Original Article ▌

A STUDY TO ASSESS WATER SOURCE SANITATION, WATER QUALITY AND WATER RELATED PRACTICES AT HOUSEHOLD LEVEL IN RURAL MADHYA PRADESH

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ABSTRACT

Background-Access to safe drinking water depends not only on the quality of water at source but also on contamination throughout it's way to the user and practices related to purification and sanitation. So, the present study was conducted to assess sanitary conditions of selected water sources and their water quality.

Methodology-Study was conducted in Jhagri village of rural field practice area Banda subdivision of Sagar district. A total of 312 randomly selected households were included in the study. It was a Community based, Cross- Sectional, Descriptive study. A WHO 9- point standard format was used with some modifications to assess the sanitary status of water sources and it's surrounding area. A pre-tested structured questionnaire used to collect information on water related practices.

Results- All the selected water sources were exposed to contamination and no source of water was found sanitary. Qualitative value of all the water source was within the prescribed limit. Percentage of households who collect drinking water from a distance of more than 100 meters was 44.8%. Problem regarding water facility was perceived by 84.2% households. Some important practices like washing hands before drawing water, use of long handle vessel were lacking.

Conclusion-All the water sources were exposed to contamination by different means and purification and sanitary practices related to water was lacking.

Key words: Water source, Surveillance, Water quality.

INTRODUCTION

Water is crucial for the well being of people. Due to industrialization, growing population , illiteracy the provision of safe drinking water will undergo global indust in near future. Globally 1.1 billion people lack access to safe drinking water, and 2.6 billion people lack access to adequate sanitation.[1] Primarily from unsafe water and sanitation, approximately 5000 people die everyday from diarrheal illness. The seventh of the eight United Nations Millennium Development Goals (MDGs) is to "halve by 2015 the proportion of people without sustainable access to safe drinking water". [2] Despite the national commitment to supply safe drinking water, access to water is difficult especially in the rural areas. [3] Factors such as poor availability, affordability and distance between water source and home may lead households to depend on less safe sources and reduce the volume of water used for hygiene purposes, resulting in water-related infections.[4]

Access to safe drinking water depends not only on the quality of water at source but also on contamination throughout it's way to the user and practices related to purification and sanitation. So " Prevention is better than cure" keeping this idea in mind our surveillance team has tried to place a step forward through the water source quality assessment and post-source improvement of drinking water by health education to the community. Thus, the present study was carried to find out the accessibility to water, sanitary conditions of water sources and to identify purification and sanitary practices of people living in village Jhagri of Sagar district.

METHODOLOGY

This study was conducted in Rural field practice area Banda ,in Sagar district. There are two blocks in Banda subdivision, one is Shahgadh and other is Banda. Banda block has 5 sectors and there are 5 subcenters under each sector and purposively Jhagri subcenter is selected for study purpose. It has a population of ap-prox.7000 residing in 1049 households.

It was a Community based, Cross- Sectional, Descrip-tive study. For study purpose sample size was calcu-lated using standard formulas available at Open Source Epidemiologic Statistics for Public Health. In absence of any previous study in the district , figure of 72 percent households used safe sources of drinking water in Madhyapradesh as reported in a study en-titled " Household Enviornmental Factors and Its Ef-fects on Child Morbidity in Madhyapradesh" conducted by K.C. Das et al.[5] used for calculating the sample size. Considering 95% confidence level, 5% absolute precision, and design effect 1, the yielded sample size was 297 . It is rounded off to 312 for an equal subsample of 104 from each divided area.

A WHO 9- point standard format was used with some modifications to assess the sanitary status of water sources and it's surrounding area.[6] The source was labeled sanitary if it fits into all the 9-point criteria. Water sources which were used by villagers for household purposes, were selected for sanitary as-sessment. Only five water sources were used by vil-lagers. A pre-tested structured questionnaire used to collect information on location of water source, time consumed in collection, household member responsi-ble for water collection, washing hands before water collection and drawing, water purification practice and problems with access to water.

For survey a spot map of the village was prepared with the help of village health worker, and project team divided the entire village in to three parts for conducting baseline survey and health interventions. Three survey team were constituted each having two members for conducting baseline survey. To assess the existing water related practices in the study area sim-ple random sampling technique was used to select study population .Random selection of families was done by each survey team in their assigned area. A total of 312 randomly selected households were in-cluded in the study . The village was surveyed by team to find out the major sources of water, followed

by an assessment of their sanitary conditions. For wa-ter quality assessment of selected water source, water sample were collected in 300 ml glass bottle and ana-lyzed for physical and chemical parameter with stan-dard methods in Department of Community Medicine by lab technician (pH, total dissolved solids, chloride, total hardness). To provide health education regarding improvement of water source quality, a 10 point health education format was prepared and safe drink-ing water practices and maintenance of proper hy-giene was explained. Emphasis was given on proper collection and storage of drinking water .Women and girls were encouraged to ask questions related to wa-ter storage, collection and filtration. The demonstra-tion of use of alum and chlorine along with pictographic education through posters was given to all available family members. The posters were pasted at Govt. school and public places.

After 20 days of initial survey, resurvey was done in study area. Five point post assessment questionnaire was used for assessment of improvement in know-ledge, attitude and practices of people regarding wa-ter. Purposively 25% of sample population randomly selected from the study population and assessed for improvement.

SPSS statistical software was used to analyse data. In analysis of data percentage, proportions was used.

RESULTS

The major source of water in the village was ground-water through hand pumps and well. No source of water was found sanitary as none fulfilled the stan-dard criteria. The water sources were exposed to con-tamination by different means. [**Table 1**]

The pH value in all the water source comes between 7.1-8.1. Chloride concentration ranges between 47-91 mg/l, where as total hardness ranges between 167-230 mg/l. All values were in prescribed limit. [**Table 2**]

Out of 312 households, 236 (75.6%) did not have access to safe drinking water with in the household premises. Majority of the families (76.4%) used both earthen and metal pots for storage of drinking water. A good prac-tice of covering stored water was found in the study area. About 97.4% families were engaged in this prac-tice and also collects drinking water everyday.

Table-1: Physical observation of existing water sources.

Questionnaire	Yes (%)	No (%)	Not Applicable (%)
Source of pollution	3(60)	2(40)	
Fencing around the source	0(0)	5(100)	
Parapet present around the source	1(20)	4(80)	
Platform present around the source	3(60)	2(40)	
Drainage facility around the source	1(20)	4(80)	
Concrete apron present(If the source is a well)		1(20)	4(80)
Rope and bucket exposed to contamination(If the source is a well)	1(20)		4(80)
Latrine or open defecation within 15m of water source	2(40)	3(60)	
Any other activity performed(washing clothes, bathing clothes etc) around the source	4(80)	1(20)	

Table-2: Water quality in existing water source in Banda village (mean value)

Water Source quality	Source1 (Hand pump)	Source2 (Hand pump)	Source3 (Hand pump)	Source4 (Hand pump)	Source5 (Well)
pH	8.1	7.1	7.7	7.9	7.3
TDS (PPM)	680	660	380	470	570
Chloride(mg/l)	47	67	91	84	49
Total Hardness(mg/l)	210	187	230	198	167

In more than half (56.09%) of the households, females were responsible to collect water. Only 99 (31.7%) families reported of washing hands always, 175 (56.09%) sometimes and 38 (12.2%) families never wash their hands before drawing water from the vessels.

Households who took water from zero distance was only 15.7%, this means these households have water facility within their premises. Households who brings water from distance up to 100 meters from their houses was 39.5% and 18.4% households brings water from 101-300 meters,13.2% households collects water from 301-500 meters and same from more than 500 meters. That means 44.8% household collects drinking water from a distance of more than 100 meters.

Percentage of households who spends up to 30 minutes in collecting water was 23.7%, 39.5% households takes up to 1 hour and 36.8% household spent more than 1 hour. The only water purification method known and practiced in village was filtration by cloth or plastic sieve.

Problem regarding water facility was perceived by 84.2% households. The main problem perceived was scarcity of water especially in summer (60.9%) followed by excessive distance (43.9%) and polluted water source (21.9%).

DISCUSSION

The findings of present study showed that groundwater is the major source of drinking water available in the study area but all the sources in the village Jhagri were communal. Studies have shown that safe drinking water supplied to the developing communities from communal sources become contaminated during the processes of fetching water in containers over the distance between home and supply source, as well as storing and using it at home.[7]In the present study , practices by villagers were favourable to contamination,and the only measure to purify water known to villagers was filteration. This indicates that there is lack of awareness regarding water sanitation. Deshpande K, *et al*. had similar findings in their study which was conducted in village Palwa in Ujjain district.[8]

It is well recognized that women bear the major burden of fetching and serving water to the household members, and similar practice was observed in the present study. The gender difference has implications on the overall development and health of women as they spend hours to manage water for the family even in days of illness and pregnancy, and a majority of women are not aware of safe drinking water practices and hence need training.[1]

This is a study of factors which bear upon people's ability to improve quality of household water through community and household efforts. In-depth interviews and observation provide the basis for an exploration of ways in which individuals act to obtain household water of acceptable quality and at elucidating the actual level of knowledge and skill.

Surrounding area of sources which were polluted during survey showed no sign of improvement even after giving necessary interventions, showing their unwillingness .Since most of them were using hand pump and tube well for drinking water, they were having access to safe drinking water.

Physical and chemical parameters of water samples from the sources under study were within normal range.

After giving health education and demonstration regarding use of CLEANWAT and ALUM, it was found that they started using long handle vessel and washing hands before drawing water, some started using ALUM, none of them used CLEANWAT.

The scale of current water related problems and expectations for near future suggest that water can no longer be neglected in a socio-economic context .The possible reason for ignorance towards quality may be lack of knowledge about waterborne diseases. Evidences suggest that water quality receives too much attention than the quantity of water.[9]A community based and consumer based well equipped water surveillance system at root level is necessary. Education and awareness of people will be more important than ever .This will help in balancing the driving forces linked to population growth, globalization etc and will provide "CLEAN WATER FOR SAFE WORLD".

CONCLUSION

The study concluded that the problem of availability of adequate quantity of water is of highest concern for villagers . Further research and interventions are required to search for other sources of water and mobilize and educate the community towards protecting the water sources.

REFERENCES

1. World Health Organization (WHO) (2004). Guidelines for Drinking-water Quality, Third Edition. Volume 1: Recommendations. Geneva: World Health Organization

2.   Millennium Development Goals Indicators .Available at: http://mdgs.un.org/unsd/mdg/host.aspx?Content=in dicators/officiallist.htm. Accessed on February 9th 2011.

3.   Pattanaik BK. Safe drinking water for all. Kurukshetra 2005;53 :53-7.

4.   Howard G, Bartram J. Effective water supply surveil-lance in urban areas of developing countries. J Water Health 2005;3:31.

5.   K.C.Das, Vandana Gautam.Household Enviornmental Factors and its Effects on Child Morbidity in Madhya Pradesh.Journal of History & Social Sciences Vol.III,Issue II,July-December 2012.

6.   Smith M, Shaw R. Sanitary surveying. Water Lines 1996;15:15-8.

7.   Jagals P, Bokako TC. The Effect of container-biofilm on the microbiological quality of water used from plastic household containers. Water Health 2003;1:101.

8.   Kirti Deshpande, Rakesh Kakkar1, Vishal Diwan. Access to Quantity and Quality Water: Problems Perceived by Residents of Village Palwa in Ujjain District. Indian Journal of Community Medicine Vol. 32, No. 4, October 2007.

9.   Kjellen, McGranahan. Urban water – towards health and sustainability: A document by the Stockholm Envi-ronment Institute 1997. p.11.