ORIGINAL ARTICLE

Assessment of Knowledge & Practices of Plain Water and Filtered Water Consumers Regarding Occurrence of Diarrheal Diseases

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ABSTRACT

Aim: To assess the knowledge and practices of plain water & filtered water consumers regarding occurrence of water born diarrheal diseases.To suggest measures for prevention and control of water born diarrheal diseases
Study design: Cross sectional survey
Place o study: Shalamar Hospital, Lahore
Methods: Water taken from Water and Sanitation Agency, Lahore (WASA) supply or Private Bore Pumps and Boiled water was taken to be as "Plain". While "filtered" water was standardized as water obtained either from filtration plants or from house-hold filters. Data was collected using systematic random sampling, with a sample size of 100. Each participant was required to fill out a pretested questionnaire.
Results: Out of 100 individuals, 49% were plain water users and 51% were filtered water users.69% had read the literature regarding drinking water.
Conclusion: Water purification practices should be made available to the people at low cost. Health education should also be provided through print media as well as electronic media.
Keywords: Plain water, diarrhea, consumer, filter consumer

INTRODUCTION

Water is the necessity of the life. It is also associated of many viral, bacterial and parasitic diseases. This leads to morbidity and mortality in humans. Common disease enlisted by WHO are as follows[1]

Recent literature reports that in North America and Europe most outbreaks were caused by protozoa.[2] In America *Legionella,* gram positive bacteria, was the main cause of drinking water related outbreaks[3]

Water borne diseases are more common in urban areas as compared to rural area. Similarly water related diseases differs in water drought areas and diseases in areas where water dams or irrigation system is present.[4]

The Pakistan Social and Living Standards Measurement Survey (PSLM) 2010-11, revealed that about 91 percent of the population had access to improved drinking water. The access to improved water MDG target had been set at 93 percent by 2015.Sanitation target of getting 67 percent of the population with access to safe sanitation was set. Safe sanitation has been targeted to rise from 34 in 1990-91 to 67 percent by 2015[5]

Thus the current study is conducted to assess the knowledge attitude and practices of the people living in urban areas of Lahore.

METHODOLOGY

This cross sectional survey was conducted in Shadman and Shahjmal, Lahore. Water taken from WASA supply or Private Bore Pumps and boiled water was taken to be as "Plain". While "filtered" water was standardized as water obtained either from filtration plants or from (functional, one or two chambered) house-hold filters. "Water-borne diarrheal diseases" are taken as the infectious diseases caused by fecal (animal or human) or chemical contamination of water. Data was collected using systematic random sampling, with a sample size of 100. Each participant was required to fill out a pretested questionnaire. The data collected was analyzed using SPSS version 21.0. Chi square test was applied to determine association using p-value of 0.05 or less as significant.

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RESULTS

Out of 100 individuals, 49% were plain water users and 51% were filtered water users.69% had read the literature regarding drinking water.The next question was asked to assess which measures did they take to filter the water; 31% of people used boiled water, 37% of people used filtered water, 5% of people used chlorinated water while 27% used water without any treatment.

Each of the individual was then asked if he had suffered from any water- borne diarrheal diseases (cholera, typhoid etc.) or water-borne illnesses (hepatitis A, hepatitis B) in past one year; 42% of people suffered from the disease while 58% of people remained safe. All of those who suffered from the disease were asked if they had changed their water source or tried to treat their water after suffering from the disease, 63% of people changed the source while 37% of people did not changed the source.

Comparison of complaint made to authorities v/s steps taken by the Authorities

Complained to Authorities	Steps Taken by Authorities	
	Yes	No
Yes	19(30.70%)	43(69.30%)
No	10(26.30%)	28(73.60%)

Fisher's Exact Test=0.821 (p>0.05)

Knowledge of individuals about water-borne diseases or illnesses assessment reveals that only 44% of participants know how these diseases occur while 56% of people did not have any idea about the occurrence of water-borne diarrheal diseases. To estimate their knowledge about how they describe the standard pure

water, Out of 100 individuals 3% of people said that the pure water should be odorless and tasteless, 51% of people said that the water should be odorless, tasteless and colorless while 46% of people said that the pure water should be laboratory tested.

When asked the people about the difficulties encountered while trying to improve water quality 72% of people were having economic burden 28% of people were having awareness problems. We then asked about the probable source of contamination in the area, 76% 0f people said that poor sanitation was the culprit, 17% of people said that human waste and garbage was the source of contamination and 7% of people regarded industrial waste as the source of contamination.

Out of 100 individuals 61% of people complained the authorities about the bad water quality while 39% of people remained silent .After registering complaints to the concerned authorities regarding the water quality 29% people got positive response while 71% of people did not get any response.

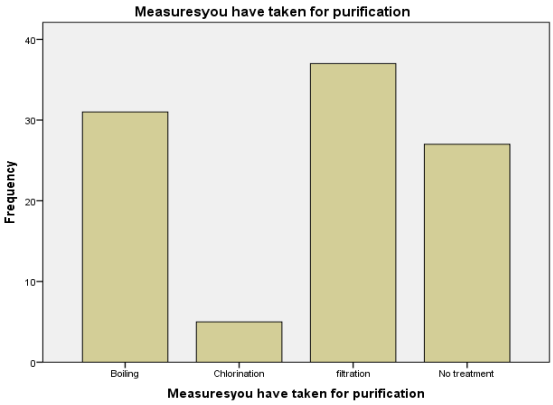
We made comparison between the people who made complaints to the authorities and the concomitant action taken by the authorities, 62% of the people were those who made complaints to the authorities out which 30.7% people got positive response from the authorities while 69.3% didn't get any response. We assessed the attitude of the people by asking if they complained to authorities regarding water contamination in their area. 62% people claimed that they complained to the authorities. 38% did not complain to authorities. Out of 62% people who complained to the authorities, only 32% said that any intervention was made by the authorities

Inference: 62% people say they have complained to authorities regarding contamination of water in their area. Out of these 69.3% People are of the opinion that authorities have never responded with proper interventions. Only 29% people say that authorities have taken steps for water purification in their area. It shows significant loss of confidence in people on authorities.

We made a comparison between exposure to informative literature and measures taken for water purification. Out of 69% people who had read any informative literature 20.28% people did no treatment to their water. However, out of the people who did not read any informative literature (31%), 42% of them did not use any water purification technique. Although percentage of practices with knowledge is higher as compared to without knowledge but this data is unable to elicit the significant difference between use of water filtration techniques with and without knowledge.

The consumption of filtered water is **55.0%** in people who had read any informative literature about water purification. It was **41.9%** in people who had not read any informative literature about water purification. Although the % of practices with knowledge is higher as compared to without knowledge but this data is unable to elicit the significant difference between use of water filtration techniques with and without knowledge.

61.9% of the people who suffered from Diarrheal diseases changed their water source or treated their waterwhereas,**63.7%** of people who did not suffer from any diarrheal disease also treated their water or changed their water source. However the above data does not show any significant statistical association between changing the water source after occurrence of disease



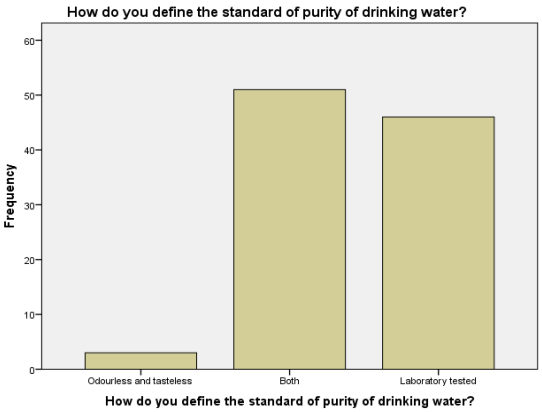


Table 1: Common water born disease and their sources[1]

Category of causative agent	Diseases	Causative organism	Common transmission route
Bacterial	Shigellosis	Shigella species	Man-feces-(flies) water and food –man
	Typhoid fever	Salmonella typhi and paratyphi	Man-feces-food and water – man
	Cholera	Vibrio cholerae	Man-feces-water and food – man
	Acute Gastroenteritis	E. coli	Man-feces-water-Man
Viral Infectious	Hepatitis	Hepatitis A virus, Hepatitis E virus	Man-feces-water and food – man
	Poliomyelitis	Polio virus	Man-feces-water -Man
	Acute Gastroenteritis	Rota Virus	Man-feces-water-Man
Protozoal	AmebiasisEntameoba	Hystolitica	Man-feces-water and food – man
	Giardiasis	Giardia lamblia	Man-feces-water and food –man
Helminths	Dracunculiasis (Guinea Worm)	Dracunculusmedinesis	Man-water-man

Comparison of Exposure to Informative Literature with Measures Taken for Water Purification

Exposure to Informative Literature	Measures Taken for Water Purification			
	Boiling	**Chlorination**	**Filtration**	**No Treatment**
Yes	25(36.23%)	2(2.80%)	28(40.50%)	14(20.28%)
No	6(19.35%)	3(9.60%)	9(29.03%)	13(42%)

Fisher's Exact test 8.151 (p-value 0.034)

DISCUSSION

Water borne diseases are the infectious diseases that arise from the contamination of water by human & animal feces, urine or chemical wastes. The water-related diseases are classified mainly into two main groups: **the non-infectious** and **the infectious** water related diseases. The non-infectious water related diseases- formerly known as the non-specific water borne diseases are related to some chemical property of water.[6]

They are related to theingestion of a harmful chemical, toxic or carcinogenic substance.

Chemical contamination of water supply for drinking and cooking can adversely affect health.

The Infectious water-related diseases are classified according to the Bradley-Feachem classification into feco-oral diseases (diarrheal diseases, dysenteries, hepatitis A, and ascariasis),

Water washed diseases (trachoma, scabies, and dysentery), water based diseases (worm infestations like schistosomiasis, guinea worm), water related insect vector diseases (malaria, filiariasis dengue, yellow fever, Japanese encephalitis), and water dispersed diseases (Legionnaire's disease), water borne diseases (Cholera, typhoid, leptospirosis). The major pathogens associated with water- borne diseases are Rotavirus, which causes diarrhea, HAV causes hepatitis A, Salmonella typhi causes typhoid, Vibrio cholera causes cholera, and Entamoebahistolytica causes amoebic dysentery. Clinically water-borne illnesses most commonly present as diarrhea and/or vomiting.[7]

Preventable water- borne diarrheal illnesses continue to be a dilemma for Preventive Health workers as they persistently take a higher toll in mortalities and morbidities. Annually there are about 4 billion cases of diarrheal diseases leading to about 1.8 million deaths worldwide, with 90% mortalities including children less than 5 years of age. Accounting to a total loss of about 443 million school days and an equivalent of 117 DALYs (Disability Adjusted Life Years) annually. Lack of safe drinking water and good standards of sanitation and hygiene are the leading causes of diarrheal diseases worldwide. Globally 884 million people lack access to improved drinking water sources, adding to the global burden of disease.[8]

However, effective treatment of drinking water at point-of-use (POU) and point-of-consumption can significantly lower the occurrence of preventable diarrhea.

In our study assessment of Knowledge, Attitude and Practices regarding diarrhea and water purification was made, of people living in Shahjamal and Shadman Lahore. It showed higher percentage of people using Filtered water who had knowledge about the causes of diarrheal diseases and water purification. Also Practices of People were assessed as most of the people after suffering from diarrhea changed their water source or started treating it. It was alos found that boiling of water for 10 minutes do not helps in purification of water it must be boiled at least for 20 minutes[9]

Most of the people think that the hurdle in improving the water quality was Economic burden. Attitude of People were assessed by knowing if they complained to authorities regarding Unclean and polluted water in their locality.

RECOMMENDATIONS

1. The federal, provincial and local governments need to take immediate initiatives for the provision of safe drinking water to the public in order to prevent the onslaught of water-borne diarrheal diseases.
2. Routine surveys should be conducted to ensure availability of safe drinking water.
3. Establishment of national programs for control of spread of water-borne diarrheal diseases
4. Establishment of legal framework for evaluating functioning of concerned programs and authorities.
5. Water filtration plants should be installed at community level and their proper functioning must be ensured.
6. Water purification practices should be made available to the people at low cost.
7. Health education should also be provided through print media as well as electronic media.

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