Table 3). The likelihood of poor SRH was 7 % (OR: 1.07; 95 % CI: 1.03–2.09) more likely among migrants than non-migrants. However, the migrants living alone reported 29 % (OR: 1.29; 95 % CI: 1.19–2.31) more likely poor SRH than their counterparts (Fig. 2). Like migration status, respondents’ age, marital status, occupation, nature of homelessness, and ANC visits were also statistically significant associated factors with poor SRH (Table 3). In particular, the likelihood of poor

Table 3

Unadjusted and adjusted odds ratio (OR) of poor self-rated health (SRH) among the study population by background characteristics, Kolkata Municipal Corporation, India, 2022–23.

Background characteristics	Unadjusted OR (95 %)	Adjusted OR (95 % CI)
Migration status		
Non-migrants ®	1.00	1.00
Migrants	1.09** (1.08–3.10)	1.07* (1.03–2.09)
Age group		
15–19 ®		1.00
20–24		0.96* (0.81–0.98)
25–39		0.91 (0.78–1.52)
30–35		1.03 (0.94–1.07)
Marital status		
Currently married ®		1.00
Ever married		1.05** (1.01–1.19)
Parity		
2 & below ®		1.00
3 & more		1.09 (0.77–1.04)
Religion		
Hindu ®		1.00
Muslim		0.99 (0.80–1.23)
Other		1.13 (0.99–1.37)
Level of education		
Illiterate ®		1.00
Primary level		1.07 (0.91–1.23)
Secondary and higher level		0.94 (0.73–1.11)
Household annual income		
≤₹25,000 ®		1.00
₹25,001–₹49,999		1.01 (0.91–1.23)
≥₹50,000		0.96 (0.79–1.99)
Occupation		
Not working ®		1.00
Beggar		1.15*** (1.05–1.28)
Rag Picker		1.17** (1.15–1.39)
Maid/servant		0.91*** (0.79–0.92)
Other		1.02 (0.90–1.17)
Nature of homelessness		
Chronic ®		1.00
Temporary		0.97*** (0.75–0.99)
Living arrangement		
With family ®		1.00
Alone		1.19*** (1.17–1.52)
Number of antenatal care visit		
0 ®		1.00
1–3		1.04* (1.03–1.26)
4 & above		1.11** (1.04–1.60)

Note: CI Confidence interval; ® Reference category; *** $p < 0.001$ ** $p < 0.01$; * $p < 0.05$; Source: Author's estimation from primary survey, 2022–23.

SRH was 5 % (95 % CI: 1.01–1.19) higher among the ever-married women than their counterparts. Occupational status was also statistically significant and associated with poor SRH. The likelihood of poor SRH was substantially high among the beggars (OR: 1.15; 95 % CI: 1.05–1.28) and rag pickers (OR: 1.17; 95 % CI: 1.15–1.39) than reference category, i.e., not working. The adjusted odds ratio of poor SRH was 1.19 times (AOR: 1.19; 95 % CI: 1.17–1.52) higher among the respondents living alone than the reference group, i.e., living with family. The likelihood of poor SRH was positively associated with the number of ANC visits (Table 3).

Scenario of self-reported diseases among the respondents with poor SRH by migration status

Depression was the topmost disease reported by both migrants and non-migrants. However, the prevalence of depression was two times higher among migrants (79 %) than non-migrants (42 %). Iron deficiency anemia was the second most reported disease, with somewhat high among the migrants. Swelling of the legs and preeclampsia was also prevalent among the respondents (Fig. 3).

Patterns of healthcare utilization among the respondents with poor SRH by migration status

The unmet need for healthcare services was around 40 % among the respondents with poor SRH (Fig. 4). The level was considerably high among migrants (51 %) than among non-migrants (27 %). Respondents mostly preferred other healthcare services (34 %) compared to public (21 %) and private (4 %) healthcare facilities. Only one-fifth of migrants with poor SRH utilized standard health services like public (17 %) and private (2 %) health services (Fig. 4).

Results from qualitative analyses

Description of participants included in the qualitative section

Table 4 shows the descriptive characteristics of the participants included in the in-depth interviews. Out of the total of 52 in-depth interviews, most of them were young (mean age 24 years), currently married (65 %), migrants (74 %), lower educated (mean years of schooling 5.1), and Muslims (48 %).

Reasons for not accessing standard healthcare services

The reasons for not accessing standard healthcare services were multidimensional and interlinked aspects displayed in the qualitative analysis, which highlighted the following aspects: (1) traditional practice, (2) reproductive and sexual health-related stigma, (3) daily work burden, (4) deprived livelihood, (5) negative attitude from healthcare providers, (6) Poor quality of public health services, and (7) language barriers.

Traditional belief

Despite residing in an urban cultural milieu, traditional health-seeking behaviors were common among the respondents who participated in-depth interviews. Most respondents believed that taking medicine without severe illness increases the risk of pregnancy loss during antenatal. They primarily sought treatment and blessing from religious ascetics and black magicians during antenatal difficulties. A woman described her antenatal depression treatment process as follows: "I was distraught and anxious during my last pregnancy because all my previous pregnancies resulted in stillborn babies. But one day, a friend suggested to me a Tantik who could save my pregnancy. I visited him, and he did an exorcism and gave me a special amulet to protect me from evil spirits. After that, I felt so much better - happy and relieved." (Ruma Mandal (name changed), In-depth interview, 31 years)

Reproductive and sexual health-related stigma

Most participants expressed discomfort in discussing reproductive and sexual health issues with male healthcare providers as a reason for not accessing healthcare services. In most reproductive and sexual illnesses, they preferred home remedies or sought treatment from untrained female herbalists (Kabiraz) to maintain privacy. Among the respondents of in-depth interviews, a woman shared her thoughts: "I experienced white vaginal discharge during one month of pregnancy. I went to a hospital but didn't find female doctors at that time. How could I talk about my problems with male doctors? Therefore, I sought treatment from a female traditional healer (Kabiraz) who gave me Guduchi plant roots as medicine. Like me, many women in our community seek treatment from female herbalists." (Ayesha Bibi (name changed), 35 years)

Daily work burden

The majority of participants expressed that they are usually busy with daily chores like collecting trash, performing laundry, and begging for a living. As a result, most of them had no additional time to receive treatment from public healthcare systems. Additionally, some participants highlighted that inflexible outpatient visiting hours, overcrowding, and long waiting times are significant barriers to not seeking treatment from public health facilities. A participant during in-depth

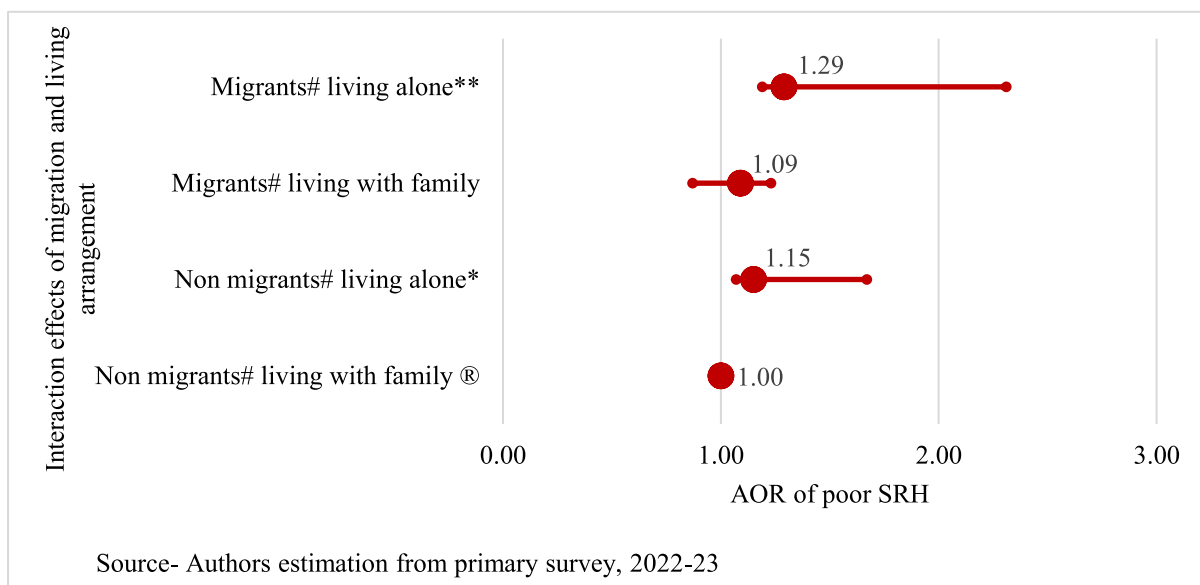
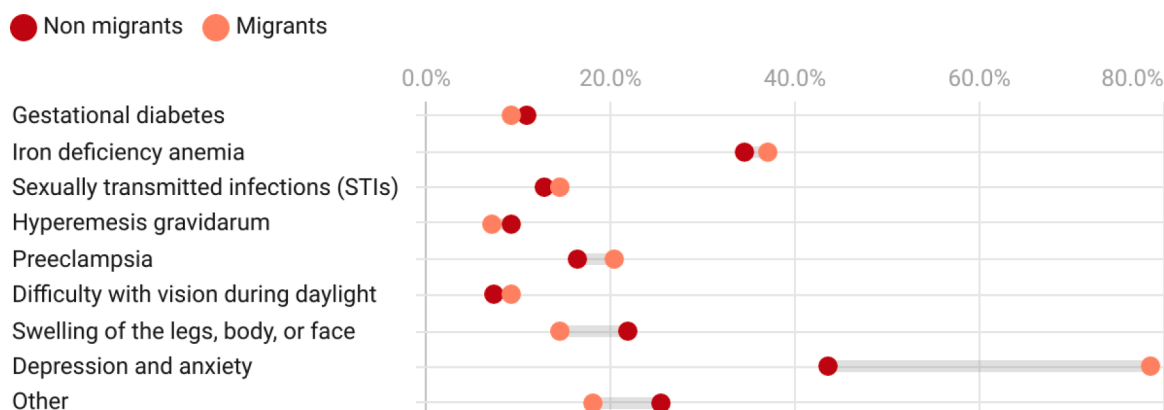


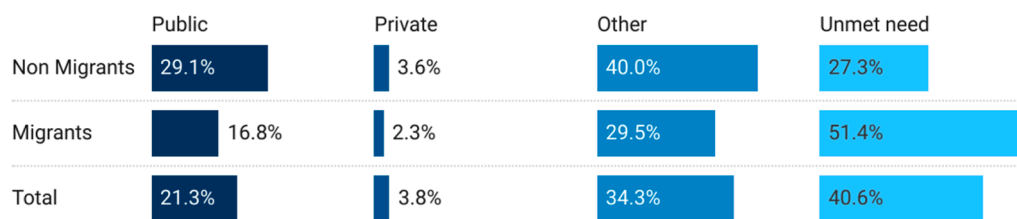
Fig. 2. Interaction effects of marital status and living arrangement on poor self-rated health among the study population, Kolkata Municipal Corporation, India, 2022–23

Note: AOR Adjusted Odds Ratio; SRH Self-rated health; CI Confidence interval; ® Reference category; **p < 0.01; *p < 0.05.



Source: Cross-sectional survey by the Authors (2022-23)

Fig. 3. Prevalence and patterns of self-reported diseases among the respondents with poor self-rated health (n = 228) by migration status, Kolkata Municipal Corporation, India, 2022–23.



Source: Cross-sectional survey by the Authors (2022-23)

Fig. 4. Levels and patterns of healthcare utilization among the respondents with poor self-rated health (n = 228) by migration status, Kolkata Municipal Corporation, India, 2022–23.

interviews expressed that: "I have four children, and their daily bread depends on begging. As a result, I have no time to visit public health facilities because it takes a long waiting time."– (Rupali Biswas (name changed), 28 years old)

Similarly, a participant who was a migrant laborer added: "Public outpatient hours are 10AM to 12AM, which is our working time. As a result, we cannot visit public health services and usually seeks treatment from nearby other healthcare facilities." (Asgari khatun, In-depth

Table 4

Description of the study population included in qualitative section, Kolkata Municipal Corporation, India, 2022–23.

Background characteristics	n	Mean	SD
In depth interview participants	Total (n)=52		
Age		23.94	5.63
Years of schooling	52	5.12	3.49
Annual income	52	13,139.73	10,381.79
Marital status			
Currently married	34	65.4	–
Ever married	18	34.6	–
Migration status			
Non migrants	14	26.92	–
Migrants	38	73.08	–
Religion			
Hindu	21	40.38	–
Muslim	25	48.08	–
Others	6	11.54	–

Source: Author's, Primary survey, 2022–23.

interview, 19 years old)

Deprived livelihood

Most participants said that the public and private treatment cost is substantially higher than their earnings. They mentioned that although the charge of care from public healthcare facilities is low, the cost of medicine and various medical tests is expensive, leading to high out-of-pocket medical expenses. Consequently, they usually avoid visiting public and private healthcare facilities for general health problems until they become severe. A participant who works as a rag picker shared her struggle of daily living and reason for not visiting standard health services followings: "I rely on rag picking, but it's a tough field with a lot of competition. I work long hours every day, sorting and selling the rags, but at the end of the day, I only earn 300 rupees. This is not enough for me to afford healthcare, medical tests, or expensive medicines. I can only hope I don't get seriously ill and rely on God's protection." (Manti Sarkar (name changed), In-depth interview, 29 years old)

Similarly, a participant who was a migrant laborer stated that: "I am struggling to secure a better future and overcome our homelessness. I hold onto the hope for a better life, and therefore, I try to send remittances to my native place for the improvement of our houses and the economic betterment of my left-behind family by adjusting healthcare and living costs." (Pinky Roy (name changed), In-depth interview, 22 years old)

Negative attitude of healthcare providers

Some participants cited that experiencing negative attitudes from healthcare providers demotivated them from accessing public healthcare services. They stated that some doctors do not treat them respectfully and generally show negative attitudes during public outpatient visits. For instance, a participant aged 25 years during in-depth interviews shared that: During my last delivery at a public hospital, doctors and nurses sterilized me without informing me. After that, I never visit public services for my illness." (Kusum Begam (name changed)

Poor quality of public health services

Several respondents reported that inadequate healthcare infrastructure, including shortages of general physicians, obstetricians, and gynecologists, poor quality laboratory services, and a shortage of labor rooms, discourages them from utilizing public healthcare services. A young woman who participated in-depth interviews shared her heartbreaking story, following: "I had severe antenatal health issues, but the doctors at the nearby primary hospital were unable to provide me emergency treatment. After long hours of waiting, the doctor informed me to be referred to a district medical hospital located 25 kms away from her homeless cluster. I was worried and anxious about the referral because I had heard stories about the poor quality of healthcare at the

district hospital. However, I had no choice!" (Sabuj Jahan (name changed), 20 years old)

Language barriers

A few participants, mainly migrants who belonged to tribal communities and usually used their local dialects during in-depth interviews, shared that they usually face linguistic barriers while seeking treatment from public healthcare facilities. They expressed that sometimes they fail to express their health issues to the doctors. As a result, they usually seek treatment from local untrained doctors who understand their dialects.

Discussion

The present cross-sectional exploratory study examined differentials in poor self-rated health, self-reported diseases, and healthcare utilization among homeless women during the antenatal period, focusing on migration status. The study also explored the reasons for not accessing public and private healthcare facilities for antenatal health difficulties. The study's findings showed a considerable difference in self-rated health (SRH) between migrants and non-migrants. The migrants were more likely to report poor SRH than their counterparts. These findings are similar to previous studies on migrant antenatal health status conducted in Sweden and France (Henriksson et al., 2020; Liu et al., 2019; El-Khoury et al., 2018). However, these studies mostly covered general women and did not include homeless women. Similar to homeless migrant women in the present study, migrant women who are asylum seekers or undocumented migrants have a higher risk of poor maternal self-rated health than their counterparts, as revealed by previous studies (Liu et al., 2019). Research related to migration, homelessness, and maternal health is limited, although many studies related to the maternal health of migrant women have been conducted. The likelihood of poor antenatal SRH was high among migrants, possibly due to the following reasons: First, maternal health vulnerabilities among migrant women are significantly higher than among non-migrants (Pardhi et al., 2020). Second, different social and physical environments at the place of destination can adversely affect migrants, particularly women's health and well-being (Kaoutar et al., 2014). Third, migrant women who are informal laborers and homeless face violence, discrimination, and exposure to substance abuse (Bohren et al., 2015). Fourth, low maternal healthcare utilization among women is prevalent among migrants, positively increasing maternal health vulnerabilities (Pardhi et al., 2020).

In the present study, homeless women who were migrants and living alone were more likely to report poor SRH compared to their counterparts. Likewise, a previous study in France also revealed a high prevalence of health risks, including chronic diseases, among homeless migrants living alone (Kaoutar et al., 2014). Existing studies have suggested that living alone during pregnancy increases the risk of depression due to a lack of peers and social support (Andersson et al., 2006). Consistent with previous studies (Duke and Searby, 2019; Roze et al., 2018), the present study identified depression and anxiety as prevalent among homeless women, particularly among those who were migrants. Prior research suggested that mothers facing material hardships, including homelessness, are at a higher risk of exposure to various environmental, social, and individual risk factors. These circumstances can exacerbate their vulnerability and contribute to an increased risk of experiencing depression (Roze et al., 2018). The present study revealed a significantly higher prevalence of depressive symptoms during the antenatal period among migrants compared to non-migrants, which aligns with a previous study on low-income Mexican American families (Luecken et al., 2013). Depression symptoms are prevalent among labor migrant women for several reasons: stressful life events, lack of family and social support, poor livelihood, and a higher risk of discrimination and violence at their destination (Zelkowitz et al., 2004). Apart from migration status, the homeless women's age, occupation, and living

arrangement were identified as significant predictors of poor SRH. Maternal health status significantly varies with women's age of child-bearing, occupation, and living arrangements, as suggested by many previous studies (Westeneng & d'Exelle, 2015; Mohapatra, 2012). Women engaged in dirty, dangerous, and demeaning work, such as rag pickers, sewage workers, and others, are more vulnerable to antenatal difficulties, as suggested by a previous study (Mohapatra, 2012).

The present study highlights a significant concern regarding the high unmet need for healthcare visits among homeless women, particularly those who were migrants. This finding aligns with numerous previous studies indicating lower utilization of modern healthcare facilities among homeless individuals and migrants (Adewole et al., 2023; Babu et al., 2022; Pardhi et al., 2020). The study's qualitative findings shed light on various factors that influence the choice, attitude, acceptability, and utilization of healthcare services among homeless women. These factors can be categorized into three main domains: individual, socioeconomic, and structural. At the individual level, factors such as adherence to traditional practices, stigma related to reproductive and sexual health, and language barriers were identified as influential in healthcare decision-making. These individual-level factors can shape perceptions, attitudes, and preferences when seeking healthcare services. Socioeconomic factors, including the burden of daily work and deprived livelihood, impacted healthcare utilization among homeless women. The demanding nature of their work and their disadvantaged socioeconomic circumstances can create barriers to accessing healthcare services. Structural factors, such as negative attitudes from healthcare providers and poor quality of public health services, were also identified as significant contributors. Homeless women may encounter judgment or mistreatment from healthcare providers, which can deter them from seeking care. Additionally, inadequate quality of public health services may lead to a lack of trust and reluctance to engage with the healthcare system. These findings emphasize the complex interplay of various factors that influence healthcare utilization among homeless women. The findings are similar to previous studies covering facilities, barriers, and factors associated with maternal healthcare among migrants and people experiencing homelessness (Paisi et al., 2021; Pardhi et al., 2020; Nabieva and Soares, 2019; Gelberg et al., 2004). Addressing these barriers requires a comprehensive approach that considers individual, socioeconomic, and structural factors to ensure equitable access to healthcare services for this vulnerable population.

Limitations and strengths of the study

The study has several limitations, as follows: First, the primary and secondary outcome variables included in the quantitative section, i.e., self-rated antenatal health, self-reported health diseases, and healthcare utilization, are measured based on the latest antenatal period during the last three years prior to the survey, which may be subject to recall bias and affect the reliability of results. Secondly, the results are based on self-reported responses, which could be affected by the reporting (under or over-reporting) based on the socioeconomic background of the population, site, and situation during the interview. Third, due to the cross-sectional design, the study is limited to describing the causal relationship between the outcome variable and associated factors. Fourth, the study used a five-point self-rated health scale but converted it to a dichotomous variable (poor vs. good) due to the limited sample size in the lowest points, limiting more reliable estimation with the ordered logit regression model. Finally, the result is restricted to only the selected study population and cannot be generalized. Therefore, the present study recommends a further longitudinal survey to capture reliable figures on maternal health among homeless women.

Although the present study has certain drawbacks, it also possesses several strengths. Firstly, this is the first study in the Indian context that contextualizes migration, homelessness, and antenatal health. Therefore, the study findings will be helpful for researchers in understanding the maternal health issues among homeless women and formulating

more systematic future studies. Secondly, the study examines the association between prenatal health and migration status among homeless women, thereby expanding the scope of research on migration and health. Finally, the study contributes to our understanding of the factors associated with healthcare choices among homeless women.

Conclusion

The study's quantitative findings concluded that homeless women are highly vulnerable to antenatal health, including prevalent poor SRH, depression, and other antenatal complications. The migrant, homeless women were more likely to report antenatal health complications. The high unmet need for healthcare visits was a significant concern among homeless women, particularly those who were migrants. Utilization of substandard health facilities and not using any health facilities was substantial among the homeless women, mainly migrants. The qualitative findings displayed a complex interplay of individual, socioeconomic, and structural factors influencing homeless women's healthcare utilization. Socio-cultural traditions, economic hardship and institutional barriers were identified for not accessing public and private healthcare facilities. To improve healthcare access for homeless and migrant women, community and mobile healthcare services should be introduced, fostering collaboration among public institutions, NGOs, and community-based organizations. Ultimately, improving the situation requires a holistic approach that addresses the physical healthcare needs and the socioeconomic and cultural factors influencing healthcare utilization. By addressing socioeconomic and cultural factors, implementing tailored programs, and training healthcare providers, we can ensure equitable and comprehensive reproductive health services for these vulnerable populations.

Consent for publication

Not Applicable.

CRedit authorship contribution statement

Margubur Rahaman: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Kailash Chandra Das:** Data curation, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – review & editing.

Declaration of competing interest

The authors declare that there are no potential conflicting interests and therefore have nothing to declare.

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Ethical Approval

The present study is part of the first author's doctoral work, and the authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional

committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The study was approved by the institutional review board under the approval number IIPS/AC/MR/10-889/2022.

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