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IMPACT OF SAFE DRINKING WATER AND SANITATION ON HEALTH STATUS AMONG RESIDENTS OF RURAL AREA IN PUNJAB

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Background
Abstract:
Access to safe drinking water and improved sanitation is a fundamental human right and basic ingredient of public health. Punjab, the most populous province of Pakistan with more than 50% of the country's population, is no exception. Keeping in view its importance, the current study is an effort to investigate Impact of Safe Water supply and Poor Sanitation on Health among Residents of rural area in Punjab to ensure the provision of these services to the masses. Multiple Indicator Cluster Survey Household data from 2017 to 2018 has been used for analysis. The results of a logistic regression model revealed that household media exposure, education level of household head, household wealth status, and ethnic background of the household head are some of the important determinants of household access to safe drinking water. For household access to improved sanitation, along with these factors, the role of social norms and place of residence are also important. Particularly, the role of social norms is very profound. Findings from the study suggest that efforts should be made to provide readily available media access, household education level needs to be enhanced, policies should be made to raise the living standard of the poorest households, and the social norm for the use of improved sanitation needs to be promoted.
Method: The study explored the indicators of safe potable water supply and poor sanitation in Punjab (Pakistan). We used household data from the Multi-Indicator Cluster Survey 2018 by the United Nations International Children's Emergency Fund (UNICEF). Based upon the household data census 2017, the sample of households was picked in two stages. At the primary stage, Primary Sampling Units (PSUs) and enumeration blocks were chosen, and at the second stage, 20 households were nominated through systematic sampling with random initiate from each PSU.
Results: The analysis has been done with the help of descriptive statistics of the respondents of the study, association tests, and logistic regression. The descriptive statistics of the respondents to the access to safe drinking water and sanitation respectively, approximately 15% of the sampled

household were selected for water quality tests, so access to safe drinking water can be assessed only for a small number of households. The data of 3756 households have been used in the access to safe drinking water analysis. This study showed that 66% of households have access to safe drinking water and around 34% do not have access to safe drinking water. The total number of households with access to poor sanitation analysis is 47,554. It was evident that around 78% of households have access to better sanitation and around 22% do not have access to improved sanitation.

Conclusion: Access to safe drinking water and sanitation is a fundamental human right. However, developing countries like Pakistan are facing problems with providing these facilities to the masses. Punjab, the most populous province of Pakistan accounting for more than 50% population of the country, is no exception. There is a serious need to address the issue, which calls for an appropriate understanding of the significant determinants to obtain safe drinking water and improved sanitation. The government should focus on the provision of water and sanitation in schools, Basic Health Units, Rural Health Centers, and public places like bus stops, railway stations, and public parks.

Keywords: Health Education, Sanitation, Public Health, Safe water, Rural Area.

Introduction

Most large Pakistan cities are overcrowded, due to urban attraction. Little controlled urban growth leads to poor management of solid and liquid wastes produced by cities. This leads to many problems of sanitation. They often repress wastewater that trickles down in living quarter streets emitting strong foul odors [1]. Moreover, water intended for consumption are very often contaminated because of drinking water connection with the sewage [2]. This fact can cause high health risks and environmental pathologies arising from it are very important [3]. The second most important risk factor for poor health is lack of clean water and poor sanitation and it has major health impacts. There are many ways by which pathogens infect individuals through water causing: water-based diseases, water-washed diseases, waterborne diseases, water-dispersed infections, and water related vector-borne diseases. Infectious diseases include water born and water washed diseases, cholera, ameobiosis, shigellosis, salmonellosis are all infectious diseases [4].

In developing countries, the poor people have a great burden of diseases due to inadequate water supply, sanitation and hygiene. The United Nations Millennium Declaration, in particular its eighth Millennium Development Goal, reflects the global importance of water sanitation and hygiene for development, poverty reduction and health. Governments are unable to provide basic needs to the citizens, because of the rapid increase in the urban population. Compared to rural households, urban households have 135% improved sanitation facilities and 30% have improved water source in developing countries [5].

In Asia, the water supply and sanitation coverage is 81% and 48%, respectively. People of rural and urban areas in Pakistan especially the poor face many waterborne diseases such as typhoid, dysentery, cholera and diarrhea due to increasing population and unhygienic surroundings, increase in solid waste generation. Crowded housing and the Water and Sanitation (WATSAN) facilities demand is also increasing day by day. One of the neglected sectors in Pakistan is WATSAN. In Pakistan, mostly people do not have sanitation facilities and access to safe drinking water [6].

In Pakistan, as of 2015, 58.7 million people lack access to adequate sanitation facilities and 32.5 million people do not have access to safe drinking water source. If such condition persists by the year 2025 in Pakistan, 48.2 million people will have no access to adequate sanitation facilities and 59.8 million people will be without safe drinking water. Current population of Pakistan is 150 million, 85% of people are living in urban while 55% are in the rural areas, and only 65% have access to safe drinking water out of the total population. Sanitation facilities are available to 42% of population, of which 30% rural and 65% urban.

In KPK, 90% of people are living in rural areas, and the populations that live in poverty are more than 36%. The people health can be improved in three ways in developing countries: improvement in the quality and quantity of drinking water and safe disposal of human excreta by providing sanitation

facilities. Global morbidity rate is 4 billion per year, of which 30% (1.2 billion/year) are due to contaminated water.

Background

In Pakistan, the deterioration of the environment continues to harm livelihoods and health, increasing the vulnerability of the nation's poor [7]. It has long been clear that lack of access to clean water and sanitation facilities has a wide variety of impacts; however, the data and evidence needed to verify the size of the burden imposed on the people of Pakistan are limited. As a result, investment in the water and sanitation sector remains well below what is required to ensure for the population a basic minimum of services. Indeed, Pakistan's population is projected to grow by more than 2.9 percent a year, which means an additional 4.0 million people each year who will require additional clean water and sanitation facilities.

The Water and Sanitation Program undertook this study to conduct evidence based research to help advocacy in the sanitation sector. The study aims is to impacts of current safe drinking water and sanitation conditions in Pakistan. The study's ultimate goal is to provide policy makers at both national and local levels with evidence to justify larger investments in improving the sanitation conditions in the country. It also provides recommendations, again based on evidence, for effectively planning and implementing sustainable safe drinking water and sanitation programs.

Water is an essential need of human being. Every person on this planet requires at least 20 to 50 liters of safe water in a day for drinking, cooking and other purposes. According to United Nations (UN) the basic human right is to universal access to Safe water, and an essential step towards better living standards all over the world. According to government of Pakistan Economic survey (2008) In Pakistan, it revealed that nearly 50 million people are deprived of Safe drinking water. In this research it is intended to produce trends of Sanitation and safe drinking water situation in Pakistan. This study also looks deep into the relationship of water borne diseases with the background information of the respondents. Secondary Data from Pakistan Demographic Health Survey (PDHS) and Multiple Indicator Cluster Survey (MICS) has been used. To see the individual impact of environmental, social and demographic characteristics to influence water born diseases like diarrhea.

Significance of study

Pakistan is being hit by PKR 112 billion per annum due to hygiene related illness; it includes disease caused by unsafe water and poor sanitation. In Pakistan, lack of water and sanitation is one of the most recurrent glitches and nearly 16 million individuals do not have access to safe water [8]. However, before any attempts we made, there is a need to understand the major concern and therefore studies are obligatory in this area. This study is an attempt to improve our understanding of the issue and come up with solid Policy recommendations to tackle this problem of poor sanitation system and unsafe drinking water in the country

Determinants of the Socio-economic Inequalities in Health

Impacts related to health

These include the attributed costs due to the effects of sanitation-linked illnesses, including premature mortality, cost of health care, productivity-time lost, and time lost to care for sick household members.

Impacts related to drinking water and domestic water

These include the attributed costs of the following measures: household treatment of drinking water, use of bottled water, piped water costs attributed to sanitation; and time spent hauling cleaner water from distant sources.

Health costs

The total economic cost of poor sanitation for the year 2006 was estimated as 343.7 billion PKR (US$5.7 billion). This amount is equivalent to 3.94 percent of GDP in Pakistan. Of this cost, 69.52 billion PKR (US$1.15 billion) constitutes the direct financial cost, which is equivalent to 0.8 percent

of GDP. Health impacts accounted for the vast majority of total economic costs. They constituted 87.16 percent of the total quantified economic costs, equating to the equivalent of 3.43 percent of GDP. The total economic impact on health is estimated to cost 299.55 billion PKR (US$4.93 billion), of which 48.76 billion PKR (US$801.53 million) represents financial costs.

Water costs

The water-related economic cost of poor sanitation is estimated as 15.98 billion PKR (US$262.68 million), equivalent to 0.18 percent of GDP. This represents 4.65 percent of the total impact; of this amount, 15.51 billion PKR (US$254.85 million) were financial costs. Piped-water costs (the excess cost made necessary by poor sanitation, which is estimated in this study as 50 percent of all piped-water cost) were the largest component of water-related costs, estimated as 7.47 billion PKR (US$122.89 million).

The cost of piped water accounts for 47 percent of all water-related costs (and 2.18 percent of total economic cost) due to poor sanitation. Bottled water consumption comprised 29 percent of water-related costs, equivalent to 1.4 percent of total economic costs and 0.05 percent of GDP. The cost of bottled water consumption was 4.67 billion PKR (US$76.72 million). The cost of household water treatment was 3.36 billion PKR (US$55.23 million), equivalent to 21 percent of water-related costs, 1 percent of total costs, and 0.04 percent of GDP.

Poverty and Social Impact Analysis

Violent conflict creates conditions under which morbidity and mortality rise, and communicable disease can flourish (WHO 2002). All lead to an increase in vector-borne diseases such as malaria and yellow fever, waterborne diseases (for example, typhoid and cholera), and measles and other vaccine preventable diseases. Likewise, HIV/AIDS and tuberculosis control programs are disrupted, and increases in maternal and child mortality are often observed [9].

Government Influence on Public Services for Health

Governance is defined as a dynamic system that "consists of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them [10]. To be effective, any interventions to improve water and sanitation resources in developing countries must be context-specific, meaning that among other considerations, the governance of the region and/country must be taken into account.

As health, education, water, and electricity services are mainly established and funded at the state level, it makes sense to assume that when governments do not run well, they are unable to provide satisfactory public services [11]. On the other hand, the more stable a government is at the basic level, the stronger its foundation for providing good public services, such as water and sanitation [12].By providing and regulating such services, governments yield responsibility over the health of their citizens [13]. Because government is responsible for the management of these services, it directly and indirectly impacts human development via the reduction of disease and the promotion of economic growth [13]. However, in many developing countries, people have trouble getting prompt, efficient service from the public administration, thus limiting their access to basic services [13].

Water and Sanitation in Developing Regions

To distinguish between improved and unimproved water and sanitation resources, this study employed the definitions established by the Joint Monitoring Program (JMP). The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) joined together to create the JMP in 2000, with the goals of monitoring global water and sanitation coverage, as well as tracking progress towards the Millennium 21 Development Goal's water and sanitation targets (WHO/UNICEF 2004).

One of the main sources of data the JMP uses to produce coverage estimates is the Demographic and Health Surveys (DHS). Sponsored by the United States Agency for International Development (USAID), the DHS begun in 1984 as a global research project with the goal of providing decision makers with the information needed to plan, implement, and evaluate programs pertaining to population health, nutrition, women's health, and children's health in developing nations and to increase international understanding of global health trends [14].

The emergence of new political and technological scales

A range of forces associated with globalization give rise to questions about the scale at which things are happening: from new information technologies and the rise of knowledge clusters and affinity groups, to reliable multi-scalar information (local, global, ecosystem, etc), to what some have termed the decline of the nation-state and the rise of global cities and functional networks to new and stubborn patterns of inequality. In this section we review the evidence related to re-scaling in the water sector. As well we look at some of the key points of struggle; most notably the interests and ideologies in favor of the re-assertion of highly centralized and state management scales, and how they chafe against capacity deficits in the global South.

To date, these tensions remain unresolved, pointing rather to new terrains of complex governance still emergent. In terms of water supply and wastewater management, perceptions of primary scale are in transition, from national to local or global, from water source or water point to catchment, ecosystem or even hydrosphere. There has been a dramatic shift in the scale at which water institutions, organizations and experts think, network and operate. Preventing contaminants from entering water sources is an effective way to help ensure clean drinking water and thus prevent human disease. This is important because conventional water treatment methods cannot effectively remove many hazardous chemicals. While source water protection works to everyone’s benefit, it is of particular concern for rural consumers whose geographic location may prevent them from having access to municipally treated water [15].

Social Determinants

Health is grossly influenced by the social conditions and customs. Inequalities in social conditions give rise to unequal and unjust health outcomes for different social groups across the nation. In Pakistan inequalities in health bases on the ethnic groups, geographic areas gender etc., Moreover, these inequalities are not random, some strata are more socially disadvantaged groups have poorer health, greater exposure to health risks and poorer access to health services.

Social Exclusion and Discrimination

Pakistanis observes sharp division on ethnic, linguistic, sectarian basis, caste, tribes, status and occupation. Firstly, Pakistan is facing the problem of discrimination on the national level with the Baluch people. The federal’s government inability and reluctance to identify and tackle the problems along with not representing the genuine interest of the people by Baluch provincial government for long period has created the major gap in socio-economic segregation of locals. Today Baluchistan has the alarming statistics of primary school education 19.8%, child labor 46.8%, domestic violence 61.5%, water treatment 3.5% and vaccination with the maximum coverage of polio only up to 46.1% [16].

The discrimination next to insurgency in the province has led the population of 7,914,000 people forming the base of the socio-economic pyramid in Pakistan. Secondly, approximately one fourth of the Pakistani population is facing the dual disadvantageous position as being minority (Hindu and Christians), and belonging to the lower socio economic classes. They are frequently described “Achoots” or untouchables [17]. This provides the basis of the under privileged subgroups in the society and influence the uptake of the health services and adherence.

Health Education about water and sanitation

Education of the nation is the foundation for the strong economy of the nation. Education system of Pakistan is based on unequal lines. There is a private sector, nourishing with genuine education to elite class and producing the leaders and bureaucrats. Whereas, the public sector which is providing obsolete education producing the workforce for the upper class with the little capacity to challenge the system. Memon argues that the education system of Pakistan has the shortcomings of quality, relevance and inadequate research. Surprisingly, Pakistan is ranked at 113th out of 120 registered UN members according to the research conducted by UNESCO. There is enormous need to make the changes in the syllabus to develop the critical thinking rather than learn by rote the content. This prepares children to participate actively and productively in society and economy.

Statistical Analysis

Descriptive statistics and regression analysis are performed on data to meet the objective of the study. Following is the brief of tools used in analysis. Trends have been observed by line graphs of percentage of household with water and sanitation facilities and incidence of diarrhea in 1991, 2007 and up to 2013. These data are extracted from three rounds of PDHS (1990-91; 2006-07 and 2012-13).

Recommendations

If we are committed to improve water and sanitation, we need a coherent policy framework and investment in the Water and Sanitation sector to improve our people's health and life. National Water and Wastewater Policies documents provide a comprehensive framework of measures. Nevertheless, these policies should be followed every five years, including midterm evaluations and independent evaluations. Water supply and management agencies should be responsible for maintaining the water quality in the water distribution system to the consumer level, which provides cooling amplifier at various pumping stations.

The role of development partners and the private sector for development in the Water and Sanitation sector is very important. The government should encourage the private sector to provide Water and Sanitation services, as is the case with other social sectors, such as health and education. The Water and Sanitation service is the legal responsibility of the provinces and local authorities, so policymakers and local government officials should understand the deterioration situation and support the increase in the share of Water and Sanitation's expenditure on gross national product.

The government should support Water and Sanitation plans at an efficient and low cost. In addition, the provision of household subsidies to households, taking into account drinking water treatment at the consumer / household level, should cost rather than costly in complex and costly designs.

Waste water should be minimized and eliminate 30 to 50% of all drinking water. Awareness must be necessary in order to minimize deceptive and unsustainable activities, such as the use of stony water for washing cars or irrigation of lawns and gardens. Each of us must understand that less water usage means less wastewater production.

Water supply agencies should install meters to charge consumers based on "pay as you use." In such interventions, departments like WASA and CDA can play a major role.

There is also a need to increase the percentage of Budget to GDP for the improvement of Water and Sanitation in the country.

If immediate action is not taken to address these issues, the amount and quality of the remaining water will have a negative impact on health, education and economic sectors. The Environmental Protection Agency (EPA) must ensure, before discharging it to the mainstreams, and to improve the drainage

network, ensuring higher sanitary coverage, ensuring household waste disposal, commercial and industrial units.

Conclusion

This study shows insightful results on the effects of availability of Safe drinking water and proper sanitation facilities on child morbidity and mortality rates across the four provinces. It also throws light on the effects of the mother's age, education, ethnicity and working status on the health and well-being of the child. It has been observed that the prevalence of most common water born disease i.e. childhood diarrhea, in the presence of improved and non-improved sources of drinking water and type of toilet facility. These two variables are often considered as common environmental household level indictors. It was hypothesized that use of improved sources of drinking water and sanitation may support the decrease in rates of childhood diarrhea.

Education and working status of mother were considered to depict the socio economic factors influencing childhood diarrhea. Educated mothers are hypothesized to be beneficial for less prevalence of diarrhea. In this regard, our investigation shows that, educated mothers are highly influential. Working status of mothers shows some kind of empowerment and autonomy of women. Economically active women may contribute to support the household economic status hence contributing to child health care. In Pakistani society mother are usually less likely to work and husbands are considered as major working person to regulate the household prosperity. Mothers who do not work are more likely to spend time better with their children as compared to working ones. Our data shows significant impact of working status on childhood diarrhea and provide evidence according to our assumptions and hypothesis.

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