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People's Perception about Poor Quality of Drinking Water and Its Impact on Human Health in Rural Areas of Tehsil Samundri Pakistan

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Abstract: ***The aim of the present study is to investigate the perception about the impact of poor quality of drinking water on human health in rural areas of tehsil Samundri, district Faisalabad. Two union councils were selected randomly from the selected tehsil, and then four villages (two from each union council) were selected randomly. A sample of 110 respondents selected proportionally. Information was gathered through well- structured research tool (Interviewing Schedule) which was developed in the light of study objectives. A majority of the respondents, 63.6 percent, reported that they used hand pumps for water, 59.1 percent of them used electric pump water for drinking purpose. Little less than one-fourth i.e. 22.7 percent of the respondents were satisfied 'to a great extent' and 31.8 percent of them were satisfied 'to some extent' with the quality of water supplied from the main source. Majority of the respondents had knowledge about waterborne disease. Family members suffered waterborne diseases i.e. Diarrhea (37.3%), Cholera (26.7%), Viral hepatitis (40.0%), and Gas trouble/ gastroenteritis (53.6%). 30.9 percent of them were agreed that Pakistan is particularly having serious problems of fresh water supply/ resources. A significant association was found between education & income of the respondents and facing any water born disease. Therefore, a public policy related to health and safety in those rural areas should be designed and implemented timely.***

Keywords: Drinking water quality, Water, Behavioral sociology, Rural sociology, Rural health, Regression, Developing country

1. Introduction

Water is an essential element for life. Freshwater comprises 3% of the total water on earth. Only a small percentage (0.01%) of this freshwater is available for human use (Hinrichsen and Tacio, 2002). Unfortunately even this small proportion of freshwater is under immense stress due to rapid population growth, urbanization and unsustainable consumption of water in industry and agriculture. According to a UNO report, the world population is increasing exponentially while the availability of freshwater is declining. Many countries in Africa, Middle East and South Asia will have serious threats of water shortage in the next two decades. In developing countries the problem is further aggravated due to the lack of proper management, unavailability of professionals and financial constraint (PCRWR, 2005).

Poor quality of water is primarily the contamination of natural or manmade sources of fresh water. Poor quality of water happens on many levels. Industrial waste deposit in rivers and other water bodies such as lakes. Discharging toxic waste and untreated waste into water resources. Poor quality of water is an undesirable change in the state of water, contaminated with harmful substances. It is the second most important environmental issue next to air pollution. Any change in the physical, chemical and biological properties of water that has a harmful effect on living things is water pollution. Poor quality of water is not only unsafe for drinking and other consumption purposes, but it is also unsuitable for agricultural and industrial uses. The effects of water pollution are detrimental to human beings, plants, animals, fish and birds. Using it for drinking purpose is the prime cause for waterborne diseases such as diarrhea, dysentery and typhoid (Arpita, 2012).

Access to a safe and continuous supply of water for drinking, cooking, and personal hygiene is an essential prerequisite for health. An inadequate water supply—whether as a result of poor access or quality, low reliability, high cost, or difficulty of management—is associated with significant health risks. These health risks are experienced most strongly by the poorest nations, and the poorest households within nations. A good water supply is necessary for good sanitation and hygiene, and to underpin livelihoods, nutrition, and economic growth (Hutton, 2008).

Water pollution is most often due to human activities (Hammer, 1986). The major ones are indiscriminate disposal of industrial, municipal and domestic wastes in water channels, rivers, streams and lakes, etc. (Kahlown and Majeed, 2003). An estimated 2 million tons of sewage and other effluents are discharged into the world's waters every day. In developing countries the situation is worse where over 90% of raw sewage and 70% of untreated industrial wastes are dumped into surface water sources (Anonymous, 2010).In Pakistan the problem of water pollution is also growing at an alarming rate. The phenomena1 increase in country's population has brought unprecedented pressure on safe drinking water. Water born diseases account for 20 to 30% of all hospital cases and 60% infant deaths (Government of Pakistan, 1999-2000). In Pakistan, 72% population lives in rural area. More of them have not the availability of good quality drinking water. So due to polluted water the people of villages have a many diseases like typhoid, stomach problems, kidney problem, food poisoning and skin problem (Ilyas, 1998).Water contamination is one of the main causes of health problems in human beings. About 2.3 billion peoples are suffering from water related diseases worldwide (UNESCO, 2003). In developing countries more than 2.2 million people die

every year due to drinking of unclean water and inadequate sanitation (WHO and UNISEF, 2000). Water related infectious and parasitic diseases account for ≈60% of infant mortality in the world (Ullah et al., 2009).

In Pakistan contamination of drinking water with industrial wastes and municipal sewage coupled with lack of water disinfection practices and quality monitoring at treatment plants is the main cause of the prevalence of waterborne diseases (Hashmi et al., 2009a). It is very hard to quantify exactly the waterborne diseases in Pakistan because of lack of maintenance of records at hospitals (Aziz, 2005). According to a UNICEF report 20–40% of patients in hospitals of Pakistan are suffering from water-linked diseases. These diseases include hepatitis, cholera, dysentery, cryptosporidiosis, giardiasis, and typhoid which account for one third of all deaths in the country (WB-SCEA, 2006). Each year with the onset of monsoon (July and August) rains in summer the situation gets worse with water-borne diseases like hepatitis, typhoid fever, gastroenteritis, dysentery, cholera, E. coli diarrhea, rotavirus diarrhea, malaria, giardiasis and intestinal worms. Lack of effective prevention and control measures contribute in worsening the situation. Diarrhea, which is a water-linked disease, accounts for 14% of illnesses in children below five years old and for 7% of all diseases in people of all ages in Pakistan (Rosemann, 2005). An estimated number of 0.2–0.25 million children in Pakistan die every year due to diarrhea and other water related diseases (Rosemann, 2005). In Karachi unclean water has been the cause of renal infection which leads to death of 10,000 people annually.Keeping in view all these issues and problems, this study aims to investigate the people‘s perception about poor quality drinking water and health impacts in rural areas. Furthermore, socio-economic and demographic characteristics of the rural people have also been explored for the selected tehsil of the study area.

2. Materials and Methods

2.1. Study Area

The study site selected for this research is Samundri tehsil of district Faisalabad (third largest city of Pakistan; also known as Manchester of Pakistan due to excellence in textile sector). The water table and water quality of Faisalabad is highly affected by the toxic chemicals and other pollutants due to heavy fabrication processes. This is why water quality and health impacts are tested for this study area keeping in view the adjacent rural community.

2.2. Sample Size

Sample can be defined as accurate envoy of the population, which has all the characteristics of preferred population. Tehsil Samundri was selected from six tehsils of district Faisalabad purposively. Two union councils (UC-119 and UC-124) were selected randomly from the selected tehsil, than four villages (two from each UC) i.e. Chak No. 52/GB and 228/GB from UC-119 and Chak No. 136/GB & 373/GB were selected randomly.110 respondents were selected proportionally from the study area.

2.3. Data Collection

Primary data is collected from the selected rural communities. Detail on data collection tools and approaches are explained below.

2.3.1. Construction of Data Collection Tool

Social science deals with human nature, Feelings, emotions and minds of human being. To study all these factors it was compulsory that data collection tool was very accurate and reliable. Interview schedule was prepared with open and close ended questions to collect the data from respondents. It was structured to get all the required information from the respondents.

2.3.2. Interviewing the Respondents

Interview was conducted from respondents to collect facts. The investigator himself interviewed each respondent to make sure unbiased response and then rechecked each questionnaire for accuracy and uniformity because it was very difficult to approach the same respondent at any subsequent stage.

2.4. Analyzing of data

The simple linear regression model is used with the mathematical format stated below:

$$Y = b0 + b1\ X1 + b2\ X2 \ldots\ldots bj\ Xj + e$$

Where Y = dependent variable, b0= the intercept value, b1-bj = the partial Regression coefficients, X1- XJ = the explanatory variables and e = error term.

The choice of this model lies in its ability to show the partial strength and possibly test the significance of the parameters of estimating rice farmers‘ level of production in the study area. Collected data was analyzed using the Statistical Package for Social Sciences. Descriptive statistics, including frequencies, percentages, means and standard deviations, were used to summarize different variables. Data was interpreted with the help of a computer software i.e. statistical package for social sciences.

3. Results and Discussion

Table 1 shows that about one-third i.e. 32.7 percent of the respondents had up to 35 years of age, while a major proportion i.e. 40.0 percent of the respondents had 31-40 years of age and 27.3 percent of them had above 45 years of age.

Table 1 also reflects that little more than one-fifth i.e. 21.8 percent of the respondents were illiterate, while more than one-fourth i.e. 28.2 percent of the respondents had primary-middle level education, 30.9 percent of the respondents were matriculated and remaining 19.1 percent of the respondents had above matric level education. Table 1further indicates that more than one-third i.e. 36.4 percent of the respondents had up to Rs. 10000 monthly income, while 35.5 percent of them had Rs. 10001-20000 monthly income and 28.2 percent of them had above Rs. 20000 monthly income.

Table 1: Distribution of the respondents according to their age, education and monthly income

Age of the respondents (in years)	*Frequency*	*Percentage*
Up to 35	36	32.7
36-45	44	40.0
Above 45	30	27.3
Total	110	100.0
Education of the respondents	Frequency	Percentage
Illiterate	24	21.8
Primary-middle	31	28.2
Matric	34	30.9
Above matric	21	19.1
Total	110	100.0
Monthly income (Rs.)	Frequency	Percentage
Up to 10000	40	36.4
10001-20000	39	35.5
Above 20000	31	28.2
Total	110	100.0

Table 2: Distribution of the respondents according to their main source of water for domestic use

Main source of water for domestic use	*Yes*		*No*		*Total*	
	F.	%	F.	%	F.	%
Hand pump	86	78.2	24	21.8	110	100.0
Electric pump	70	63.6	40	36.4	110	100.0
Canal bank Pump	23	20.9	87	79.1	110	100.0
Tubewell	12	10.9	98	89.1	110	100.0
Filter plant	11	10.0	99	90.0	110	100.0
Canal water	14	12.7	96	87.3	110	100.0
WASA supply	0	0.0	110	100.0	110	100.0

Table 2 reveals that a majority i.e. 78.2 percent of the respondents had hand pump, 63.6 percent of them had electric pump and 20.9 percent of the respondents used canal bank pump‘s water for their domestic use, while 10.9 percent of the respondents used tube well water, 10.0 percent of them used filter plant‘s water, 12.7 percent of them used canal water for their domestic use. Results also show that little less than one-fourth i.e. 22.7 percent of the respondents were satisfied ‗to a great extent‘ and 31.8 percent of them were satisfied ‗to some extent‘ with the quality of water supplied from the main source, whereas 45.5 percent of them never satisfied with the quality of water supplied from the main source. It further indicates that 30.9 percent of the respondents had perception that the water quality is good, 19.1 percent of them told that the water quality is normal, 24.5 percent of them had heavy water and 25.5 percent of them had bad quality water in their home.

Table 3: Distribution of the respondents according to adopt any measures to improve the quality of drinking water

Adopt any measures to improve the quality of drinking water	*Frequency*	*Percentage*
Yes	23	20.9
No	87	79.1
Total	110	100.0
Method	Frequency	Percentage
Filtration	7	6.4
Boiling	16	14.5
Chlorination	0	0.0
NA (87)	87	79.1
Total	110	100.0

Table 3 shows that only one-fifth i.e. 20.9 percent of the respondents reported that they were adopted protective measures to improve the quality of drinking water, while a large majority i.e. 79.1 percent of them were replied negatively. Table 21 indicates that 6.4 percent of the respondents were adopted filtration method and 14.5 percent of them were adopted boiling method for the improvement of drinking water.

Table 4: Distribution of the respondents according to their knowledge about waterborne diseases

Waterborne diseases	*Knowledge*				*Total*	
	Yes		*No*			
	F.	%	F.	%	F.	%
Diarrhea	87	79.1	23	20.9	110	100.0
Food poisoning	61	55.5	49	44.5	110	100.0
Vomiting	33	30.0	77	70.0	110	100.0
Cholera	71	64.5	39	35.5	110	100.0
Viral hepatitis	91	82.7	19	17.3	110	100.0
Gas trouble/ gastroenteritis	77	70.0	33	30.0	110	100.0
Typhoid fever	18	16.4	92	83.6	110	100.0
Dysentery	24	21.8	86	78.2	110	100.0

Table 4 shows that a majority i.e. 79.1 percent of the respondents had knowledge that the diarrhea is a waterborne disease, while more than a half 55.0 percent of them had knowledge that food poisoning is a waterborne disease, whereas 30.0 percent of them had knowledge vomiting is a waterborne disease, 64.5 percent of them had knowledge Cholera is a waterborne disease, a huge majority i.e. 82.7 percent and 70.0 percent of them had knowledge that viral hepatitis and gas trible/gastroenteritis are the waterborne disease, respectively. About 16.4 percent and 21.8 percent and 21.8 percent of the respondents had knowledge that Typhoid fever and dysentery are the waterborne disease.Therefore, majority of the respondent had knowledge that Diarrhea, Cholera, hepatitis and gas trouble are waterborne disease.

Figure1 shows that more than one-third i.e. 38.2 percent of the respondents were suffering any waterborne disease due to poor quality of drinking water, while 61.8 percent of them had no waterborne disease.

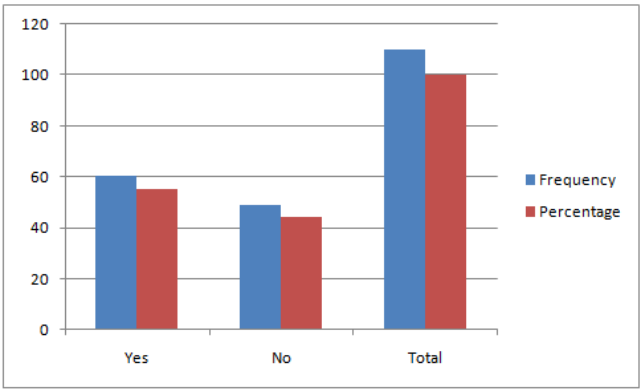

Figure 1: Distribution of the respondents according to have any health problem due to poor quality of water

Figure 2 indicates that more than a half i.e. 55.5 percent of the respondents‘ family members had health problems due to poor quality of drinking water, while 44.5 percent of them told that their family members had no health problem related to waterborne diseases.

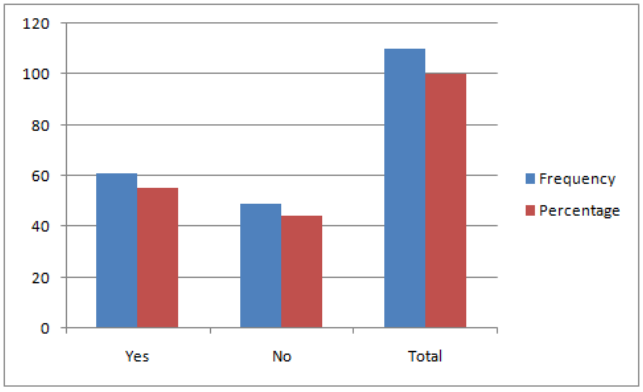

Figure 2: Distribution of the respondents according to their family members has suffered because of water

Table 5: Distribution of the respondents according to the type of waterborne diseases they suffered

Waterborne diseases	*Response*				*Total*	
	Yes		*No*			
	F.*	%**	F.	%	F.	%
Diarrhea	41	37.3	69	62.7	110	100.0
Food poisoning	23	20.9	87	79.1	110	100.0
Vomiting	17	15.5	93	84.5	110	100.0
Cholera	29	26.4	81	73.6	110	100.0
Viral hepatitis	44	40.0	66	60.0	110	100.0
Gas trouble/ gastroenteritis	59	53.6	51	46.4	110	100.0
Typhoid fever	7	6.4	103	93.6	110	100.0
Dysentery	14	12.7	96	87.3	110	100.0

*Frequency **Percentage

Table 5 indicates that more than one-third i.e. 37.3 percent of the family members had diarrhea problem, 20.9 percent of them had food poisoning problem and 15.5 percent of them had vomiting problem due to poor quality of drinking water. Whereas about one-fourth i.e. 26.4 percent of respondents‘ family members had Cholera, 40.0 percent of them had viral hepatitis, 53.6 percent of them had gas trouble, 6.4 percent of them had typhoid fever and 12.7 percent of them had dysentery problem due to poor quality of drinking water.

Similarly Farooqui et al. (2009) revealed that 98% of the respondents suffered weakness, 91% fever, 65% diarrhea, and 42% had vomiting and other symptoms. Ahmed et al. (2006) stated that although in the developed countries typhoid fever has been almost eliminated, in developing countries like Pakistan it is still a common disease and a

major cause of morbidity and mortality due to lack of sewage and water treatment facilities.

Chi-square value (3.18) shows a non-significant association between age of the respondents and them facing any water born disease. Gamma value shows a positive relationship between the variables. It means high age respondents were facing waterborne diseases as compared to low age respondents, while association is non-significant. So the hypothesis —Age of the respondents will be influences on their health status" is rejected.

Chi-square value (29.09) shows a highly-significant association between education of the respondents and them facing any water born disease. Gamma value shows a strong negative relationship between the variables. It means educated respondents had less problem due to poor quality of drinking water as compared to illiterate respondents.. So the hypothesis —Education of the respondents will be influences on their health status" is accepted.

Chi-square value (16.06) shows a highly-significant association between income of the respondents and them facing any water born disease. Gamma value shows a strong negative relationship between the variables. It means high income respondents had less problem due to poor quality of drinking water as compared to low income respondents.. So the hypothesis —income of the respondents will be influences on their health status" is accepted.

Table 6: Association between socio-economic characteristics of the respondents and they facing any water born disease

Variables	*Chi-square*	*D.F.*	*P-value*	*Gamma*
Association between age of the respondents and they facing any water born disease	3.18	2	.204^{NS}	.234
Association between education of the respondents and they facing any water born disease	29.09	3	.000**	-.668
Association between income of the respondents and they facing any water born disease	16.06	2	.000**	-.519

** = Highly Significant
NS = Non-significant

4. Conclusions

The findings of the present study may not be as conclusive as the study was limited to a smaller area. It is, therefore, suggested that more studies on large level may be undertaken to draw broad conclusion about the poor water quality and its impact on human health.

It is found that open drain and bad sewerage system is a cause of water pollution. So local governmentshould construct a proper sewerage system to control the water pollution.Subject of water pollution should be included in the national curriculum for creating awareness about the benefits of body water and all effects of poor quality water on human health. Mass media can play vital role to create awareness among the public about the problem of poor quality water.Social workers, local govt. and leaders should be involved to seek greater public participation in seminars and workshops about awareness of water pollution in rural areas. Programs on television (T.V.) and radio should be presented in an easy language so that illiterate persons may also get information about water pollution. T.V. should present programmes like any drama or seminar should be telecast once in every week on water pollution. People should be warned about the health hazards caused by poor water quality through advertisements.Subject of consumption of freshwater should be included in the national curriculum for creating awareness about the use of freshwater, benefits of body water and all effects of poor quality water on human health.

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