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Original Research Article

Access to sanitation and risk of developing urinary tract infections among women from low socio-economic settings

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ABSTRACT

Background: Poor sanitation facilities are root cause of many health problems of people residing in slums. The present study estimates the prevalence of urinary tract infections (UTI) and identifies factors associated with an increased risk of UTI among women.
Methods: A cross-sectional study was conducted among 616 women aged between 18 to 60 years residing in 33 slums across four cities in Maharashtra, India. Data related to individual characteristics of women, housing condition, access to sanitation facilities, behaviors adopted by the women that could lead to UTI and an episode of symptomatic UTI in the previous one month were recorded through structured questionnaire. Logistic regression analysis was performed to find out risk factors for UTI among women.
Results: The prevalence of UTI was found to be 19.6%. The prevalence was higher among young women aged upto 30 years (23.2%). In absence of individual toilet, women had adopted certain behaviors such as urine holding (21.3%), modify dinner to avoid toilet use at night (26.6%) and avoid intake of liquids (10.7%) to reduce frequency of visits to toilet. All these behaviors were significantly associated with UTI. Multiple logistic regression indicated that UTI was strongly and independently associated with age (OR=1.64, 95%CI: 1.08, 2.47), no access to bathroom (OR=2.21, 95%CI: 1.08, 4.49) and avoid intake of liquids (OR=2.70, 95%CI: 1.53, 4.75) ($p<0.05$).
Conclusions: Behavior modifications by women to adjust with restricted use of place of urination may affect their health and increase the likelihood of developing UTI. Younger women are more at risk of developing UTI.

Keywords: Urban slums, Risk factors for urinary tract infections, Place of urination, Access to toilet

INTRODUCTION

Inadequate and poor quality sanitation infrastructure is the major concern for developing country. Poor sanitation can substantially increase morbidities and severity of the various diseases in women. Moreover, it can have long-term negative effects on their psychological well-being and can leads to poor quality of the life.[1] India is implementing nationwide program to improve access to basic sanitation by building individual toilet at household level. Yet, staggering 355 million women and girls are still waiting for a toilet.[2] Inadequate access to sanitation that is unavailability of either individual or shared toilet forces them to use badly maintained and overcrowded community toilet blocks or practice open defecation. Often, in densely populated areas such as urban slums, it is challenging for women to find privacy. This can lead them to refrain from urinating and defecating for many hours which may cause urinary tract infections (UTI) in them.[3]

UTI is the most common non-intestinal infection among women worldwide. More than half of all women experience at least one urinary tract infection (UTI) during their lifetime.[4] UTI may not be a life-threatening but can cause serious health effects in women if left untreated or undertreated. The possible clinical manifestation includes impaired kidney function, pyelonephritis which can lead to renal scarring and sepsis and increased risk of preterm birth and low birth weight in pregnancy.[5] Further, UTI has an impact on health related quality of life.[6] Studies have reported that UTI is associated with poor self-esteem, social isolation, and depression among women.[7]

Studies available in the literature pertaining to UTI are mostly conducted in hospitals and use laboratory investigations to confirm UTI.[6,8] Typically, these studies reported UTI among health service users. However, hospital based studies may not present sufficient information about UTI in women as they are less likely to seek medical consultation for problems related to urinary tract. Women suffering from UTI prefer to follow self-care practices such as use of protective pads and decrease fluid intake.[8] Therefore, community based study carried out using symptomatic approach is necessary to understand the issue in depth. Earlier community-based survey has reported UTI in 29.9% of women from urban slums of Mumbai, India.[9] Prevalence of community acquired-UTI was found to be 45.2% in women from rural Odisha.[10] However, updated data on prevalence and determinant of UTI among women from community based studies are essential for planning and implementation of health and sanitation program at grass-root level.

This community-based study estimates the prevalence of UTI among women residing in urban slums. It examines the association between UTI and access to sanitation especially the accessibility to place of urination. Further, it studies the sanitation related behaviors in women and the pattern of consumption of water and other liquids as risk factor of UTI.

METHODS

A cross-sectional descriptive study was carried out between October 2015 and January 2016. A random sample of 616 women from 33 slums across four cities of Maharashtra, India was recruited for the study. A pre-tested structured interview schedule was administered to respondents by trained field investigators during house visits. The data collected for the study include background characteristics, housing condition, access to sanitation facilities and behaviors adopted by the women that could lead to UTI as well as an episode of symptomatic UTI in the last one month.

Women were asked to report whether they have complaints for any of the following symptoms like burning sensation/ pain during urination, frequent urination and itching around vagina. The key dependent variable of the study was binary variable; suffering from UTI or not suffering from UTI. Women reporting at least one symptom of UTI were categorized as women suffering from UTI. Women not reporting any symptoms of UTI served as reference group.

The women enrolled in the study did not have access to individual toilet; instead bathroom was used for urination. In the study setting 'bathroom' is a small and semi-constructed structure either inside or outside the house. In the slums bathroom is used for multiple water related activities mainly washing clothes, cleaning utensils, taking bath etc. In the absence of individual toilet, bathroom serves as a sanitation facility for these households.

The study protocol was evaluated by the Institutional Ethical Committee of the Gokhale Institute of Politics and Economics, Pune and was found to be ethically acceptable. Before conducting the interview, informed written consent was taken from each the respondents. The participation in the study was voluntary. Women were given an option to withdraw anytime from the study without any fear or obligation if they felt to do so.

Statistical analysis

The data entry and analysis was carried out using IBM SPSS 21.0 for Windows (Chicago, IL, USA). The variables used for analysis were either nominal or ordinal in nature. Pearson's Chi-square test was used to check the differences in proportion of women suffering from UTI by their characteristics. Statistical level of significance was set at 0.05. Univariate regression analysis was carried out to assess risk of UTI associated with individual characteristics of the women. A risk profile was then constructed in terms of adjusted odds-ratio (ORs) with 95% confidence intervals (CIs) by multivariate forward stepwise logistic regression.

RESULTS

Average (mean±Standard deviation) age of the women was 34.0±10.6 years and 42.7% women were between 18-30 years of age group. Majority (77.8%) of the women were educated up to 10th grade. Around 42.2% of the women were formally employed either as laborer or skilled workers (Table 1).

Average (median±inter-quartile range) area of the house was 200±150 sq.feet. Thirty-one percent households were staying in small single room with area less than 150 sq.feet. Individual bathroom was available for majority of the households (93.2%); either inside (76.0%) or outside (17.2%) the house.

Around 13.1% of the respondents confirmed suffering from burning sensation/ pain during urination. Frequent urination and itching around vagina was reported by

16.4% and 10.7% of the respondents, respectively. Overall, symptoms of UTI were reported by 19.6% of the women.

Table 1: Characteristics of the participants (n=616).

Characteristics		Number	%
Age (years)	18-30	263	42.7
	31-60	353	57.3
Education (years)	<10	479	77.8
	10+	137	22.2
Occupation	No formal employment	356	57.8
	Formally employed	260	42.2
Area of house (sq.ft.)	<150	192	31.2
	150-250	197	32.0
	>250	227	36.8
Access to bathroom	Inside house	468	76.0
	Outside house	106	17.2
	No access	42	6.8
Distance of public toilet from home	Near	389	63.8
	Neutral	69	11.3
	Far	152	24.9

None of the household had individual toilet. So, to reduce the toilet visits women had adopted certain behaviors such as urine holding (21.3%), modify dinner to avoid toilet use at night (26.6%) and avoid intake of liquids (10.7%) (Table 2).

Table 2: Behaviors related to urination among women.

Behavior	%
Women avoid going to urination even in need (urine holding)	21.3
Women modify dinner to avoid toilet use at night	26.6
Women avoid intake of liquids to reduce frequency of urination	10.7

Higher reporting of UTI was found in the younger age group of 18 to 30 years (23.2%) than older women aged more than 30 years (17.0%). Risk of UTI was 1.47 (95% CI: 1.01, 2.20) times higher in young women as compared to old women. Other factors which increased the risk of UTI in women included no access to bathroom (OR=1.91, 95% CI: 1.01, 3.82), community toilet far from home (OR=1.60, 95% CI: 1.00, 2.48), avoid visiting toilet (urine holding behavior) (OR=1.60, 95% CI: 1.02, 2.53), Modifications in dinner (OR= 2.05, 95% CI: 1.34, 3.12), avoid intake of liquids (OR=2.46, 95% CI: 1.42, 4.28) ($p<0.05$). Other characteristics of the women such as education and occupation did not have significant association with prevalence of UTI ($p>0.05$) (Table 3).

Table 3: Prevalence of UTI across characteristics of the women along with OR for UTI and associated 95% CI.

Characteristics		UTI		OR (95% CI)	P value
		Absent (n=495)	Present (n=121)		
		N (%)	N (%)		
Age (years)	18-30	202 (76.8)	61 (23.2)	1.47 (1.01,2.20)	0.035*
	31-65	293 (83.0)	60 (17.0)	1	
Education (years)	<10	381 (79.5)	98 (20.5)	1.27 (0.77,2.10)	0.341
	10+	114 (83.2)	23 (16.8)	1	
Occupation	No formal employment	290 (81.5)	66 (18.5)	1	0.269
	Formally employed	205 (78.5)	55 (21.4)	1.03 (0.95,1.12)	
Area of house (sq.ft.)	<150	153 (75.7)	49 (24.3)	1.35 (0.84, 2.16)	0.268
	150-250	170 (82.1)	37 (17.9)	0.92 (0.55, 1.51)	
	>250	204 (82.3)	44 (17.7)	1	
Access to bathroom	Inside house	379 (81.0)	89 (19.0)	1	0.058
	Outside house	87 (82.1)	19 (17.9)	0.93 (0.53, 1.60)	
	No access	29 (69.0)	13 (31.0)	1.91 (1.01, 3.82)	
Distance of community toilet from home	Near	323 (83.0)	66 (17.0)	1	0.051
	Neutral	52 (75.4)	17 (24.6)	1.60 (0.87,2.94)	
	Far	115 (75.7)	37 (24.3)	1.60 (1.00,2.48)	
Avoid visiting toilet	No	398 (82.1)	87 (17.9)	1	0.042*
	Yes	97 (74.0)	34 (26.0)	1.60 (1.02, 2.53)	
Modify dinner	No	378 (83.6)	74 (16.4)	1	0.001*
	Yes	117 (71.3)	47 (28.7)	2.05 (1.34, 3.12)	
Avoid intake of liquids	No	452 (82.2)	98 (17.8)	1	0.001*
	Yes	43 (65.2)	23 (34.8)	2.46 (1.42,4.28)	

Table 4: Risk factors for urinary tract infection among women from low-socio economic setting.

Characteristics	B	S.E.	Sig.	Exp (B)	95% C.I.for EXP(B)	
					Lower	Upper
Avoid intake of liquids	0.995	0.288	0.001	2.705	1.539	4.755
No access to bathroom	0.793	0.362	0.028	2.210	1.088	4.490
Age (18-30 years)	0.496	0.210	0.018	1.642	1.089	2.476
Constant	-0.936	0.223	0.000	0.392		

Multivariate forward stepwise logistic regression analysis was performed using UTI present/ absent as dependent variable and independent variables were age, access to bathroom, distance of community toilet from home, Avoid visiting toilet, modify dinner, avoid intake of liquids. R^2=0.049, p<0.05.

Univariate logistic regression analysis was carried out to obtain Odds Ratio (OR) and 95% confidence interval (CI) of OR using UTI present / absent as dependent variable.

Multiple logistic regression indicated that UIT was strongly and independently associated with age (OR=1.64, 95% CI: 1.09, 2.47), no access to bathroom (OR=2.21, 95% CI: 1.08, 4.49) and avoid intake of liquids to reduce frequency of visits to the toilet (OR=2.70, 95% CI: 1.53, 4.75) (adjusted R^2=0.049, p<0.05) (Table 4).

DISCUSSION

This study provides prevalence of UTI based on symptoms reported by women from slums of four major cities of Maharashtra, India. Women participated in the study were largely from low income settlements with reduced access to sanitation. Around 1/5th of the study participants reported symptoms of UTI. Analysis indicated age as significant independent risk factor for UIT, along with other factors such as no access to bathroom and less intake of liquids to reduce frequency of toilet visits.

Symptoms of lower urinary tract infection include bothersome sensations such as urinary urgency, frequent urination, painful urination, hesitancy and the sense of incomplete bladder emptying. In the present study data were collected on three symptoms of UTI mainly, burning sensation/ pain during urination, frequent urination and itching around vagina. Out of 616 women between 18 to 60 years of age, 121 (19.6%) women reported at least one symptom of UTI. The reporting was higher among young women aged 18 to 30 years (23.2%) as compared to women above 30 years (17.0%). Similar, prevalence (19.8%) of symptomatic UTI was reported in young nursing students with rural background.[11] Around 21.5% prevalence of UTI was observed among women attending community based health clinics.[12]

The term sanitation used in the study described as the availability of facilities to urinate or defecate. None of the households enrolled in the study had access to individual or shared toilet. Around 76.0% and 17.2% of the households had bathroom inside or outside the house, respectively. This was the place of the urination for the women. Other option for the women was community latrine. Although, the bathrooms were available in majority of the households, its' use as a place of urination was limited. Bathrooms inside the small houses may not provide sufficient privacy to the women especially when male member is present in the house. Use of bathrooms outside the households was restricted during night time. The restricted use of bathrooms leads to urine holding practice among these women which has adverse effect on their bladders.

The present study explored the association between access to sanitation and occurrence of UTI. The risk of UTI was more among women who do not have access to bathrooms and use unhygienic and inadequately maintained community latrines. Even earlier studies have reported highly significant association between of use of public toilets and UTI among women[11] as these toilets act as epicenters of germ transmission. The study conducted by Das et al reported the protective effect of access to latrine inside the house on UTI.[13]

Further, to lessen frequency of urination women avoid intake of liquids and do not drink their daily requirement of water, which has impact on their health, including increased chance of UTI, prolapsed bladder, involuntary urine release etc. The prevalence of UTI was almost double among women who avoid intake of liquid (34.8%) as compare to other women (17.8%). The relationship between limited liquid intake and UTI is been reported by various studies especially among working women and student.[14,15] Our study revealed that occupation was not the significant determinant of UTI among women from low socio-economic strata, residing in slums. It indicated that working women and home makers have equal risk of UTI especially when access to toilets is limited.

CONCLUSION

The present study discusses the issue of UTI among women who don't have access to individual toilet. The sanitation facility available at household level mainly bathroom, is not providing them the sufficient privacy and freedom to use it whenever they need to. To adjust with the situation, women had adopted certain behaviors mainly urine holding and intake of insufficient liquid. Providing better sanitation facility for these women is a challenging task and requires recourses. However, these women can be educated about ill effects of behaviors

which they have adopted to deal with restricted use of place of urination.

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