

Water, sanitation, and hygiene practices among population living in slums, Jhansi, Uttar Pradesh, India

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Received: August 12 2017, Accepted: September 05, 2017

ABSTRACT

Background: Water- and sanitation-related disease, despite being preventable, remains one of the most significant child health problems worldwide. Unsafe water, poor sanitation, and unhygienic practices cause millions of children in the developing world to suffer needlessly from disease. A significant proportion of deaths can be prevented through safe drinking water, adequate sanitation and hygiene. **Objectives:** (1) To assess water sanitation and hygiene practices among population living in slums. (2) To find out an association between WaSH and neglected tropical diseases (NTDs). **Materials and Methods:** A cross-sectional study was conducted among families living in slum areas of Jhansi district in Uttar Pradesh. The study sample consisted of women in the age group of 15-49 years. A pre-tested semi-structured questionnaire was used for interview and data were analyzed using Epi Info 7.2.0.1. **Results:** Out of the total families, 42% reported the source of water as public hand pumps and doing nothing at home to make the water safe for drinking. Around 63% of the families reported storing water in a proper way in a utensil. Open defecation was still a reported practice (29%). One-third of respondents reported washing their hands before eating and after defecation and only 37% using soap for hand washing after defecation. A significant association was found between NTDs and condition of kitchen, storage of food, hand washing habits, and place of defecation. **Conclusion:** Overall, among the participants, there were both lack of adequate hand washing and sanitation practices. Therefore, there is a need to encourage people to adopt healthy habits and practices. There is an immense need for sensitization of slum population through health education and promotion to improve the health and environment conditions.


KEY WORDS: Water; Sanitation, and Hygiene; Neglected Tropical Diseases; Hand Washing; Sanitation Practices; Slums

INTRODUCTION

Water- and sanitation-related disease, despite being preventable, remains one of the most significant child health problems worldwide. Poor water and sanitation result in a huge economic burden in terms of health spending, loss of productivity, and labor diversion.^[1]

World Health Organization (WHO) in August 2015, unveiled a global plan to better integrate water, sanitation, and hygiene (WASH) services with four other public health interventions to accelerate progress in eliminating and eradicating neglected tropical diseases (NTDs) by 2020. “Millions suffer from devastating WASH-related NTDs – such as soil-transmitted helminthiasis, guinea-worm disease, trachoma, and schistosomiasis. Access to safe water, managing human excreta, improving hygiene, and enhancing targeted environmental management are the key solutions. Such improvements not only lead to improved health but also reduce poverty.”^[3]

A recent report showed that in 2015 more than 660 million people did not have access to improved water sources. The

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2017.0824506092017001	

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WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation report also showed that almost 2.5 billion people lacked access to improved sanitation. Open defecation and lack of hygiene are among important risk factors for the transmission of many NTDs. Over half a million lives are lost each year as a result of NTDs. Prioritizing water and sanitation will address the determinants of many NTDs and support WHO's drive for equitable and sustainable universal health coverage. Targeted water and sanitation interventions are expected to bolster ongoing efforts in tackling 16 out of the 17 NTDs, which affect more than 1 billion of the world's poorest and most vulnerable populations mainly in underprivileged areas like slums.^[1,3]

Slum population remained deprived, particularly in health, education, and socioeconomic aspects. The census of 2011 recorded 1.3 crore urban slum households and revealed that the problem is growing, as it indicates the percentage of people living in slums in smaller cities with a population of less than a million is rising.^[4]

A significant proportion of deaths can be prevented through safe drinking water, adequate sanitation, hygiene, and immunization, proper infant feeding, and enabling environments.^[5] The WaSH practices in India are well documented and key measures of the Swachh Bharat Abhiyan, government of India, a massive movement that seeks to create a clean India.^[6,7]

Jhansi is a historical city famous for Maharani Laxmi Bai, lies in the region of Bundelkhand on the banks of the Pahuj River, in the extreme south of Uttar Pradesh.^[8] It is recently added to the list of upcoming smart city with a total population of 1,998,603, and around 42% of total urban population lives in slums.^[4,8]

Due to paucity of studies and policies execution, there is need to assess present WaSH practices. The objectives for conducting this study were to assess WaSH practices and to find out an association between WaSH and NTDs among the population living in slums, Jhansi, Uttar Pradesh.

MATERIALS AND METHODS

This was a cross-sectional community-based study conducted in slums of Jhansi district in Uttar Pradesh from May 2016 to November 2016.

Study area

The study was conducted in the city of Jhansi, Uttar Pradesh, in India. There are 54 notified, and three non-notified slums and around 42% of total urban population lives in these slums. Details of the inhabitations of the slum population in and around Jhansi were obtained from the Jhansi Nagar Nigam.

Sampling: Sources of Data and Study Design

Out of total 57 slums, three slums were selected by simple random sampling method and cluster random sampling method was used for selecting the households living in these slums.

Sample Size

The sample size was calculated considering the prevalence of NTDs as 12%.^[9] Assuming an alpha error of 0.05 and relative precision of 25%; the required sample size comes out as 470. Taking the cluster design effect of 1.5, the sample size was 705 and assuming 5% of non-response rate; the sample size was 740. The total households surveyed for the study were 1004, 768 households with at least one reproductive age women (15-49 years) were included in the study. A semi-structured pretested questionnaire was used to collect information from these women. It contained demographic details of the study subjects and WaSH practices. An approval to conduct the study had been taken from Ethical Committee, and verbal consent of respondents was taken for study.

Data Analysis

Data was entered into a Microsoft Excel spreadsheet and analyzed with Epi Info version 7.2.0.1. Wherever applicable, proportion, percentage, and mean (standard deviation) were calculated and $P > 0.05$ taken as significant.

RESULTS

A total of 768 women of reproductive age group (19-49 years) were studied in the study area. 371 (48.31%) women had age between 26 and 35 years followed by 19-25 years (38.28%). Most of them were Hindu (66.93%) and belonged to general category (41.01%). 362 (47%) women were in the upper lower class followed by 192 (25%) in lower socioeconomic class while around 27% were above the upper lower socioeconomic class (according to Modified B. G. Prasad classification). 409 (53.25%) women were housewives and did all routine activity followed by laborer (14.06%) and business of own (12.52%) (Table 1).

Nearly 42% women reported the source of water as public hand pumps followed by piped water supply and they did not take any extra step to make the water safe for drinking. Only 3.55% of women told that they drink RO water. Around 63% of the families reported storing water in a proper way in a utensil, and nearly half of them reported cleaning of the utensils at least once a day (Figures 1 and 2).

Open defecation was still a reported practice in the study area, and 221 (29%) women reported about open defecation. The main places for defecation were open drains, nearby lands and the streets. Among the total women, 485 (63.15%)

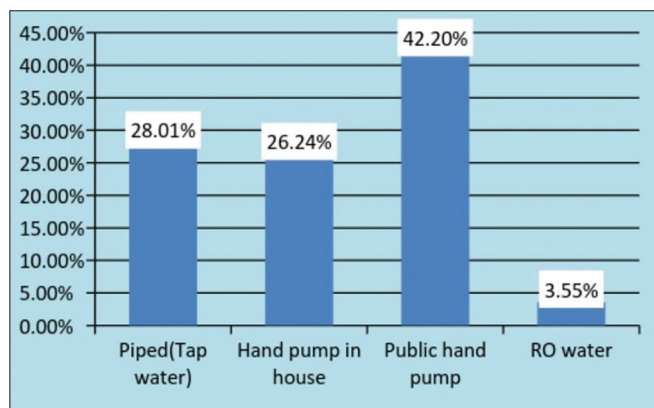


Figure 1: Source of drinking water in houses

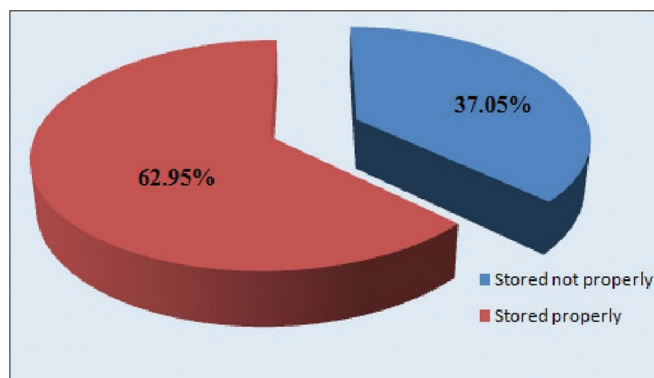


Figure 2: Storage of water in houses

reported washing their hands after defecation. Nearly, one-third women reported washing their hands before eating and food preparation and out of them 38% using soap for hand washing (Table 2).

Total 199 (25.9%) had suffered with NTDs in past 1 year and primarily seeking care while 54 (7.03%) needed hospitalization. A highly significant association was found with housing condition of kitchen and storage of food. This shows an increase NTDs with unhygienic kitchen and improper storage of food. A significant association was also seen with hand washing habits and place of defecation. Source and storage of drinking water were not found to be statistically significant with NTDs (Table 3).

DISCUSSION

One of the key measures to prevent NTDs among the population is the use of safe and wholesome drinking water, basic toilets, and proper hygiene practices. Out of the total families, 42% reported the source of water as public hand pumps and doing nothing at home to make the water safe for drinking. Around 63% of the families reported storing water in a proper way in a utensil. Open defecation was still a reported practice in 29% respondents. One-third of respondents reported washing their hands before eating and after defecation and only 37% using soap for hand washing

Table 1: Distribution of mothers by sociodemographic determinants

Variables	Frequency N=768 (%)
Age (years)	
19-25	294 (38.28)
26-35	371 (48.31)
36-49	103 (13.41)
Religion	
Hindu	514 (66.93)
Muslim	209 (27.21)
Others	45 (5.86)
Category	
General	315 (41.01)
OBC	239 (31.12)
SC	196 (25.52)
ST	18 (2.34)
Socioeconomic status*	
Upper	8 (1.04)
Upper middle	76 (9.89)
Lower middle	130 (16.94)
Upper lower	362 (47.13)
Lower	192 (25.00)
Occupation	
Housewife	409 (53.25)
Laborer	108 (14.06)
Unskilled worker	25 (3.25)
Semi-skilled worker	106 (13.80)
Skilled worker	24 (3.12)
Business	96 (12.52)

*Moditiled B. G. Prasad classification

Table 2: Distribution by place of defecation and hand washing habits

Variables	Frequency (%)
Place of defecation	
Open	221 (28.78)
House latrine	547 (71.22)
Hand washing habits	
After defecation	485 (63.15)
Before eating and food preparation	272 (35.42)
Both	11 (1.43)

after defecation. A significant association was found between NTDs and condition of kitchen, storage of food, hand washing habits, and place of defecation. Overall, among the participants, there were both lack of adequate hand washing and sanitation practices.

This study revealed that source of water as public hand pumps followed by piped water supply similar to study by Reddy et al.^[2] This was lower as compared to data reported in Census

Table 3: Association of WaSH with NTDs

Variables	NTDs in last 1 year		χ^2 d.f. P value
	Yes (N=199)	No (N=569)	
Source of drinking water			
Hand pump in house	83	194	5.7 3 0.1
Public hand pump	67	231	
Piped (Tap water)	41	108	
RO water	8	36	
Storage of drinking water			
Stored not properly	86	220	3.01 1 0.2
Stored properly	113	349	
Washing hand habits of respondent			
After defecation	63	146	72.36 2 0.00*
Before eating and after defecation	22	246	
Washing intermittently	114	177	
Condition of kitchen			
Clean	59	264	16.97 1 0.00*
Unclean	140	305	
Storage of food			
Stored properly	63	260	11.91 1 0.001*
Not properly	136	309	
Place of defecation			
House latrine	81	179	5.62 1 0.01*
Open field	118	390	

χ^2 : Chi-square value, d.f.: Degree of freedom, * $P < 0.05$ taken as significant. WaSH: Water, sanitation and hygiene, NTDs: Neglected tropical diseases

2011 of Jhansi district households (94.1%).^[10] According to data of the number of households with an improved drinking-water source 96.4% in NFHS 4 Uttar Pradesh.^[11] Majority of households did not take any step for making water safe to drink in the study area similar to study by Kuberan *et al.* (45%).^[12] Around three-fourth did not store water in a proper way in a utensil, and nearly half of them use un-cleaned utensils similar to Reddy *et al.*^[2] Open defecation was still a reported practice in the study area and 29% women reported about open defecation similar to study of Kuberan *et al.*^[12] and lower than data of NFHS 4, Uttar Pradesh^[11] and Reddy

et al.^[2] In this study only one-third of women washed their hands before eating and food preparation and merely 38% using soap for hand washing after defecation. Our finding was lower as compared to the study of Reddy *et al.*,^[2] Ray *et al.*,^[13] and Wilson.^[14] The study shows significant association with hand washing habits and place of defecation. A highly significant association was found with housing condition of kitchen and storage of food. The study revealed that an increase NTDs with unhygienic kitchen and improper storage of food. A significant association was also seen with hand washing habits and place of defecation. According to the WHO, targeted water and sanitation interventions are expected to bolster ongoing efforts in tackling 16 out of the 17 NTDs, which affect more than 1 billion of the world's poorest and most vulnerable populations. Paucity of safe water sources, open defecation and lack of hygiene are also an important risk factor for the transmission of many NTDs.³

This is a community-based study with adequate sample size and findings are generalized to slums population. It is a unique work in the field of WaSH and NTDs in Bundelkhand region. Our study had certain limitations. There is a possibility of recall bias, and for the better understanding of WaSH practices, one needs a qualitative study. The cross-sectional study design limited the temporality of the association between WaSH and NTDs.

CONCLUSION

WaSH practices are one of the largest causes of morbidity and mortality in children. Overall, among the participants, there were both lack of adequate hand washing and sanitation practices. Gaps in hygiene practices of study households are a matter of public health concern. The present study found a need for improvement in WaSH practices of the people of slum population, especially those related to the use of sanitary latrines, hand washing, and water treatment practices. There is an immense need for sensitization of slum population through health education and promotion to improve the health and environment conditions. A community-based intervention program needs to be carried out to educate the slum people about appropriate water storage and retrieval methods and sanitation and hand washing practices.

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How to cite this article: Agarwal R, Tiwari N, Malhotra AK. Water, sanitation, and hygiene practices among population living in slums, Jhansi, Uttar Pradesh, India. *Int J Med Sci Public Health* 2017;6(10):1533-1537.

Source of Support: Nil, **Conflict of Interest:** None declared.