

Incidence of diarrhea among children as an exposure to poor water quality and unimproved sanitation: A case of Farooqabad, Pakistan

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ABSTRACT

Availability of safe drinking water and sanitation are two major issues faced by population, lack of which is causing many health threats to community in developing countries, especially Pakistan. Current research is an attempt to analyze the exposure of these environmental health risks and their effect as incidence of diarrhea among children during 2012-2013 in a small unplanned town of Farooqabad, District Bahawalnagar. Main objective of research is to provide set of strategies for community participation and organization to minimize the environmental health threats in such areas. Data pertaining to basic demographics, sanitation, water supply and incidence of diarrhea was collected through extensive household survey while laboratory tests were carried out to check the drinking water quality and identification of bacterial contamination in water. Finally this study culminates a strategic framework to anticipate the local environment in a sustainable and healthy way. This study can be implemented in most of the towns of country which are considered as economically deprived areas.

Keywords: Environmental health, sanitation, water quality, diarrhea, community participation

1. Introduction

When studying the spread of disease, it is important to examine a multitude of factors, including the overall population that is impacted by a particular disease, the environmental context in which that disease is spreading, and the social behaviors or practices that might intensify or mitigate the diffusion of a particular disease (Noor et al., 2014). Pure, safe and high quality drinking water is an essential ingredient for public health. Much of ill health which adversely effects population efficiency, particularly in developing countries like Pakistan, might be associated to the lack of safe and purified drinking water supply(Khan et al., 2014). Water quality and sanitary conditions can make or mar the health structure of an area but if they are in adverse condition they can cause many diseases like Diarrhea (Dicken, 1998, Khan et al., 2014, Graham, 1989, Luby et al., 2004, Pruss-Ustun, 2008). If hygiene conditions, hand washing habits, water and sanitary conditions are regularly practiced and maintained respectively then there is less chance of the morbidity rate of the diarrhea but if they are sporadically practiced and maintained they can serve as a cause of diarrhea. The current study “Incidence of Diarrhea among Children as an Exposure to Poor Water Quality and Unimproved Sanitation: A Case of Farooqabad, Pakistan” was conducted to examine the

recent supposition. Diarrhea is defined as the passage of loose, liquid or watery stools. These liquid stools are usually passed more than three times a day (Park, 2009, Steiner et al., 2006). This health issue largely relates with the exposure to poor sanitation, water and food quality. Major environmental health condition responsible for the causation of this disease includes excreta disposal, water quality (Esteves, 2012, Smith et al., 1999, Pruss-Ustun, 2008), water supply, food safety, solid waste management and hand washing practice.

According to WHO, diarrhea is the second largest cause of death in children and globally it kills almost 7.5 hundred thousand deaths around the world. Moreover almost 1.7 million cases of diarrhea are reported every year around the world (Yassi, 2001). Each year, almost 1.5 million children around the world die from diarrheal disease, due to unsafe water, inadequate sanitation and poor hygiene practices (PSI, 2010). In developing countries this disease is almost universally infectious in origin (Black, 1984, Dicken, 1998).

The purpose of this study is to assess the water quality and sanitation situation in Farooqabad. The significance of this matter lies in the fact that it reveals the environmental health structure of an area. The water, sanitary condition, hygienic situation and overall health structure of an area provide guideline for the policy makers and planners to frame out projects for the physical, economic, social, educational, and cultural and health services of an area. As the morbidity of diarrhea is mostly found in children under the age of 5 years so this topic deals with the health of future progeny which is necessary for the sustainability of an area. Also the research on this topic will prove to be helpful in providing medical care and facilities to families and government to equip themselves to fight against germs.

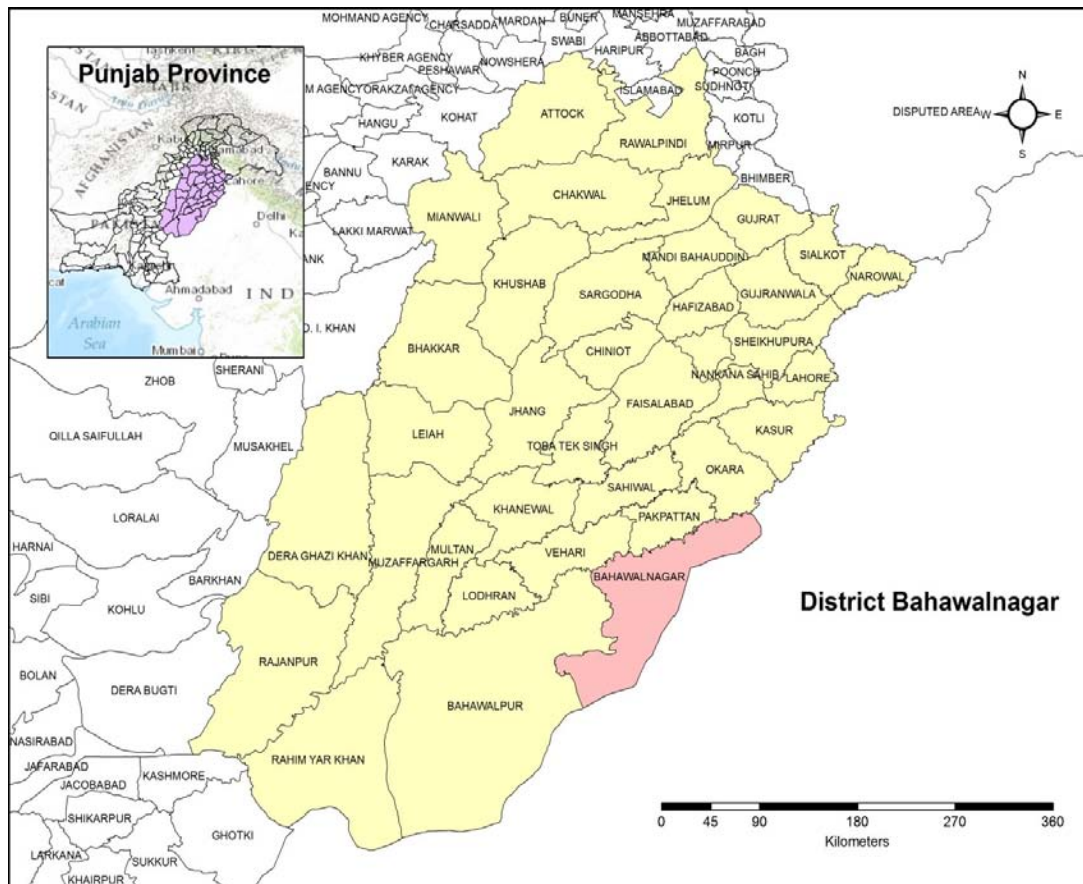


Figure 1: Location of District Bahawalnagar

Bahawalnagar is one of the important districts located in province Punjab (Figure 1). Its old name was Rojhanwali. It was named as Bahawalnagar in 1904 after Bahawal Khan V. Farooqabad the urban areas of the Bahawalnagar city, especially characterized by poor inhabitants.

2. Material and methods

This case study was piloted during February-June 2013 in the Farooqabad of Bahawalnagar City. The descriptive study was carried out by surveying total number of 230 households from the representative areas. Water quality, sanitary conditions, hygiene conditions and hand washing habits were taken as indicators of environmental health particularly for diarrhea morbidity in children. Field Survey and observations were the main sources of collecting primary data. Moreover laboratory analysis of water quality was taken out with the help of PCRWR (Pakistan Council of Research in Water Resources) department. Field survey was based on questionnaire method. It contained four sections, first socio economic profile of dwellers, second about the water sources and purification practice, third with the sanitation conditions, i.e. excreta disposal facility, and the final section relates with the diarrhea morbidity among children (5 year of age) during the last year.

3. Results and discussion

According to field survey of study area, socio economic profile of the inhabitants of Farooqabad showed that almost 63 percent of households have income less than ten thousand; dependency rate was as high as 67 percent, reflecting the poor economic conditions of dwellers. These conditions are the main reason of their degraded local sanitation condition. As per indicator of water sources, almost 86 percent of households have Municipal water supply, while 8 percent used hand pump for drinking water and rest of the households use other sources (Figure 2). Though the water sources are safe in study area, but the water quality as tested by PCRWR was contaminated with bacteria and feces especially in municipal and hand pump water sources (Table 1) (Figure 3).

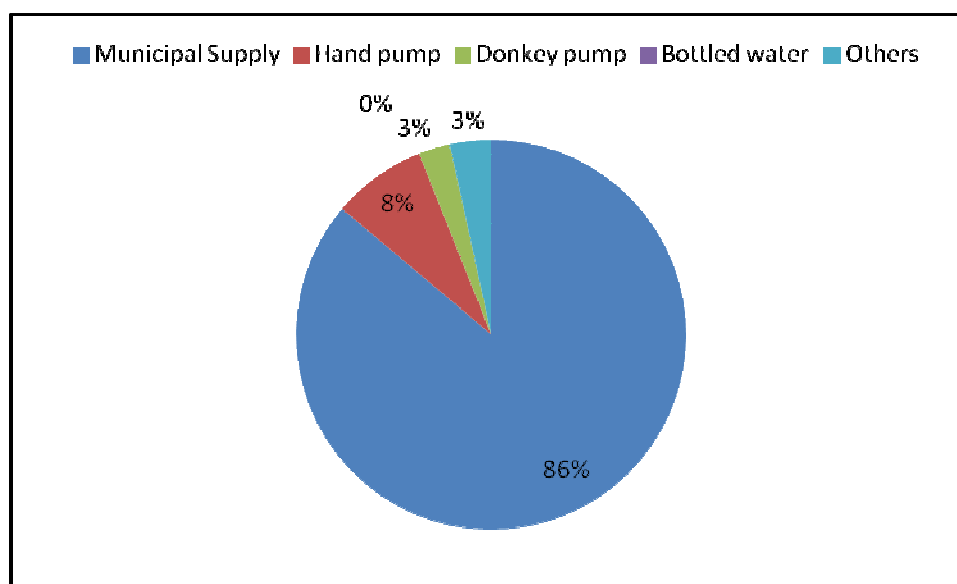


Figure 2: Sources of Drinking Water in Farooqabad

Table 1: Water Samples Results

Water Samples	Mode of water supply	Bacterial presence
Sample 1	Municipal supply	Highly bacterial
Sample 2	Hand pumps	Highly bacterial
Sample 3	Donkey Pump	Less Bacterial

Moreover the fact that almost 91 percent household do not use any purification method for drinking water, is very alarming and posing serious health threats to the population of Farooqabad (Figure 4).



Figure 3: Water Samples Showing Results

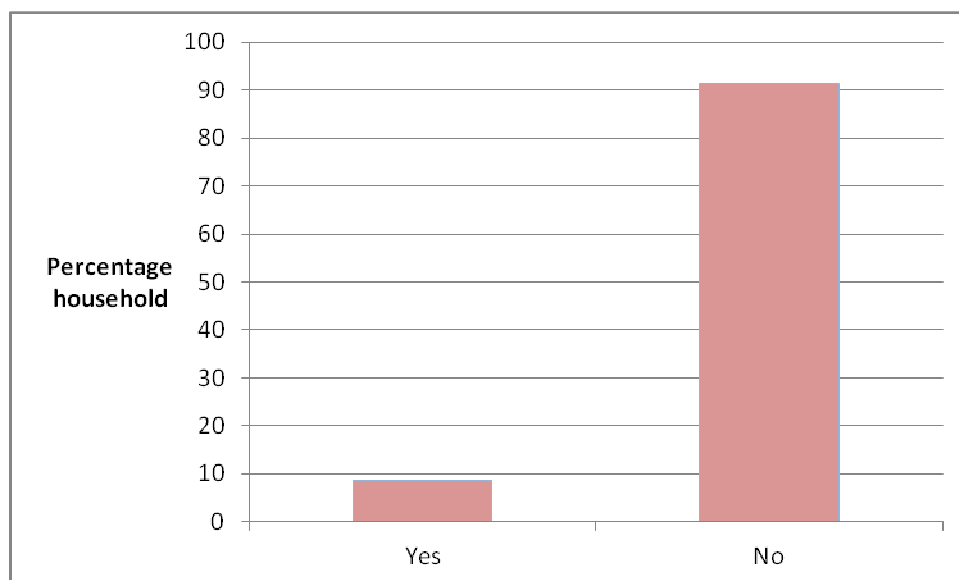


Figure 4: Water Purification Practice

Sanitation means to minimize the human contact with hazardous waste including human excreta, solid waste and waste water. It also deals with the adaptation of environment to

minimize health threats.. In Farooqabad, 45 percent of households have piped sewerage system, 36 have pit latrine while rest of them use septic tanks and public latrine (Figure 5). While hand washing practice found to be satisfactory among all household (Figure 6).

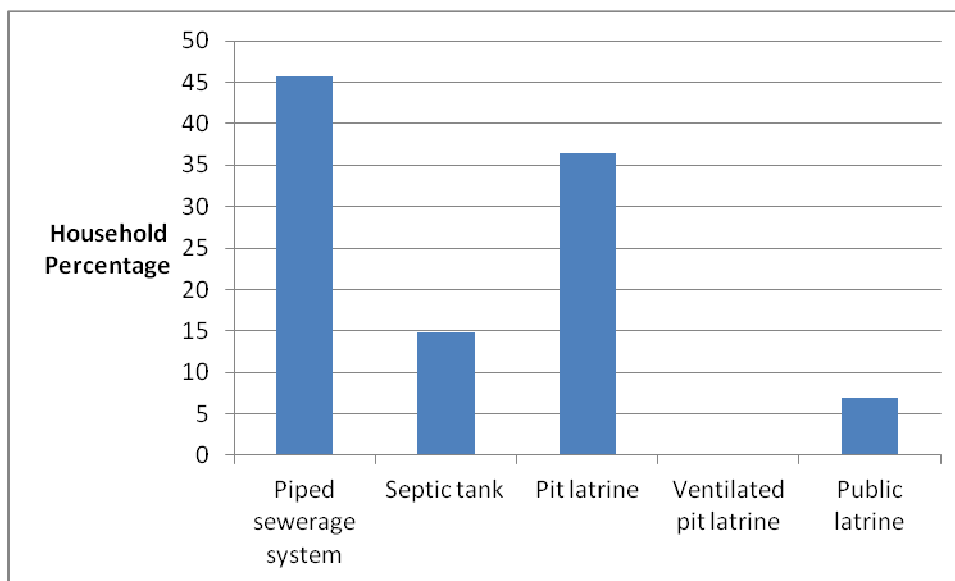


Figure 5: Sanitation Facilities in Farooqabad

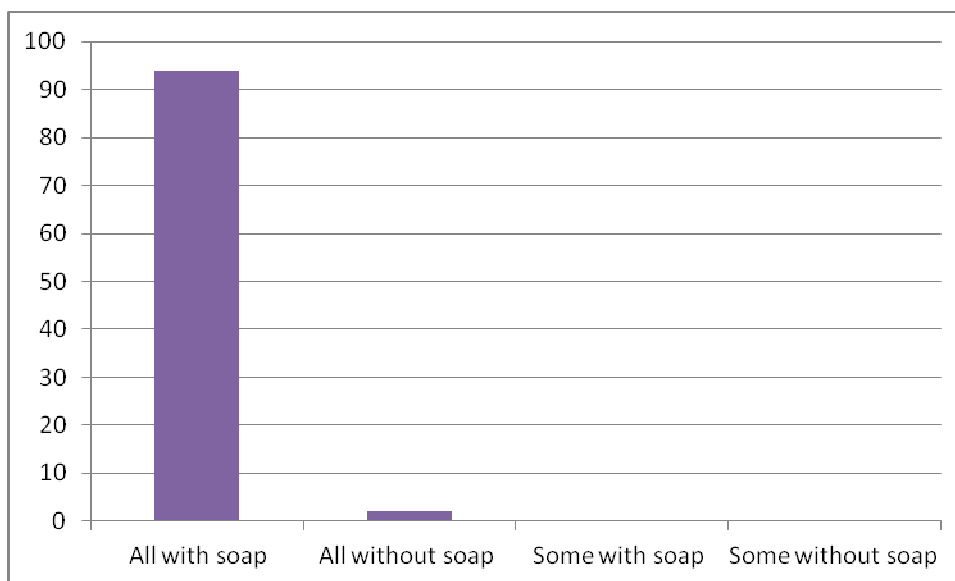


Figure 6: Hand Washing Practice

Solid waste disposal was found to be mismanaged as dumped outside the houses or in the streets of Farooqabad. Similarly waste water was found to be drained in open streets making this area prone to various health threats (Figure 7 and 8).

Hence, in the result of all these mal environmental factors, incidence of diarrhea among children was calculated for the year 2012-2013. Total number of children were surveyed almost of 333, among which there were 182 boys and 151 girls, while the highest numbers in less than 1 year of age (Figure 9).

Diarrhea morbidity analysis shows that it is prominent among children less than 1 year of age (Table 2), with frequency high as once and twice episodes of diarrhea. This age group shows high mortality i.e. 3 deaths during one year. Next risk group is 2 year of age with high diarrhea episodes and deaths of 2 in a year (Figure 10). Rest of the age groups show somehow low morbidity and mortality rates.



Figure 7: Waste Water Disposal in Farooqabad



Figure 8: Solid Waste Disposal in Farooqabad

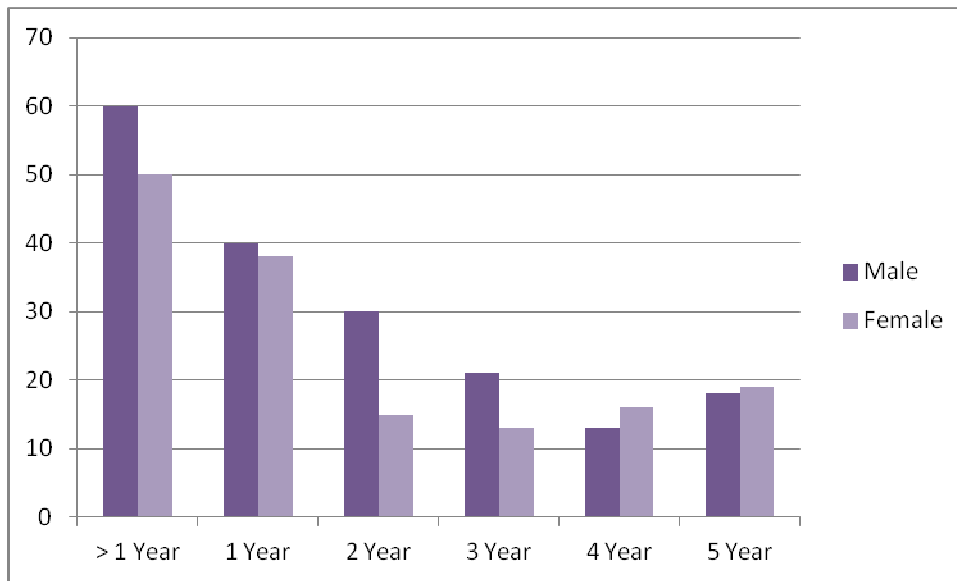


Figure 9: Number of Male and Female Children in Farooqabad during 2013

Table 2: Incidence of Diarrhea among Children

Episodes of Diarrhea during 2012-2013				
Age of Children in Years	Once	Twice	Thrice	More
0- 1	31	22	9	3
1-2	24	21	11	1
2-3	20	15	6	1
3-4	18	12	7	1
4-5	15	11	4	1

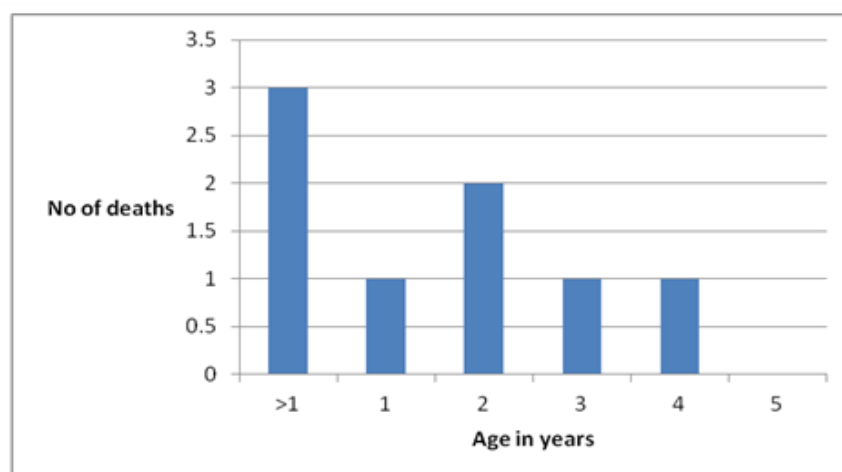


Figure 10: Diarrhea Mortality among Children during 2012

4. Conclusion

The outcome of this study is that the poor water quality and sanitation conditions are causing the incidence of diarrhea in Farooqabad and its morbidity rate is high among the children under the age of five years, which is a potential threat for the stability of the population of that area. Therefore attention should be paid to address this problem by the concerned authorities and also by the community of the Farooqabad. Following are the suggestions to improve the water quality and sanitation of the concerned area.

1. Municipal authorities should take measures to improve the water quality.
2. The waste water disposal should be properly done by the help of pipelines.
3. Government should provide filter plants to that area for the availability of clean and pure water.
4. The awareness programs and schemes should be practiced in the area to make illiterate people about the cleanliness, diarrheal risk factors and hygiene conditions.
5. The Tehsil Municipal Authority (TMA) should play an effective role to maintain the sanitation conditions of the area.
6. The complaint system should be maintained by local committees regarding sanitation condition and availability of clean water.
7. Moreover the proper monitoring should be done by the TMA on the ongoing sanitation activities and practices.
8. The planning projects should be initiated in the city to improve the standard of living.
9. The residents should also play an effective role by maintaining hygiene conditions individually and collectively.

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