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A CROSS-SECTIONAL STUDY ON ACCESS TO IMPROVED DRINKING WATER AND SANITATION FACILITIES IN AN URBANISED VILLAGE OF WEST BENGAL

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ABSTRACT **Background:** Safe and improved water is one of the most important felt needs in public health in developing countries. In India around 37.7 million people are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone. Diarrheal morbidity can be reduced upto 6-20 percent with improvements in water supply and by 32 per cent with improvements in sanitation.

Objectives: To identify sources of drinking water to households in an urbanised village of West Bengal and to assess access to improved drinking water and sanitation facilities among the households of that village.

Materials and Methodology: A cross sectional study was carried out using an interview schedule developed by WHO/UNICEF joint monitoring programme for water supply and sanitation among the households by total enumeration method in Lalgola village in November 2019.

Result: 100% of the households have access to safe and improved water facility. Among them 42% of the houses had piped water supply in the dwelling /yard/plot. 63.7% used some method of purification of drinking water and 7.3% households used packaged drinking water which was already purified. Improved sanitary toilet facility was present in 54.1% of households but only 14.5% of the toilets were situated inside the house. More than two third (76.6%) households disposed the faeces of children less than 3years old into the open field.

Conclusion: All the households in the village studied had access to safe and improved water supply but almost half of them did not have improved sanitary toilet facility.

KEYWORDS : Improved drinking water, Sanitation

INTRODUCTION:

Safe water is one of the most important felt needs in public health in developing countries in the twenty first century[1]. The year 2005 marked the beginning of the "International Decade for Action: Water for Life" and renewed effort to achieve the Millennium Development Goal (MDG) to reduce by half the proportion of the world's population without sustainable access to safe drinking water and sanitation by 2015[2].

It is estimated by World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation3. In India around 37.7 million people are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone and 73 million working days are lost due to waterborne disease each year4. The resulting economic burden is estimated at $600 million a year[4].

Diarrheal morbidity can be reduced by an average of 6-20 per cent with improvements in water supply and by 32 per cent with improvements in sanitation5. In India, approximately 72.7 per cent of the rural population does not use any method of water disinfection and 74 per cent have no sanitary toilets[6]. Open air defecation, a common practice among villagers, may lead to contamination of the water supply system and result in outbreaks of diarrhoeal disease [7,8]. The practice of tethering animals close to human dwellings and the consequent proximity to animal faecal matter further enhances the risk of contamination of drinking water [9,10]. The key to providing microbiologically safe drinking water lies in understanding the various mechanisms by which water gets contaminated, and formulating interventions at critical points to decrease and prevent contamination of drinking water[11].

The government has undertaken various programmes since independence to provide safe drinking water to the rural masses4. "Access to improved water source" is defined as the percentage of population with access to an improved drinking water source in a given year[12]. "Access to improved sanitation" is defined as the percentage of population with access to improved sanitation in a given year[12]. Improved drinking water sources are defined in terms of the types of technology and levels of services that are more likely to provide safe water than unimproved technologies[12]. Improved water sources include household connections, public standpipes, bore wells, protected dug wells, protected springs, and rainwater collections[12]. Improved sanitation facilities are defined in terms of the types of technology and levels of services that are more likely to be sanitary than unimproved technologies. Improved sanitation includes connection to a public sewers, connection to septic systems, pour-flush latrines, simple pit latrines and ventilated improved pit latrines[12]. There is dearth of knowledge regarding access to safe water and sanitation facilities in developing countries especially in rural areas. This study aims to answer some basic questions pertaining to the drinking water practices and sanitation facilities in an urbanised village of West Bengal.

OBJECTIVES: To identify sources of drinking water to households in an urbanised village of West Bengal and to assess access to

improved drinking water and sanitation facilities among the households of that village.

MATERIALS AND METHODS:

This was a community based cross sectional type of descriptive study carried out in the month of November 2019 in Lalgola village. This village comes under the Krishnapur PHC which is one of the rural field practice area of Murshidabad Medical College and Hospital, Murshidabad. The sampling units were the households of that selected village which were mapped and counted. An interview schedule developed by the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) in collaboration with experts from three international survey programmes – the Demographic and Health Survey (DHS), the Multiple Indicator Cluster Survey (MICS) and the World Health Survey (WHS) – as well with selected members of the JMP Technical Advisory Group (TAG) was used for the study. All the households in the village were numbered and a total of 134 houses were included in the study. But data were obtained only from 124 households as the rest could not be reached. Informed consent was obtained before taking the interview. Households found to be locked on 3 visits and those who did not give consent were excluded from the study. The interview schedule was administered to the senior most member of the family who was present at the time of the visit. Strict confidentiality of the data and privacy was maintained. Data analysis will be done using SPSS Ver.21 and appropriate statistical methods will be used for drawing inferences. The study has been approved by the Institutional ethical committee of Murshidabad Medical College. (IHEC/MMC/2018/00178)

RESULTS:

Socio-demographic profile: 124 households were interviewed. Out of them, 69 (55.6%) were nuclear families and 55 (44.3%) were joint families. Most of them 80 (64.5%) belong to Islam followed by Hindu religion 44 (35.5%). 75(60.5%) households belong to socio-economic class III (Lower middle) according to revised Kuppuswamy socio-economic scale, 2018.

Table 1: Distribution of households in the study area according to socio-demographic profile (n=124)

S no.	Socio demographic factors		Number (%)	
1	Type of families	Nuclear	69	(55.6%)
		Joint	55	(44.3%)
2	Religion	Islam	80	(64.5%)
		Hindu	44	(35.5%)
3	Socio-economic class	I	3 (2.4)	
	(revised Kuppuswamy scale, 2018)	II	26	(20.9)
		III	75	(60.5)
		IV	20	(16.2)

Sources of water: Bore well is the most common sources of drinking water supply. Majority 96 (77.4%) of the households utilize water from bore well for drinking purposes. Water is pumped into the storage tank and is made accessible to the households through a piped system. The access to improved water facility was 100% as all the houses derived water from sources which were considered 'improved' according to the definition. 63 (50.8%) households collected water for drinking purpose from a public stand pipe, 32 (25.8%) from a tap present in the yard, 20 (16.2%) from a tap present in the house, 9 (7.2%) used packaged drinking water.

Table 2: Distribution of households in the study area according to source of collection of drinking water (n=124)

S no	Source of collection of drinking water	Number (%)
1	Piped water into dwelling	20 (16.2)
2	Piped water to yard/plot	32 (25.8)
3	Public tap/standpipe	63 (50.8)
4	Packaged drinking water	9 (7.2)

Majority i.e. 112 (90.3%) households used a pot to transfer drinking water from the source to the household. For domestic purposes other than for drinking, 32 (25.8%) households collected water from a tap present in the yard, 72 (58.1%) from a public stand pipe, 20(16.2%) from a tap present in the house. 108 (87.1%) households used a pot or bucket for its transfer.

Purification of water: 79 (63.7%) households used some method of purification of drinking water and 9 (7.3%) households used packaged drinking water which was already purified. It was seen that majority i.e. 49 (55.6%) of them purified drinking water by straining it through a cloth.

Table 3: Distribution of households in the study area according to method of purification of drinking water (n=88)

S no	Method of purification of drinking water	Number (%)
1	Straining it through cloth	49 (55.6)
2	Water filter	21 (23.8)
3	Boiling	9 (10.2)
4	Packaged drinking water	9 (10.2)

Access to sanitation facilities: Out of the 124 households interviewed 78 (62.9%) had a toilet of which 67 (54.1%) had an improved sanitary toilet facility and 11 (8.9%) households had a shared sanitary toilet which was considered as unimproved sanitary toilet facility. Only 18 (14.5%) of the toilets were situated inside the house whereas a majority i.e. 49 (39.5%) of the toilets were situated outside the house. 95 (76.6%) households disposed the faeces of children less than 3years old into the open field, 10 (8.1%) into the open drain and only 19 (15.3%) households disposed the faeces in the sanitary toilet.

DISCUSSION:

Around 829 000 people succumb to death yearly due to diarrhoea globally as a result of unsafe drinking-water, sanitation and hand hygiene. Highest number of water related diseases reported in the past includes viral gastroenteritis, hepatitis A, E. coli diarrhoea and legionellosis. In the past 10 years, a positive trend has been observed in access to basic and safely managed drinking-water and sanitation services, indicating a progress towards achieving Sustainable Development Goal (SDG) targets 6.1 and 6.2.[13]

Present study showed that access to improved water facility was 100% as all the houses derived water from source which were considered 'improved' according to our definition as compared to 84.5% access in rural India6 and 82% globally[14]. In rural India there were 11.8% of houses who had piped water in the dwelling /yard/plot[6], as compared to this study wherein 42% of the houses had piped water supply in the dwelling /yard/plot. The improvement in the access to drinking water supply can be attributed to various factors among which the initiatives by the Murshidabad Municipality, Lalgola Community Development Block are very important. Bore wells are the main source of water supply to the village households in rural India [6] and Murshidabad Municipality has created bore wells for the village with pipe lines for the easy accessibility. The responsibility for collecting water was mostly with the adult woman of the family (87%) which was comparable to findings reported from other studies in rural India (82.7%) and pot (90.3%) was the most common mode of transfer or storage of water within the house [6]. The lack of safe drinking water creates a tremendous burden for diarrheal diseases and other debilitating life threatening illnesses for people in the developing world[14]. Keeping this in mind we also included the purification of water at the household level in this survey and it was found that 29% of houses do not use any method of purification. However, it is still better than the findings reported from other studies in rural India where 72.7% did not use any method of purification[6].

Present study also assesses the access to sanitation facilities of the people. Sanitary facilities interrupt the transmission of faecooral disease at its most important source by preventing the contamination of water and soil by human faeces[14]. It was found that 54.1% of houses possessed a sanitary toilet as compared to 17.6% houses in rural India6. Number of houses having a sanitary toilet within the house infrastructure was found to be as low as 14.5%. This can be attributed to the belief of the people that toilet was an unhygienic place to be present within the house and also an active source of spread of germs. Most often children are neither encouraged nor coaxed to use a toilet, nor is due importance given for safe disposal of their faeces. It was found that 76.6% of houses practiced open air defecation and 8.1% passed stools into open drains adjacent to their houses. The reasons for this indifferent attitude of parents towards children come from the fact that many communities consider faeces of children as harmless.

CONCLUSION:

All the households in the village studied had access to safe and improved water supply as compared to 88% in rural India and 82% globally. 54.1% of the households had improved sanitary toilet facility.

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