Original Research Article

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

Anchlesh V. Tekam¹, Sushama S. Thakre¹*, Subhash Thakre², Roshan U. Raut¹

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

Received: 04 February 2020
Accepted: 07 March 2020

*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 Swachhata 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.1 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 overnight, 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).

| Sources of water            | Households | Percentage (%) |
|-----------------------------|------------|----------------|
| 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     | Households | Percentage (%) |
|-----------------------------|------------|----------------|
| Flush pour                  | 460        | 88.3           |
| Ventilated improved pit latrine | 61    | 11.7           |
| Total                       | 521        | 100.0          |

| Where does it flush to? (n=460) | Households | Percentage (%) |
|---------------------------------|------------|----------------|
| 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).

| Sanitary method of disposal | Households | Percentage (%) |
|-----------------------------|------------|----------------|
| 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 | Households | Percentage (%) |
|-----------------------------|------------|----------------|
| Put/rinsed into drain or ditch | 17 | 06.04 |
| Thrown into garbage or surface water | 36 | 12.81 |
| Total | 53 | 18.87 |

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

| 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 3: Association between socioeconomic status and source of drinking water (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%). 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. 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. 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. 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. Efforts directed toward enhancing the knowledge and awareness in the study area can lead to a change in their current behaviour about water disinfection. Millenium 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.19 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.

ACKNOWLEDGEMENTS

We sincerely acknowledge the support provided by the staff at Rural Health Centre and also all the study subjects for their participation in this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bos R, Gore F, Bartram J. WHO safer water better health, WHO, 2008.
2. UNICEF, WHO. Progress on household drinking water, sanitation and hygiene 2000-2017. Special focus on inequalities. Progress on Drinking Water, Sanitation and Hygiene 2000-2017; 2019: 140.
3. Prasanna Mithra P, Unnikrishnan B, Rakha T, Ravindra P, Alok Shetty K, Ahemad T, et al. Drinking water in an urban area in South India - A community based cross sectional study. Australas Med J. 2010;1(5):295-8.
4. Ministry of Health and Family Welfare National. National Family Health Survey 4 (2015-16) Maharashtra factsheet. National Family health Survey. 2015. Available at: http://rchiips.org/nfhs/pdf/NFHS4/MH_FactSheet.pdf. Accessed on 3 November 2019.
5. WHO UNICEF. washdata.orga. 2017. Available at: https://washdata.org/reports?text=&page=4. Accessed on 3 November 2019.
6. WHO UNICEF. Core questions on drinking-water and sanitation for household surveys. 2006: 25. Available at: http://www.who.int/water_sanitation_health/monitoring/oms_brochure_core_questionsfinal24608.pdf. Accessed on 3 November 2019.
7. CDC epi info. 2019. Available at: https://www.cdc.gov/epiinfo/index.html. Accessed on 3 November 2019.
8. BG P. Social Classification of Indian families. J Indian Med Assoc. 1961;37:250-1.
9. Registrar General and Census Commissioner I. Percentage of Households to Total Households by Amenities and Assets. Available at: http://www.censusindia.gov.in/2011census/HLO/HL_PCA/Housing.pdf. Accessed on 3 November 2019.
10. WHO. Preventing diarrhoea through better water, sanitation and hygiene. World Heal Organ. 2014;1-48. Available at: http://www.who.int/water_sanitation_health/publications/preventing-diarrhoea/en/. Accessed on 3 November 2019.
11. Myint ST, Myint T, Aung W, Wai K. Prevalence of household drinking-water contamination and of acute diarrhoeal illness in a periurban community in Myanmar. WHO South-East Asia J Public Heal. 2015;4(1):62.
12. Brown J, Hien VT, Mcmahan L, Jenkins MW, Thie L, Liang K, et al. Relative benefits of on-plot water supply over other “improved” sources in rural Vietnam. Trop Med Int Heal. 2013;18(1):65-74.
13. Fewtrell L, Colford JM. Water, sanitation and hygiene: interventions and diarrhoea A Systematic Review and Meta-analysis. Int Bank Reconstr Dev World Bank Washington, DC. 2004: 88. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/01/31/00090341_20060131093704/Rendered/PDF/349600 HNP0Water0Sanitation0Hygiene.pdf. Accessed on 3 November 2019.
14. Wolf J, Prüss-Ustün A, Cumming O, Bartram J, Bonjour S, Cairncross S, et al. Systematic review: Assessing the impact of drinking water and sanitation on diarrhoeal disease in low- and middle-income settings: Systematic review and meta-regression. Trop Med Int Heal. 2014;19(8):928-42.
15. Kumar A, KC D. Drinking water and sanitation facility in India and its linkages with diarrhoea among children under five: Evidences from recent data. Int J Humanit Soc Sci Invent. 2014;3:50-60.
16. Meenakshi JV, Ray R. Impact of household size and family composition on poverty in rural India. J Policy Model. 2002;24(6):539-59.
17. WHO. The Right to Water. 2003: 44. Available at: https://www.who.int/water_sanitation_health/en/righttowater.pdf. Accessed on 3 November 2019.
18. Rah JH, Cronin AA, Badgaiyan B, Aguayo V, Coates S, Ahmed S. Household sanitation and personal hygiene practices are associated with child stunting in rural India: A cross-sectional analysis of surveys. BMJ Open. 2015;5(2).

19. UNICEF. Soap, toilets and taps: How UNICEF supports water, sanitation and hygiene. Assembly, 2009; Available at: http://www.unicef.org/wash/files/FINAL_Soap_Toilets_Taps.pdf. Accessed on 3 November 2019.

Cite this article as: Tekam AV, Thakre SS, Thakre S, Raut RU. Assessment of water and sanitation facilities of Raipur, Hingna in the district of Nagpur: a cross-sectional study. Int J Community Med Public Health 2020;7:1410-4.