



## Original Article

## Impact of Drinking Water on People's Health and Water Borne Diseases

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## ABSTRACT

Poor water quality is a result of a variety of sources, including human, animal and industrial wastes, by consuming such unhygienic water, there is a risk of contracting waterborne diseases and infections. **Objective:** To explore impact of drinking water on health of people and related waterborne diseases due to poor quality of drinking water. **Methods:** From March 2022 to June 2022, a cross-sectional study was carried out to assess the drinking water quality and any concomitant health concerns. The areas with the highest illness ratios were selected using convenient sampling technique. Total 277 participants both male and female participated in this study. Multiple choice questions (MCQs) and rating questions on a Likert scale were the two formats used in questionnaire. **Results:** According to survey area demographic data, 84.1% of respondents were living in joint families, and 63.5% of respondents were male. However, the respondents' literacy rate was below average. Motor pumps made up the majority of the water supply (60.6%). The majority of participants (84.8%) firmly believed that the quality of the water they consume has an impact on their health. The majority of respondents (56.3%) stated that water-borne illnesses such cholera, typhus, and stomach ailments affected children in their community. **Conclusions:** It was determined that the majority of the population reported higher disease development and expressed dissatisfaction with the quality of their drinking water. Also, education and economic conditions of a person can play an important role in health management and more access to better quality of drinking water.

## INTRODUCTION

Pure water is very essential vital. liquid for continuation of life on earth, around 97% water is occurring in sea (oceans) which is not benefited for drinking purpose, only 03% is (fresh) water ,2.97% which is covered by glacier and ice capes. The residual slight share of 0.3 is accessible as a surface and ground water [1]. Pure and harmless drinking water is fundamental need of human being's health. Pure & safe drinking water is too fundamental right of human's beings. (Fresh) water now-a-days a limiting reserve in maximum part of the world. In the next phase of century, it will become scarce commodity as zig zag population, urbanization and climate change is being worst in the world [2]. According to a research study, which holds the water's sample of Pakistan's 34 urbane cities. This research showed the result that the water samples are composed of

bacteria, viruses, and also showed some extremely poisonous elements. 2, 000,000 people of Pakistan are affected by drinking water (contaminated) and hygienic conditions. In Pakistan nearly 4,000,000 infants, and children died every year, due to drinking of polluted water (water borne pathogens), and poor hygienic and sanitations conditions. Drinking water and poor hygienic conditions leads to diseases rate of 50% and 30%deaths in the country. The people who belong to slum urban areas have been severely stimulated by polluted water (water borne pathogens) as in Sargodha 1000 people affected by diarrhea and typhoid and other stomach diseases [3]. However (TAZA) water assets are unequally and unevenly circulated many areas of the(world)are facing enormously lack of water. Safe and pure (PANI) is basic component of

life and polluted and water borne pathogens are hazards to humanism's life. As mankind human health based on the supplies of pure, safe & satisfactory water approachable and trustworthy water's drinking supplies. Safe and pure water as well as hygienic and sanitation conditions sustainability is becoming more difficult to achieve in 21<sup>th</sup> century as boom of population is going on worst. The condition is too serious because truth is that in 1956, 67% of the worldwide populace lived in to country side parts, 33% in urban areas .1996 this transformed to 54% rural & 46 % urbane. This will lead in 2026 as 41% countryside and 59% in urban areas [4, 5]. According to latest study, diseases are the major concern and problem, upsetting the well-being worth and prestige illness by self is medicinal situation which can't be separated by communal, racial, & economics upbringing. Value of foods and drinking, foods patterns, human life style, financial conditions also approach to health centers these are entirely aspects have an impact on the patterns and the intensity of diseases in society [6]. Because of presence of various types of pollutants (organic pollutants, inorganic pollutants, pathogens, suspended solids, nutrients and agriculture pollutants, thermal, radioactive, and other pollutants) access to safe pure drinking water is lacking for most of peoples/population in Pakistan. According to a research report ratio of population who are unable to have access to safe drinkable water raised from 38.3 million to 52.8 million in ten years (2005 to 2015) [7, 8]. Deaths and disease ratio (40 and 30%) occur due to contaminated drinking water with industrial waste water and municipal sewage according to an analysis. consequently, the assessment of health risks brought on by environmental contamination by pollutants has recently received considerable attention on a global scale [9]. Presence of microorganisms (bacteria, protozoa, and virus) in drinking water in developing countries are cause of waterborne diseases (typhoid, giardiasis, intestinal worms, diarrhea, cryptosporidium infections, and gastroenteritis). It is also reason of death (90%) of small children below age 5 in developing countries like Pakistan each year. In Pakistan diarrhea a waterborne disease due to infection of pathogen in drinking water is basic reason of mortality in young children and infants [10]. Due to the country's expanding population, excessive water use is a result of household, agricultural, and industrial demands. Water quality has declined and has become dangerous and unfit for drinking as a result of widespread discharge of untreated industrial and municipal waste water in fresh water sources (streams, rivers, lakes, and ponds). Water contamination issue is rising in Pakistan at alarming rate due to excessive consumption of pesticides/insecticides and fertilizers [11].

Very few cities have been analyzed for quality check of

drinking water in Pakistan. Limited data was available about drinking water quality in district Sargodha. People awareness should be assessed about quality control and contamination of water. There was ominous need of development of monitoring agencies and well-equipped labs for quality check of drinkable water. Therefore, this study was designed for determination of people's awareness about water contamination and water borne diseases.

## METHODS

A cross-sectional study was carried out from March 2022 to June 2022, to assess the drinking water quality and associated health concerns. The study was conducted in three of the tehsils in the Sargodha District. This study included a total of 277 individuals, both male and female. Inclusion Criteria: Individuals of areas with low quality of drinking water and high frequency of water borne diseases for at least six months and were willing to participate in the study. Exclusion criteria: individuals who were not willing to be voluntary participants of the study. Data on water-borne infections/diseases were collected from DHQ Sargodha (the district headquarters) and other health facilities. The areas with the highest illness ratios were selected using convenient sampling technique. The questionnaire contained two types of questions: multiple choice (MCQ) questions and rating questions on a five-point Likert scale (1=strongly disagree, 2=disagree, 3=no opinion, 4=agree, 5=strongly agree). The five categories were divided into three new groups with the labels agree, disagree, and have no opinion in order to simplify statistical analysis. SPSS software (Statistical Package for the Social Sciences, version 23.0, IBM®) was used for the analysis after the data were entered into Microsoft Excel. Through Cronbach's alpha, the validity and reliability of the data were assessed. For all variables, descriptive statistics were applied using frequency and percentage.

## RESULTS

Cronbach's alpha (0.73), the reliability of the data is high which indicates data is reliable. Demographic information of the survey area revealed that 63.5 % respondents were males (Table 1). Literacy rate cannot be considered up to the mark as majority of the respondents were primary and matric pass (70% and 65%) then FA, BA and MA 53%, 42 % and 45 % respectively. Most of the respondents (84.1%) respondents were living in joint family setup. Majority of the respondents (55.6%) were earning their income on daily wages basis and higher monthly income percentage was 59.6% within range of 31000-4500. Majority of the people (78%) were living in their own houses.

**Table 1:** Demographic characteristics of the participants

Parameters	Participants	Frequency (%)
Gender	Male	176(63.5)
	Female	101(36.5)
Age	28-32	20(7.2)
	33-37	41(14.8)
	38-42	30(10.8)
	43-47	59(21.3)
	48-52	41(14.8)
	53 or above	86(31.0)
Education	Illiterate	2(1)
	Primary	70(25.4)
	Matric	65(21.8)
	F. A	53(19.6)
	B. A	42(15.4)
Family Type	M.A and above	45(16.8)
	Joint	233(84.1)
Nature of job	Nuclear	44(15.9)
	Regular	51(18.4)
Monthly income (PKR)	Contract	50(18.1)
	Self-employed	22(7.9)
	Daily wages	154(55.6)
	16000-30000	18(6.5)
Residential status	31000-45000	165(59.6)
	46000-60000	47(17.0)
	Any other	47(17.0)
	Personal	216(78)
Type of drinking water	On rent	15(5.4)
	Govt.	46(16.6)
	Total	277(100)

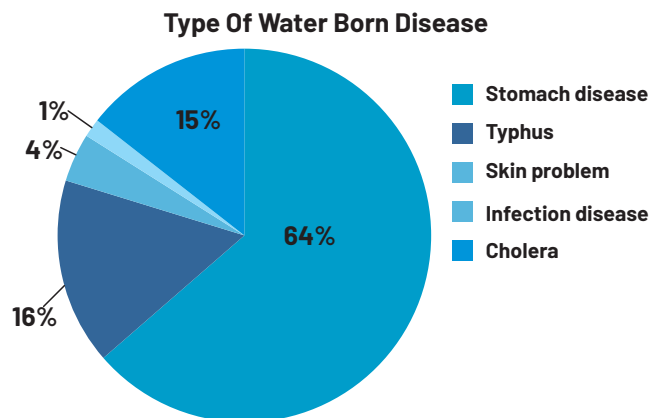
According to table 2 for water consumption 60.6 % of population used electric pumps as main source of drinking water. While, 19.5 %, 19.1 % and less than 1 % of respondents used water supply, hand pump and buy from market respectively. When asked about which type of drinking water they use, majority (57.8%) replied ground water, while 35% used filtered water as drinking source and less than 1% consume bottle drinkable water

**Table 2:** Source and type of drinking water

Sources	Frequency (%)	
Drinking water	Hand Pump	53 (19.1)
	Motor Pump	168(60.6)
	Water Supply	54(19.5)
	Buy from Market	2(0.7)
	Total	277(100)
Type of drinking water	Bottled	2(0.7)
	Filtered	97(35)
	Ground Water	160(57.8)
	Stored Tank	18(6.5)
	Total	277(100)

As shown in Figure 1. Percentage of stomach diseases (64%) due to impurity of drinking water was quite high followed by 16%, 15%, 4% and 1% typhus, cholera, skin

problems and other infectious diseases respectively.



**Figure 1:** Percentage of water borne diseases

As per table 3, drinking water has major impact on health and health related issue in that area of district Sargodha, 95.7% of the respondents said that drinking water poor quality is the major cause of water borne diseases. 84.8% of the view that drinking water has direct impact on people's health. 37.2% were agreed that diarrhea is major disease due to poor quality of drinking water in their area. 56.3% of the respondents said that children in their area suffered from water borne diseases due to drinking water. 72.6% were of the opinion that drinking water caused stomach disease. Majority 40.1% have never testified drinking water quality from laboratories. 22% of the respondents said that there are not adequate sanitation facilities in their area. The majority of participants (66.6%) expressed dissatisfaction with the quality of the water they were drinking.

**Table 3:** People's perception about drinking water and its effects on health

Sources	Agree (%)	No opinion (%)	Disagree (%)
Drinking water is the major cause of waterborne diseases in your area	265(95.7)	8 (2.9)	4(1.4)
Drinking water has direct impact on one's health	235(84.8)	6(2.2)	36(13)
Diarrhea is a common disease in your area	103(37.2)	148(53.4)	26(9.3)
Typhus is a common disease in your area	79(28.5)	137(49.5)	61(22)
children suffered from different diseases related to drinking water	156(56.3)	117(42.2)	4(1.4)
Skin related diseases are common due to drinking water	28(10.1)	173(62.5)	76(27.4)
Drinking water cause stomach diseases	201(72.6)	68 (24.6)	8(2.8)
You ever testified water you drink, from laboratories	40 (14.4)	126 (45.5)	111 (40.1)
Literate people are more conscious about type of their drinking water	213(77)	32 (11.5)	32(11.2)
You are used to visit a dietician frequently	6(2.2)	109(39.4)	162(58.5)

Government health services are easily available in your area	59 (21.3)	158(57)	60 (21.6)
Government hospitals provide satisfactory health services to patient	79 (28.5)	124(44.8)	74(26.7)
Healthy life style leads to better health	97 (35)	164(59.2)	16(5.8)
Adequate sanitations facilities are available in slum areas	53 (19.1)	163(58.8)	6(22)
Are you satisfied with quality of drinking water?	34 (12.3)	75 (27.1)	168(60.6)

## DISCUSSION

The Aim of this study research was to investigate, impact of drinking water upon the health status of the people and type of water borne diseases due to low quality drinking water. The study finds out that the health of people is affected by the type of water they use and the source of water which is used for drinking water. Many epidemiological researches and outburst inquiries have also found link between poor water class and health illnesses [12, 13]. The people who use ground water or hand pump water are more vulnerable to diseases as compared to others. In the Pakistan, for example, 19 outbreaks of gastroenteritis with an infectious etiology connected with drinking water were described in the 2-year period 2001-2002 [14]. One of the objectives of the study was to describe the impact of hygienic and sanitation conditions on the health of the people. The study finds out that people have less access to hygienic and sanitation conditions. Only 25% of the population in Pakistan has access to clean drinking water, according to an analysis. It badly affects the health of people by spreading water-borne pathogens and resulting in water-borne diseases. In another study in Rawalpindi and Islamabad fecal contamination and pathogen were found in drinking water which indicate poor hygiene and sanitation conditions [15]. The study also finds out the people who had poor health had also less access to proper sanitation facilities. The study gives an insight into the impact of income level of the people onto their health. The study finds that people with high income levels have more and better approach to both, healthy Drinking water and cleanness facilities. Income which is a financial feature and have linked with diseases, illness and basic health like other factors that influence to them and have a direct link with fundamental health and illness. Poor educational techniques and skills, unhealthy residence and highly nutrition prices in the setting of low and uneven earnings creates bad health and illness [16]. Recent data from Pakistan show unequivocally that there is still a need to improve the availability of clean water and sanitary facilities for both urban and rural populations, even in the most remote places. It also emphasizes that drinking water is frequently contaminated with Salmonella, E. coli,

Enterobacter, and Clostridium, but that lack of general public awareness is also a big factor in people's poor health [17 18]. In study area, Typhoid, cholera, gastro, abdominal discomfort, are major water borne diseases which respondents reported in their families. Our results were consistent with a study in district Abbottabad, where typhoid, stomach problems, skin infection, allergies and diarrheal diseases were found due poor quality of drinking water and sanitation conditions [19]. Similarly, in another analysis in Karachi, Pakistan outbreak of diseases like malaria, typhoid, diarrhea, helicobacter pylori were identified as water borne diseases due to contamination in drinking water. The situation is made worse by quickly expanding population and the general lack of knowledge among the populace regarding clean drinking water. Access to drugs and proper healthcare services is hampered by historical socioeconomic inequality and illiteracy[20].

## CONCLUSIONS

According to the study, the type of drinking water, its low quality, and its unsafe sanitation conditions have an impact on people's health and are also the root of various water-borne diseases that are serious threats to both adults and children alike. A combination of economic, social, ecological, and environmental factors affect health standards, illness, and diseases. As a result, attention must be paid to both enhancing health and preventing sickness. The actions made in this regard should take into account all of the problem's aforementioned dimensions.

## Authors Contribution

Conceptualization: QY, SY

Methodology: QY, SY

Formal Analysis: SY

Writing-review and editing: QY, SY

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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