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Original Research Article

Assessment of water and sanitation facilities of Raipur, Hingna in the district of Nagpur: a cross-sectional study

Anchlesh V. Tekam[1], Sushama S. Thakre[1]*, Subhash Thakre[2], Roshan U. Raut[1]

[1]Department of Community Medicine, Indira Gandhi Government Medical College and Hospital, Nagpur, Maharashtra, India
[2]Department of Community Medicine, Government Medical College and Hospital, Gondia, Maharashtra, India

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***Correspondence:**
Dr. Sushama S. Thakre,
E-mail: sushamathakre@rediffmail.com

ABSTRACT

Background: Drinking water supply and sanitation in India continue to be inadequate, despite longstanding attempts by the different levels of government and communities at improving coverage. The study was conducted to assess the water and sanitation facilities of Raipur, Hingna in the district of Nagpur.
Methods: A community-based, cross-sectional research was conducted among 521 households in Raipur (Hingna) from June to August 2018 by interviewing one member from each household using a predesigned and pretested questionnaire based on the WHO/UNICEF Joint Monitoring Program Core questions on drinking water and sanitation for household surveys.
Results: A majority 284 (54.5%) of slum households have piped water into dwelling, 157 (30.1%) used public tap and 460 (88.3%) household used flush or flush pour latrine. Open field defaecation was not reported in this study.
Conclusions: The utilization of improved drinking water source was high. And piped water connection and improved sanitary toilet used was also high. The results coincide with the national and state figures.

Keywords: Sanitation, Water, Drinking water supply

INTRODUCTION

Safe drinking water and adequate sanitation and encouraging personal, domestic and community hygiene will improve the quality of life of millions of people.[1] United Nations General Assembly had acknowledged that safe water and sanitation is a human right. The Sustainable development goals have pledged to provide safe water and sanitation to every person in this world.[2] A child's survival is at risk without access to safe water and basic toilet facilities. Water-borne diseases are significant causes of death in children under five. Unsafe drinking water, inadequate availability of water for hygiene and lack of access to sanitation together contribute to about 88% of deaths from diarrheal diseases.[1]

A significant proportion of water may be contaminated at the source itself, and the local geographical conditions may have a role to play in it. Hence, water treatment assumes utmost importance to ensure the safety of the water consumed. At the community level, it is the responsibility of the municipalities to chlorinate the water being supplied to the households and public taps. Also, it is up to the individual house to ensure that the drinking water they consume is adequately safe.[3]

According to national family health survey-4 in Maharashtra, 85.6% of rural households have an improved source of drinking water. And only 44.2% of the rural Households are having improved sanitation facility.[4] According to national sample survey - rapid

Survey on Swachhta status 2017, the prevalence of open defecation in rural India is 33.0%. Despite comprehensive programs like Swaccha Bharat Mission open defecation remains the prevailing norm and poses one of the greatest danger to the health of the people.[5]

Thus, this study was conducted to assess the water and sanitation facilities of Raipur (Hingna) in the district of Nagpur.

METHODS

Study type and setting

The cross-sectional (community-based) study was conducted in the households of Raipur village, i.e. field practice area of IGGMCH Nagpur during three months from June to August 2018.

Study population

The study population were all households in the rural area for which consent could be obtained from the head of the house.

Sampling

There are around 700 adopted families by Indira Gandhi Government Medical College and Hospital, Nagpur in the village of Raipur, to which special attention is provided. Every head of households in the rural area was approached for the study. Finally, 521 participants consented to participate in this survey.

Data collection tools and techniques

A predesigned, pretested questionnaire based on the WHO/ UNICEF joint monitoring program core questions on drinking water and sanitation for household surveys was the data collection tool. Drinking water sources were defined as "improved" and "not improved" based on definitions used by the WHO. Improved sources included a piped water supply into the dwelling, piped water to a yard/plot, a public tap/standpipe, a tube well or borehole, and a protected dug well. Sanitary facility was considered "improved" if it hygienically separated excreta from human contact like flush to the piped sewer system, flush to a septic tank, flush/pour flush to pit, composting toilet, pit latrine with a slab and ventilated improved pit latrine.[6]

One adult member of each household who is usually engaged in water collection was interviewed. Houses that could not be accessed for an interview after two visits were considered as non-responders. Data from each household were recorded about the primary water source for drinking, cooking and handwashing, time of water collection on a single occasion, the person collecting water, methods of water disinfection, type of sanitation facilities used by the households, use of the shared toilet, and disposal of young children's faeces.

Data analysis

Data were recorded and analysed by Microsoft Excel and Epi Info.[7] The proportion of improved and unimproved drinking and cooking water sources and sanitation facilities were calculated.

RESULTS

Most of the study participants (45.49%) belonged to the class-II according to the modified B. G Prasad scale, 29.75% in class-III, 16.12% class-I, 4.41% in class-IV and 4.22% in class-V.[8] This study revealed 521 (100%) of the slum households used improved drinking water source. Piped water into the dwelling (54.5%) and public tap (30.1%) were the primary sources. 8.3% used protected dug well, 7.1% tube well (Table 1). In this study, the households used the same source for cooking and hand washing purpose.

A major percentage of the households (61.61%) have a source of water on the premises. About 1.91% of the households who did not have water sources inside the house premises had to spend >30 min daily for water collection. In 79.46% of households, an adult woman usually goes to fetch the water for the household. 521 (100%) households use one or the other methods to make drinking water safe. Among these methods, 50.28% used to strain water through the cloth, 26.68% used to boil, 19.38% had water filters, 2.88% allowed water to stand and settle, and 0.78% used alum to treat water.

Table 1: Distribution of households according to drinking water sources, toilet facility and where it flush to? (n=521).

	Households	Percentage (%)
Sources of water		
Piped water into dwelling	284	54.5
Public tap or standpipe	157	30.1
Protected dug well	43	8.3
Tube well or borehole	37	7.1
Total	521	100.0
Type of toilet facility		
Flush pour	460	88.3
Ventilated improved pit latrine	61	11.7
Total	521	100.0
Where does it flush to? (n=460)		
Septic tank	406	88.26
Pit	54	11.74
Total	460	100

100% of households used improved sanitation facilities, of which 460 (88.3%) household had flush or pour flush facility, and 61 (11.7%) used ventilated improved pit latrine. Of these 460, 88.26% used the septic tank, and

11.74% used the pit (Table 1). About 77.92% of the households disposed children's faeces into the latrine, 6.04% into drains, 12.81% into the garbage or open field, and 3.2% used to bury the faeces with soil (Table 2).

Table 2: Distribution of households according to the disposal of children's faeces (n=281).

	Households	Percentage (%)
Sanitary method of disposal		
Put or rinsed into toilet or latrine	34	12.09
Child used toilet or latrine	185	65.83
Buried	9	03.20
Total	228	81.13
Unsanitary method of disposal		
Put/rinsed into drain or ditch	17	06.04
Thrown into garbage or surface water	36	12.81
Total	53	18.87

Table 3: Association between socioeconomic status and source of drinking water (n=521).

Socio-economic class	Piped water into dwelling	Protected dug well	Public tap or stand pipe	Tube well or borehole	Chi square Test
1	52	0	0	18	Chi square value=46.25 d.f.=3, p<0.01
2	215	0	0	7	
3	9	33	122	6	
4	7	5	18	4	
5	1	5	17	2	
Total	284	43	157	37	

#Socio-economic class 1, 2 and 3 were compared against class 4 and 5.

Table 4: Association between socioeconomic status and sanitation (n=521).

Socio-economic class	Flush pour	Ventilated improved latrine	Chi square Test
1	78	6	Chi square value=27.09 d.f.=2, p<0.01
2	211	26	
3	142	13	
4	14	9	
5	15	7	
Total	460	61	

#Socio-economic class 1, 2 and 3 were compared against class 4 and 5.

Table 3 and 4 depicts the relationship between the sociodemographic characteristics of the households with the practice of drinking water and sanitation facilities. The occupation of the head of the family was found to be significantly associated with the drinking facility types, and socioeconomic status was found to be significantly related to the sanitation facility used by the households.

DISCUSSION

In our study the proportion of households with improved drinking water was comparable with global achievements, the percentage of piped household water connection (54.5%) was lesser than the national averages (77.6%).[9,10] Myint et al reported a 32.22% piped water connection in Myanmar, whereas Brown et al reported a 74.66% piped water connection in Vietnam.[11,12] Several meta-analyses had proven that households with piped water connection experienced less diarrhoea than homes without a piped water connection. This reiterates the requirement of greater piped household connection in the slums.[13,14]

In our study, an adult woman was tasked to collect water in 79.46% of households. In India, as in other countries around the world, traditionally, women are tasked to collect water for the home.[15,16] Less than 2% of the households did not have water sources inside the house premises and had to spend >30 min daily for water collection. This very less as compared to the study conducted by Bhar et al. In our study, 26.68% of households used to boil the water and 19.38% had water filters. Joshi et al reported that 10% of homes used to boil the water before use and 15% had water filters in Delhi.[17] Efforts directed toward enhancing the knowledge and awareness in the study area can lead to a change in their current behaviour about water disinfection.

Millennium development goals target has fallen short of providing basic sanitation. Globally, 2.4 billion people

still lack improved sanitation facilities. Rah et al concluded that only one-fifth of the households had improved sanitation facilities, whereas 77% had no toilet facility in rural Maharashtra, which differ from our study findings.[18] Open defecation was not found in the study area, which different as compared to other studies from different regions.[17,19]

Shifting from unimproved water sources to improved sources by providing a piped connection to houses will help in health gains by declining probable water contamination. Improving access to basic sanitation at the household level remains important but ignored public health intervention for preventing diarrhoea. The local administration needs to accelerate action on providing safe water and basic sanitation to those currently unserved. The provision of advanced levels of service, which protect whole communities from faecal exposure, might offer significant additional protection from diarrhoea.

CONCLUSION

The utilization of improved drinking water source was high in the rural area of Raipur, which is a good thing. Piped water connection and improved sanitary toilet used was also high. Awareness amid the people should be devised regarding the water, sanitation and waste disposal. Further researches should be done to evaluate the knowledge, attitude and practice of the people.

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