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Perception of Drinking Water and Diseases Associated with it in the Rural Areas of Sindh, Pakistan

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Abstract

In the rural areas the vast majority of people mostly on drinking ground water. Ground water in some areas contains contaminants and heavy metals, and bacteria and amoeba and other pathogens, which might cause number of diseases. The quality of drinking water and its associated diseases have not been extensively studied in the rural areas of Sindh. The purpose of this study is to evaluate the level of perception of respondents living in the rural areas of Sindh. This was a cross sectional survey based study carried out from January 2016 to December 2016. Data was collected through the interview based structured questionnaire. Out of 241, majority of the respondents were drinking ground water (56%) and (27.8%) were using the treated water as the drinking water source. 12% were using surface water and only 1.3% relied on drinking bottled water and 2.9% were using boiled water as the source of drinking water. The highest reported disease was diarrhea (38.6%) followed by the vomiting. (19.1%). 15.3% reported that they suffered from kidney problems and 5.8% reported to suffer from hepatitis. 21.2% responded that they did not suffer from any water borne diseases during the reported year.

Keywords: Perception, drinking water, water related diseases, Sindh.

Introduction

Drinking water is mainly comprised of fresh water, which is 3% of the total water on earth, yet only 0.01% water is approachable for the use of human (Hinrichsen and Tacio 2002). Due to the lack of proper management, unavailability of well equipped laboratories, financial restriction and the absence of legal framework for drinking water therefore is not fit to drink (Ashbolt 2004; Aziz 2005).

Drinking water is contaminated with the heavy metals and chemical has become major health concern (Muhammad, Shah et al. 2011) presence of heavy metals in drinking water can affect

health (Muhammad, Shah et al. 2011) some of these metals such as arsenic has been implicated in cancer (Smith, Hopenhayn-Rich et al. 1992) and preterm deliveries in several studies (Ahmad, Sayed et al. 2001). In addition, the presence of bacteria and other pathogen cause many types of infections, which include diarrhea, urinary infection, food poisoning, cholera typhoid and hepatitis not only in the developed countries but also under developed countries (Fawell and Nieuwenhuijsen 2003; Ashbolt 2004; Turgeon, Rodriguez et al. 2004; Jones, Majowicz et al. 2007).

Number of studies indicate the perception of people about water is the main indicator of the satisfaction of water these studies suggest that quality of water is improved with the public perception, and WHO guidelines are made accordingly (Jones, Majowicz et al. 2007; de França Doria 2010; Dupont and Krupnick 2010). The study at Quebec showed that public perception affects the quality of water is improved with the public perception of the quality of water and health risk associated with it (Turgeon, Rodriguez et al. 2004). Unsafe drinking water might pose the health risk as has been previously reported (Ashbolt 2004; Nickson, McArthur et al. 2005; Muhammad, Shah et al. 2011). Governments in developed countries consider safe water supplies as the major responsibility, however, developing countries majority of people do not have access to drinking water.

In Pakistan, the problem of water pollution is growing at an alarming rate. Drinking contaminated water can cause number of water related diseases such as diarrhea, food poisoning, vomiting, typhoid, hepatitis, gastroenteritis, urinary infection and skin infection are very common, which account to higher mortality rate (Ahmed, Billoo et al. 1995; Ashbolt 2004; Nickson, McArthur et al. 2005; Khan, Shahnaz et al. 2013). Although number of reports has been published on drinking water, however, very few studies have been carried out regarding the water borne diseases.

The purpose of this study is to evaluate the use of drinking water in the rural areas of Sindh Pakistan. This study also aims at investigate the types of water borne diseases, which respondents living in the rural area of Sindh suffered due to drinking contaminated water.

Methodology

This survey based cross-sectional study was carried out in various rural areas of Sindh from January 2016 to December 2016. Total 250 respondents were approached for the study, out of

250 total 241 agreed to participate in the study. The Data was collected through interview based structured questionnaire comprised of socio-demographic distribution of respondents, the perception and the use of drinking water, and diseases these respondents experienced in the last 12 months. Verbal consent was taken before collecting the data.

Health Risk Assessment

All the respondents were interviewed for the diseases they experienced during the last 12 months, they were also interviewed about their perception if they had suffered the disease due to drinking water, they were also asked about the episodes of the diseases respondents suffered during the last 12 months. The respondents were also interviewed for the level of awareness they had about drinking water quality and its associated diseases. The data was analyzed using statistical software, SPSS 16.

Results

In order to find out the perception of respondents about the quality of drinking water and associated diseases, total 250 participants were randomly selected out of 250 only 241 participated in the study, giving the response rate of 96.4%. Out of 241 subjects, 55.2% (n=133) were male subjects and 44.8% (n= 108) were female subjects. According to the age wise distribution the highest respondents were from 19 to 29 years of age (29%) and the lowest were from ≥ 60 years (10.8%).

Table.1. Distribution of respondents according to basic characteristics

| Characteristics | Frequency (n = 241) | Percentage % |
|-----------------|---------------------|--------------|
| Gender | | |
| Male | 133 | 55.2 |
| Female | 108 | 44.8 |
| Age (years) | | |
| < 18 | 31 | 12.9 |
| 19-29 | 70 | 29 |
| 30-39 | 38 | 15.8 |
| 40-49 | 47 | 19.5 |
| 50-59 | 29 | 12 |
| > 60 | 26 | 10.8 |

According to the Table 2, majority of respondent 56% (n=135) used the ground water and 27.8% (n=67) used the treated water as the drinking water source. 12% of the respondents were using the surface water and only 2.7% were treated the water with boiling and only 1.3% of these respondents were using bottled water as the drinking water source.

Table 2. Use of the type of water for drinking purpose by the respondents

| Type of drinking water | Frequency (n = 241) | Percentage % |
|------------------------|---------------------|--------------|
| Boil water | 7 | 2.9 |
| Ground Water | 135 | 56 |
| Surface Water | 29 | 12 |
| Treated Water | 67 | 27.8 |
| Bottled Water | 3 | 1.3 |

Contamination of water is health risk and it can cause number of diseases.

Table 3 indicate that diarrhea was the highly reported (38.6%) by the respondents, which they perceive was due to intake of poor quality water. Respondents also reported vomiting (19.1%) due to drinking contaminated water. 15.3% reported that they had kidney problems. Respondents also reported hepatitis (5.8%) and they perceived that it was due to drinking contaminated water. However, 21.2% of the respondents did not report any disease during the last 12 months.

Table 3 shows the diseases reported by the respondents

| Types of Diseases | Frequency (n= 241) | Percentage % |
|----------------------|--------------------|--------------|
| Diarrhea | 93 | 38.6 |
| Vomiting | 46 | 19.1 |
| Kidney problems | 37 | 15.3 |
| Hepatitis | 14 | 5.8 |
| No Diseases reported | 51 | 21.2 |

Discussion

Perception of water is generally studied to assess the level of satisfaction in the population so that the quality of water is improved with taste, smell and purity (Turgeon, Rodriguez et al. 2004; WHO 2004; de França Doria 2010). The data we have collected suggest that ground water was the largest source of drinking water, where people

believed that ground water is safer than surface water which is not safe to drink, this might be due to the fact that chlorination does not stop the episodes of diarrhea (Jensen, Ensink et al. 2003; Khan, Shahnaz et al. 2013).

Only 27.80% percent were using the treated water provided by various organizations, generally people do not use the low grade technologies for treating the water (Luby, Agboatwalla et al. 2001), therefore increasing the risk of water borne diseases, intervention with low grade technologies have indicated the decrease chances of water borne diseases. Very few people in the rural areas were using bottled water, which is generally perceived as the safest water; however, low use of the bottled water might be due to poverty in the rural areas (Bibi, Khan et al. 2014; Khan, Chaudhry et al. 2014).

Our data suggest highest prevalence of diarrhea as the highest perceived diseases caused by drinking poor quality water, followed by the vomiting and food poisoning. The data is purely on perception and it is very hard to determine exactly the prevalence of water borne diseases due to lack of maintaining the hospital records (Aziz 2005). Our data indicate the prevalence of diarrhea due to drinking contaminated water was 38.6 this is slightly higher than already published studies (Ali and Akhtar 2013; Akhtar 2015). Hassan Ali reported diarrhea at 37.3% majority of the respondent were using the ground as water as drinking water source (Nadeem, Yasmin et al. 2013), another study put the prevalence from 29 to 38% and the respondents were drinking ground and surface water (Memon, Soomro et al. 2011). The prevalence rate of gastroenteritis, diarrhea, vomiting, skin diseases and kidney problems and various other water borne diseases are usually due to drinking contaminated water, our study is in agreement with previously published studies (Farah, Zia et al. 2002; Shar, Kazi et al. 2010; Memon, Soomro et al. 2011; Shah, Ara et al. 2012; Khan, Shahnaz et al. 2013; Nabeela, Azizullah et al. 2014). This indicates that people

are generally deprived of quality drinking water in rural areas Sindh, Pakistan.

Conclusion

Overall our data suggest that majority of people in the rural areas of Sindh Pakistan use the ground water as the main source of drinking water. These people perceived the drinking water as the source of various water borne diseases. This study will help in understanding the rural masses perception of drinking water; in addition this will also help in making public health policy related to quality drinking water. Provision of availability of clean drinking water may save the high expenditure incurred on health in under developed countries.

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