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Original Research Article

Water source and its handling, knowledge and preventive practices of water borne diseases among different communities in Manipur

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ABSTRACT

Background: Most of the ill health affecting humanity especially in developing countries can be traced to lack of safe and wholesome water supply. This study was conducted to assess the various sources of water, to estimate the knowledge and preventive practices of water borne diseases and to determine association of preventive practices with some socio-demographic variables.
Methods: A community-based cross-sectional study was conducted among residents aged ≥18 years of Kshetrigao, New Checkon and Mantripukhri of Imphal East District. A pretested, semi structured interview schedule was used. Descriptive and analytical statistics like Chi square test were generated taking a $p<0.05$ as level of significance. Ethical approval was obtained from the Institutional Ethics Committee.
Results: Out of 446 participants, majority buy water for drinking (343, 76.9%) and domestic (244, 54.7%) purposes. Most of the participants (377, 84.5%) knew that water quality can affect health. Almost all participants (439, 98.4%) used soap and water for handwashing. Residents of Mantripukhri perform significantly higher safe preventive practices.
Conclusions: Buying was main source of water for both drinking and domestic purposes across all the communities. Increased public health activity like awareness campaigns regarding water borne diseases and its prevention needs to be organised.

Keywords: Handling, Knowledge, Manipur, Practices, Water borne disease, Water source

INTRODUCTION

Water resources are critical for existence of all life forms on earth and play an important role in economic development of a country. India's water resources are under immense pressure, as it supports 17% of the global population, though it has only 4% of the global water resources. India's per capita water availability has touched the water-stressed benchmarks and expected to decline further towards water scarce conditions.[1]

To tackle this problem, Government of India has introduced Jal Jeevan Mission in 2019 which is envisioned to provide safe and adequate drinking water through individual household tap connection by 2024 to all household in rural India. The programme will also implement source sustainability measures as mandatory elements, such as recharge and reuse through grey water management, maximum water conservation, rain water harvesting.[2]

According to WHO, over two billion people live in water-stressed countries, which is expected to be exacerbated in some regions as result of climate change and population growth.[3] Much of ill health that affects humanity is due to lack of safe water supply, particularly in developing countries.[4] In India, less than 50% of the population has access to safely managed drinking water.[5] Lack of safe water creates an enormous burden in the form of waterborne diseases such as diarrhoea, cholera, typhoid,

etc which are the leading cause of mortality and morbidity in developing countries.[6] Many water borne disease can be effectively managed by improving knowledge and preventive practices regarding water borne diseases.

Although government has introduced many programs and schemes to improve access to safe water, for effective reduction of water borne diseases there is need to understand knowledge as well as practices by the community regarding prevention of water borne diseases.

Hence this study was conducted to assess the various source of water availability and its handling, knowledge and preventive practices about water borne diseases among different communities in Manipur. Also, to assess the association of preventive practices with some socio-demographic variables like age, sex, community etc.

METHODS

A Community-based cross-sectional study was conducted among adult population ≥18 years residing in three areas of Imphal east district i.e. Kshetrigao, New Checkon and Mantripukhri. These areas were selected by Purposive sampling and also based on predominance of different communities in these three areas. Kshetrigao is a rural area in Imphal east district with a total population of 14,298 and consisting predominantly of Muslim Community. New Checkon is an urban area in Imphal East distict with a total population of 3,265 with people belonging to different communities. Mantripukhri is a semi-urban area in Imphal East with a total population of 17,453 and people belonging to different communities. Those who were residing in the study area for more than one year and gave consent were included in the study. Those who were seriously ill and those who could not be contacted even after third visit were excluded from the study.

Study duration was from October 2022 to January 2023. Sample size was calculated using the formula z^2pq/e^2 assuming that the prevalence of participants who were not following any method of water treatment was 45%.[7] The sample size was estimated to be 418 assuming 95% confidence interval, 5% absolute error and 10% non-response rate. Household was selected as a sampling unit. When there was more than one eligible participant in one household, only one participant was selected randomly using Random number table. Data were collected by face-to-face interview method by going house to house. A pre-designed, pre-tested, structured questionnaire consisting of the following domains- socio-demographic profile, source of water, knowledge regarding water borne diseases and preventive practices was used. A total of 10 preventive practices questions were used with a total score of 10. Those who score 9 and above were considered as safe preventive practice and those who score below 9 were considered as unsafe preventive practice. All the collected data were in the custody of the investigators in password protected computers.

Statistical analysis

Data were entered in MS Excel and analysed in SPSS v19. Descriptive statistics like mean, proportion, standard deviation were used to summarize the findings and analytical statistics i.e. Chi square test was used to find association between preventive practice of water borne diseases and some socio-demographic variables. P value of less than 0.05 was taken as statistically significant.

Ethical approval

Ethical approval was obtained from the institutional ethics committee. Informed consent was taken from the study participants and purpose of the study was clearly explained prior to the interview. Strict confidentiality of the information was maintained.

RESULTS

Total number of respondents was 446 with a response rate of 100%. Mean age of the respondent was 42.8±13.9 years, ranging from 18-87 years. Maximum of the respondent were female (64%) and most of them belong to Meitei community as shown in Table 1.

Majority of participants were found to buy water (tanker/jar/bottled) for drinking purpose. Only 34.6% were found using tap water for drinking purpose as shown in Figure 1.

More than half of the respondents were found to buy water (tanker/jar/bottled) for domestic use followed by tap water as shown in Figure 2.

Majority of the respondent (84.5%) had knowledge regarding water borne diseases. Most of them knew diarrhoea and dysentery were caused by using unsafe water. Maximum of them (61.5%) cited boiling to make water safe for consumption. However, 14.3% of the respondent cited direct consumption of water. Almost all participants knew that water should be stored in covered containers as shown in Table 2.

Regarding preventive practices, majority of participants (96.9%) practice handwashing before food, after food, after defecation and after house cleaning. Almost all participants (98.4%) used soap and water for handwashing. Only 41.9% of respondent reported using long handle mug for retrieving water. Most of them (97.3%) maintained separate water storage for drinking and domestic purpose. Safe preventive practice was found in 346 respondents (77.5%) while remaining 100 (22.4%) respondents had unsafe preventive practices.

Table 1: Socio-demographic characteristics of the respondents.

Variables	Frequency	Percentage
Age (completed years)		
18-40	234	52.5
41-60	165	37
>61	47	10.5
Sex		
Male	159	36
Female	287	64
Name of village		
Kshetrigao	105	23.5
Checkon	209	46.9
Mantripukhri	132	29.6
Community		
Meitei	188	42.2
Muslim	105	23.5
Tribal	136	30.5
Others (Bihari, Bengali, Nepali)	17	3.8
Marital status		
Married	371	83.2
Unmarried	63	14.1
Family		
Nuclear	271	61
Joint	175	39
Educational status		
Illiterate	47	10.5
Primary (class 1-5)	16	3.6
Middle school (class 6-8)	33	7.4
High school (class 9-10)	90	20.2
Higher secondary (class 11-12)	80	17.9
Graduate and above	180	40.4
Occupational status		
Unemployed	72	16.1
Private job	51	11.4
Retired/current govt. employee	65	14.5
Self employed	130	29.1
Homemaker	128	28.7

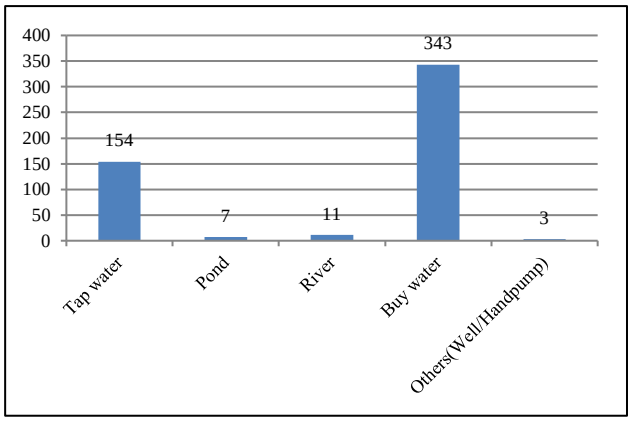

Figure 1: Main source of water for drinking purpose (n=446).*

*multiple options allowed.

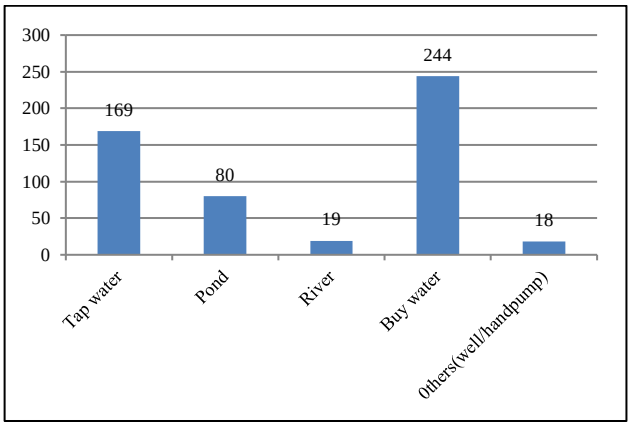

Figure 2: Main source of water for domestic use (n=446).*

*multiple options allowed.

Table 2: Knowledge regarding water borne disease.

Question	Frequency	Percentage
Do you think quality of water can affect health?		
Yes	377	84.5
No	69	15.5
If yes, name some disease cause by using unsafe water		
Diarrhea and dysentery	290	77
Hepatitis A and E	14	3.7
Typhoid	3	0.7
Others (incorrect options)	70	18.6
How do you make water safe for consumption? (multiple options allowed)		
Boiling	275	61.5
Filtration	174	38.8
Direct consumption	64	14.3
Chlorination/Bleach	8	1.7
Sieving through clothes	12	2.6
Reverse osmosis	29	6.5
How should you store water for consumption?		
Covered	445	99.8
Uncovered	1	0.2

Table 3: Association between preventive practices of water borne disease and socio demographic variables.

Variables	Preventive practice		P value
	Safe (score ≥9) n (%)	Unsafe (score <9) n (%)	
Age group (years)			
18-40	186 (79.5)	48 (20.5)	0.124
41-60	129 (78.2)	36 (21.8)	
>61	31 (66)	16 (34)	
Sex			
Male	224 (78)	63 (22)	0.749
Female	122 (76.7)	37 (23.3)	
Name of the village			
Kshetrigao	83 (79)	22 (21)	0.001
New Checkon	147 (70.3)	62 (29.7)	
Mantripukhri	116 (87.9)	16 (12.1)	
Community			
Meitei	153 (81.4)	35 (18.6)	0.108
Muslim	85 (81)	20 (19)	
Tribal	94 (69)	42 (30.9)	
Others (Nepali, Bengali, Bihari)	14 (82.35)	3 (17.64)	
Marital status			
Unmarried	47 (74.6)	16 (25.4)	0.050
Married	293 (79)	78 (21)	
Divorce/widower/widow	6 (50)	6 (50)	
Type of family			
Nuclear	208 (76.8)	63 (23.2)	0.603
Joint	138 (78.9)	37 (21.1)	
Education			
Illiterate	33 (70.2)	14 (29.8)	0.343
Primary (class 1-5)	11 (68.8)	5 (31.3)	
Middle school (class 6-8)	27 (81.8)	6 (18.2)	
High school (class 9-10)	76 (84.4)	14 (15.6)	
Higher secondary (class 11-12)	59 (73.8)	21 (26.3)	

Continued.

Variables	Preventive practice		P value
	Safe (score ≥9) n (%)	Unsafe (score <9) n (%)	
Graduate and above	140 (77.8)	40 (22.2)	
Occupation			
Homemaker	98 (76.6)	30 (23.4)	0.879
Private job	41 (80.4)	10 (19.6)	
Retired/current govt. employee	51 (78.5)	14 (21.5)	
Self employed	103 (79.2)	27 (20.8)	
Unemployed	53 (73.6)	19 (26.4)	

People residing in Mantripukhri performed significantly higher safe preventive practices than those residing in Kshetrigao and Checkon ($p<0.05$). Age, sex, community, type of family, educational status, marital status and occupational status were not found to be statistically associated with preventive practices as shown in Table 3.

DISCUSSION

The current study was conducted in both rural and urban area of Manipur, to understand the existing water sources, knowledge and preventive practices of water borne diseases by the households residing in the study area. A total of 446 respondents participated in the study with mean age of 42.8±13.9 years. Respondents were mostly adult females (64%) and majority of respondents belong to Meitei community (42.2%).

In our study, majority of participants buy water (jar/bottle/tanker) as a main source for both drinking (76.9%) and domestic (54.7%) purposes. However, in a study conducted by Kuberan et al in rural population of Chennai, India, majority of participants used pipe water.[7] Also in a study conducted in North India, 82% used piped water.[8] This may be because majority of households in our study area doesn't have pipe water supply and among the households with pipe water supply, majority of them received only for 1-2 hours.

In our study, less than half of the respondents (40%) have tap water supply in their house. This may be because there is less coverage of government tap water connection in Manipur.

In our study, mostly adult women (71.2%) fetched water from distant source. Similar findings were seen in a study conducted in Chennai, where females of age 15-60 years were primary responsible person for fetching water.[7]

Almost all participants have knowledge about the importance of covered drinking water in our study and is supported by a study conducted in rural area of Haryana, where all informants have knowledge about importance of covered drinking water.[6] In our study, majority of participants (77%) have knowledge that use of unsafe drinking water can cause diarrhoea and dysentry as compared to a study conducted by Mehta et al where only (33.5%) of participants have knowledge that used of unsafe drinking water can cause diarrhea.[6] This may be because majority of our participants were literate. Also, in a study conducted by Islam et al in Chattogram city, Bangladesh (90%) of participants have knowledge that use of unsafe water can cause diarrhea.[9]

In our study, majority of participants (49.5%) practiced boiling as the main method for making water safe while only 12.5% of them consumed directly. Similar findings were supported in a study conducted in Imphal.[10] However in a study conducted by Subbaraman et al shows that more than half of the participants do not follow any method of water treatment.[11] This may be because majority of our participants (84.5%) have good knowledge of the effects on health due to quality of water.

Almost all participants (96.9%) practice handwashing before food, after food, after defecation and after house cleaning and almost all participants (98.4%) used soap and water for handwashing. Similar findings were also observed in different studies.[12-14] The limitation of our study is that we could cover only one district in Manipur, so the results may not be representative of the whole population of Manipur. All the preventive practices were self reported. The strength of our study is that this is the first study of its kind covering the different communities residing in Imphal.

CONCLUSION

Buying was main source of water for both drinking and domestic purposes across all the communities. More than four-fifth of participants have knowledge regarding water borne diseases. Residents of Mantripukhri perform significantly higher safe preventive practices than those residing in Kshetrigao and New Checkon. Increased public health activity like awareness campaigns regarding water borne diseases and its prevention needs to be organised. Community participation is required to create awareness regarding safe water practices. It is the government's responsibility to ensure that the people have access to safe water through household tap water connection so that people does not resort to buying water.

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