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Dire Consequences: Examining the Social Impacts of Poor Sanitation and Polluted Water on Community and Institutional Dynamics

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Abstract

This study looks into the often overlooked effects that water pollution and inadequate sanitation have on local social institutions. This research takes a novel approach by looking at the ripple effects of environmental challenges on social structures, norms, and community cohesion, whereas previous research has primarily focused on the health implications of these kinds of challenges. The research was conducted in a rural area called Chak 141 Jahanian, located near Khanewal District in Punjab, Pakistan. Data were gathered by using convenience sampling technique and a mixed-methods approach, which included surveys, interviews, and on-site observations of communities with poor sanitation and unhygienic water sources. The results showed a complicated web of relationships between community social fabric and environmental stressors. It has been discovered that poor sanitation and water pollution have profound, diverse impacts on a range of social institutions, such as political behavior, religion, family dynamics, educational systems, and the economy. Important findings show that pitiable sanitation and water quality aggravate social injustices, upset established roles and responsibilities, obstruct educational attainment, and weaken community cohesion. The findings also sheds light on potential areas for intervention and support by highlighting the resilience and coping strategies used by communities to mitigate these negative effects. This study highlights the significance of taking the social aspects of environmental challenges into account, which adds to the larger conversation on sustainable development and public health. It recognizes the significant impact that inadequate sanitation and water pollution have on the social institutions that support community well-being and advocates for a more comprehensive approach to addressing these issues. Understanding these intricate dynamics is crucial for policymakers, public health officials, and community leaders when designing effective interventions to mitigate the impact of poor sanitation and polluted water on communities and their social institutions.

Key Words

Social Institutions, Polluted Water, Poor Sanitation, Public Health, Sustainable Development

Introduction

One major problem that humanity has been facing recently is water quality. Water cannot be substituted for other environmental elements, so it is kept apart from them. The fundamental dynamics of the life and economic cycles are made up of the water cycle. Water resources are infrequent and subject to frequent detrimental human-caused factors. Just 2.5 percent of the water resources on Earth are freshwater resources. Water is a vital resource that is necessary for all living things. Life cannot be considered without water. A precondition for freshwater ecosystems is the availability of adequate, high-quality water as sustainable development and food security, and consequently, humankind's future[1]. It is recognized that having access to basic sanitation and water services is a fundamental human right. The UN Sustainable Development Goals 6 and 10, which seek to guarantee that everyone has equitable access to water and sanitation services and to promote inclusivity and reduce inequality, both make reference to it. However, according to data from the WHO/UNICEF Joint Monitoring Program 2017, 2.3 billion people are still not receiving basic sanitation services, and 844 million people do not have basic access to water[2].

Numerous types of toxic waste exist to harm water resources. If water pollution continues to increase, this will lead to its depletion soon. Almost 40% of the world's population lives in 88 developing nations. The lack of water is a major problem because of its social and economic advancement. The amount of fresh water used for various purposes has gradually increased due to the growing global population and variety of their activities. Water pollution arises from the disposal of solids and organic materials that deplete oxygen, primarily from untreated urban sewers and industrial drains. These areas are also the source of trace pollutants, which are hazardous chemicals and metals like mercury, zinc, lead, and cadmium[3]. UNICEF, the United Nations International Children's Emergency Fund, recently released a report estimating that 800 million people in Asia and Africa lack access to safe drinking water, which leads to illness. The report goes on to say that things will only get worse soon and that developed countries will also be dealing with a severe water quality crisis. Although there is an abundance of water on the planet, 97% of it is unfit for agricultural or drinking use due to salt (seawater). A clean water supply enhances wellbeing and lowers the burden of disease from illnesses brought on by the water. The likelihood of water contamination rises in tandem with the growth of the human population and contemporary technological advancements. Landfills, improperly disposed of chemicals, and animal and human waste are a few examples of sources of water contamination. Human health can be seriously risked by drinking water that has not been properly treated[4].

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[1]Kılıç, Zeyneb. "Water Pollution: Causes, Negative Effects, and Prevention Methods." *İstanbul Sabahattin Zaim Üniversitesi Fen Bilimleri Enstitüsü Dergisi* 3, no. 2 (2021): 129–132.

[2]Bayu, Tidar, Hyungjun Kim, and Taikan Oki. "Water governance contribution to water and sanitation access equality in developing countries." *Water Resources Research* 56, no. 4 (2020): e2019WR025330.

[3]Al-Taai, Suaad Hadi Hassan. "Water pollution Its causes and effects." In *IOP Conference Series: Earth and Environmental Science*, vol. 790, no. 1, p. 012026. IOP Publishing, 2021.

[4]Tanwir, F., A. Saboor, and M. H. Shah. "Water contamination, health hazards and public awareness: a case of the urban Punjab, Pakistan." (2003): 460-462.

As of 2005, 38.5 million people in Pakistan lacked access to a safe drinking water source, and 50.7 million people lacked access to proper sanitation facilities. By 2015, 43.2 million people in Pakistan will lack access to adequate sanitary facilities, and 52.8 million people will lack safe drinking water, if this situation persists. There are 150 million people living in Pakistan as of right now, of whom 85% live in cities and 55% in rural areas. Of these, only 65% of people have access to clean drinking water. Of the population, 42% has access to sanitation facilities, with 30% living in rural areas and 65% in urban areas. In KPK, 90% of people are living in rural areas, and the population that lives in poverty is more than 36%[5]. Significant public costs have resulted from Pakistan's current state of sanitation and inadequate hygiene practices, including early deaths, medical expenses and financial losses from diseases linked to poor sanitation, environmental costs, and other welfare costs. For instance, in 2006, only 10% of sewerage was being properly treated, and the coverage level for sewage collection was estimated to be 50% nationwide. Only a few cities had treatment plants, and even fewer of those were operating at full capacity. In 2006, 42 percent of the population lived with substandard toilet facilities, of which 11 percent had access to either share or substandard facilities[6].

Without proper access to clean water and sanitary facilities, children are more likely to contract waterborne illnesses. Without appropriate access to these services, children and their caregivers must set aside their free time to take care of their water and sanitation needs when they are not ill. Children's educational attainment is impacted by their access to water and sanitation services due to changes in their health and leisure activities[7].Cultural customs may also command that women and girls, in particular, do not use the same toilet as men while they are menstruating. Regardless of menstruation, women and girls are not allowed to share a toilet in certain cultures. However, cultural norms and limitations have also been mentioned as reasons why girls miss school during their periods, in addition to poor sanitation, guilt, and embarrassment[8].

[5]Jabeen, Sadia, Qaisar Mahmood, Sumbal Tariq, Bahadar Nawab, and Noor Elahi. "Health impact caused by poor water and sanitation in district Abbottabad." *Journal of Ayub Medical College Abbottabad* 23, no. 1 (2011): 47-50.

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[7]Ortiz-Correa, Javier Santiago, Moises Resende Filho, and Ariel Dinar. "Impact of access to water and sanitation services on educational attainment." *Water Resources and Economics* 14 (2016): 31-43.

[8]Yamauchi, Taro. "Interactions Between Health and Socio-Culture in Sanitation." In *The Sanitation Triangle*, 91. 2022.

Since the Sustainable Development Goals (SDGs) were adopted by the 193 UN member states in September 2015, there has been an unprecedented level of political will to implement the agenda for reducing poverty by the 2030 deadline. "Achieve access to adequate and equitable sanitation for all" is the aim of Goal 6.2. This is no small accomplishment. The most significant deviation was observed between the actual and target scores for the MDG of sanitation. Now that the SDG targets have been established, attention is turning to creating strong implementation strategies[9]. But still global water crisis is expected to worsen if urgent action is not taken in making sustainable amends. This is relevant to Pakistan because the nation as a whole greatly suffers from inadequate water sanitation. In many of Pakistan's water bodies, the rise in drug toxicity, trace element contamination, and microbial infestations is to blame for the exponential rise in waterborne diseases. Individuals as well as national authorities must implement treatment and prevention strategies. Emphasis must be placed on the use of clean water, and appropriate administration of water management regulations must be put into place. Pakistan can have a safer future if water resources are immediately and actively sustained[10].

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[9]Simiyu, Sheillah, Mark Swilling, Sandy Cairncross, and Richard Rheingans. "Determinants of quality of shared sanitation facilities in informal settlements: case study of Kisumu, Kenya." *BMC public health* 17 (2017): 1-13.

[10]Qamar, Khulud, Goodluck Nchasi, Hania Tul Mirha, Javeria Arif Siddiqui, Kainat Jahangir, Sean Kaisser Shaeen, Zarmina Islam, and Mohammad Yasir Essar. "Water sanitation problem in Pakistan: A review on disease prevalence, strategies for treatment and prevention." *Annals of Medicine and Surgery* 82 (2022).

Materials and Methods

The research employed a **qualitative approach** with a **phenomenological research design**, utilizing **bracketing** to minimize researcher bias. Data collection methods included **in-depth interviews**, **observations**, and **rapport building** to establish trust with participants. Key informants were selected to provide valuable insights, including **Dr. Sajad**, a local dispenser from the area, and **Muhammad**

Yasir, a university student and resident of the research locale. The study also incorporated **content analysis** of the **Socio-Economic Census Survey** to contextualize the findings. A **convenience sampling technique** was used, with a **sample size of 175 households** from the community. Data was gathered through **semi-structured interviews**, guided by an **interview guide** to ensure consistency and depth in responses.

The research was conducted in **Chak No. 142 of Tehsil Jahanian Mandi**, a locale strategically located near Multan Road to the north (approximately 34 km away) and Vehari Road to the south (approximately 49 km away). This geographical positioning made the area an ideal setting for exploring the socio-economic and environmental dynamics related to the study's focus

Results and Discussions

Effects of poor sanitation system and polluted water on community Health

The socioeconomic dilemma is intricately connected to both direct and indirect factors such as water pollution and inadequate sanitation. This research explores into the nicety interplay between water and sanitation issues, socioeconomic challenges, health conditions, and the corresponding treatment patterns, along with an examination of the water infrastructure conditions within the research locale. The harmful impact of water pollution on community health is underscored, manifesting in severe diseases that not only risk public well-being but also precipitate economic challenges associated with the cost of treatment. The data collected during the study sheds light on the intricate relationship between socioeconomic status and the health status of the community. Notably, financial standing emerges as a critical determinant, with individuals possessing strong economic resources experiencing better health outcomes, while those with lower socioeconomic status confront a heightened risk of poor health conditions. This research highlight the essential role of monetary factors in shaping societal well-being and health disparities, offering valuable insights for developing targeted interventions and policies to address these multifaceted challenges.

Polluted water

The indigenous residents of Chak have consistently reported concerning characteristics in their local water, noting distinct odors, a salty taste, and a yellowish color. Substantiating these claims, the researcher personally experienced a pronounced saltiness upon consuming the water. The formal water test report conducted by the Water Testing Laboratory of DHQ/PHED Khanewal unequivocally categorizes the local water as entirely unfit for consumption. The primary factor rendering the water unsuitable is the excessive presence of total dissolved solids (TDS). As per the standards outlined by the Public Health

Department of Pakistan, water is deemed drinkable at levels below 1000 mg/1 TDS. The World Health Organization (WHO) offers a slightly higher threshold, indicating drinkability up to 1500 mg/1 TDS. In plain contrast, the water in this locale surpasses both benchmarks, thereby posing a significant health risk to the community. The heightened TDS levels not only compromise the taste and quality of the water but, more critically, pose potential health hazards, warranting urgent attention and remedial measures.

Effect of Polluted water on health

The dire consequences of contaminated water in locale are manifesting in a flow of severe diseases among the community's residents. According to census form data, a staggering 17.00% of the population is grappling with hepatitis, while the remaining 83% is plagued by ailments such as stomach, skin, or joint-related conditions. The prevalence of poor sanitation systems is notably contributing to the incidence of malaria within the community. The existence of open, stagnant bodies of polluted water in the streets serves as a breeding ground for mosquitoes, exacerbating the malaria risk. Compounding this issue is the concerning fact that children often play in close immediacy to these unhygienic water sources. This hazardous practice significantly increases the likelihood of children, as well as other community members, contracting malaria and other dangerous diseases. Recognizing the sources of germs and worms is crucial for understanding the transmission pathways. While certain indicators of contamination, such as feces, rotting foods, and unclean toilets, are readily identifiable, other sources may appear deceptively clean, like clear water. The transfer of germs and worms can occur through direct touch, airborne transmission via dust or respiratory droplets from coughing or sneezing. Additionally, these harmful agents may propagate through food, drinking water, or be transported by flies, insects, and animals. Uncooked or inadequately cooked food can also serve as a reservoir for these pathogens.

Sanitation system

The inhabitants of Chak relied on a traditional waste disposal method known as the "Hole System," locally referred to as the "Garha System," for managing their sewage. In this indigenous approach, the community utilized holes in the ground as a means of waste disposal. Unfortunately, the absence of proper drains and sewerage systems in numerous households led residents to openly dispose of their waste in the streets. This practice, while rooted in local customs, resulted in significant drawbacks for the community. The open disposal of waste in streets had direct implications for the infrastructure, contributing to the deterioration of roads and streets over time. The accumulation of waste not only posed environmental and aesthetic challenges but also inflicted tangible damage to the community's physical surroundings.

The reliance on the "*Garha System*" without adequate drainage infrastructure reflected a gap in sanitation practices. The absence of a comprehensive waste management system not only impacted the immediate surroundings but also raised concerns about public health and hygiene. Open disposal of waste in public spaces can lead to the spread of diseases, foul odors, and a generally unsanitary living environment.

Socioeconomic Consequences

Water pollution and poor sanitation emerges as a substantial economic burden, demanding considerable resources for both treatment and prevention. The cost of managing pollution is not only financial but also extends to the intricate challenges associated with waste disposal. Approximately 29.00% of income is allocated to patient treatment, emphasizing the financial toll of waterborne diseases on the community. Moreover, the alternative of procuring clean water from outside the Chak area presents its own set of challenges. This includes a substantial time investment of at least one hour and a daily expense of 100 rupees for fuel, further burdening the community.

The persistent issue of waterlogging necessitates recurring expenditures on the reappearance of tube wells, with projected annual costs soaring up to 50,000. The predominant poverty in Chak exacerbates the situation, forcing residents to sell valuable assets, including animals and domestic items, to finance their healthcare. This perpetual cycle of economic strain significantly disrupts the financial stability of the community. In an attempt to mitigate the impact of polluted water within the locality, residents incur additional monthly expenses ranging from 500 to 1000 for covering the streets with dry mud. This practice, while serving as a makeshift solution, imposes an extra financial burden on already struggling households. During the rainy season, the economic repercussions intensify as the streets of Chak become inundated with dirty water, hindering the ability of residents to leave their homes for employment. This, in turn, exacerbates the economic challenges faced by the community, creating a cyclical pattern of financial strain and hindering overall economic development.

While conducting the census, an individual shared insights about a specific neighborhood, describing its residents as "*achey khasy, khatay pitay*" – a informal expression denoting a strong economic status. Intrigued by this information, I approached the mentioned residents to gather data for research project, particularly focusing on the impact of water pollution on their health. Upon meeting them, it became evident that despite their perceived economic well-being, the reality was marked by significant health challenges within the family. The parents, in particular, were dealing with stomach problems and high blood pressure, apparently attributed to water pollution in the area. To address these health issues, the family found themselves compelled to sell their valuable assets, including a substantial number

of animals. This scenario vividly illustrates the paradox of economic prosperity parallel with the pressing issue of water-related health problems. It challenges the conventional notion of a "strong economic status" by highlighting the unexpected financial strain imposed by health crises linked to water pollution. This firsthand account adds a nuanced layer to the understanding of the community's economic dynamics and the intricate interplay between health and wealth within the Chak locality.

Politics

The political institution plays a pivotal role in the effective governance of any society, overseeing the formulation of laws that regulate individual behavior based on societal norms and values. This governance, whether in written or unwritten form, is integral to the smooth functioning of a community. In the case of Chak 142, water pollution emerges as a significant factor influencing the political landscape. Politicians leverage the issue of water pollution and sanitation to garner votes from the community. Promising improved water quality and infrastructure for Chak, these political figures secure support during elections. However, over the years, despite these promises, there has been a notable absence of tangible developments in Chak. According to the elderly residents of Chak 142, the settlement was established in 1950, and as of 2015, no substantial government-led initiatives have been implemented. The continuous deterioration of water quality and escalating health concerns have eroded the trust of the community in politicians. The disillusionment is palpable, and residents are increasingly disheartened by the unfulfilled assurances made by political figures. This disillusionment is manifesting in a decline in voter confidence, with many residents expressing reluctance to participate in upcoming elections. The prevailing sentiment is that politicians merely exploit their votes for political gain without delivering on their commitments.

Family

The family institution holds a fundamental and paramount role in society, particularly in Islamic societies, where it forms the keystone of the social structure. Chak 142, being a residential area of the Muslim community, highlights the significance of examining the impact of water pollution on the family institution. This effect is particularly pronounced in the context of clashes and disruptions occurring both within households and in the broader community due to inadequate sewerage systems and contaminated water.

One respondent, Mrs. Nasir, shared a distressing example of the impact of polluted water on family dynamics. She talked about the conflicts with her husband that often occurred after rainfall when dirty water from the streets penetrated their home. The ripple effect extends beyond family conflicts to societal relations. The prevalence of disputes, especially during rainy weather, is a significant issue arising from the accumulation of dirty water from a sewerage hole in front of neighboring houses.

Residents find themselves entangled in disagreements over the polluted water, as the excess from one house accumulates in front of a neighbor's residence. This not only disrupts domestic harmony but also contributes to broader social tensions within the community.

Furthermore, the adverse effects of water pollution extend to social gatherings. Residents shared that guests express unwillingness to visit Chak 142 due to the perceived water quality issues. The discomfort and health risks associated with drinking polluted water become restrictions for visitors. Consequently, guests often bring their own water when they do visit, reflecting the pervasive impact of water pollution on the social fabric of Chak 142.

Religion

The influence of religious beliefs on perceptions of water is profound, with a universal reverence for water observed in major religions worldwide. Many religious practices involve the ceremonial use of "holy" water, emphasizing its purity, historical significance, and mythological origins. The River Ganga in India, for instance, is regarded with great respect, reflecting the broader universal veneration for water. Within Islam, water is considered a divine gift from Allah, and this spiritual perspective amplifies the significance of water in the lives of its followers. However, the disparity between the logical understanding of water pollution and prevailing misconceptions is evident, particularly among the less-educated residents of Chak.

When the researcher probed the community about the causes of water pollution, a noteworthy 2% attributed it to religious reasoning. In the predominantly Muslim population of Chak, a common belief emerged that water pollution is a manifestation of Allah's will, described as "*Ye Allah ki taraf say hay*" or "*Ye Allah ki hikmat hay*" — signifying that water pollution is attributed to Allah's divine plan.

This perception reflects a gap in understanding, as the true causes of water pollution, such as poor sanitation practices and the absence of a proper sewerage system, are overshadowed by religious interpretations. The lack of awareness about the scientific explanations behind water pollution perpetuates misconceptions, especially among those with limited access to education.

Education

Education, being a fundamental social institution, holds dominant importance for the advancement of any society. However, in the context of Chak, there exists a concerning trend of low participation in formal education, primarily attributed to economic constraints prevalent in the community. The majority of Chak's residents,

facing economic challenges, choose to engage their children in income-generating activities instead of prioritizing their education. Despite economic limitations, a notable segment of the population in Chak recognizes the significance of education and strives to provide it to their children. This commitment to education spans across varying economic statuses within the community, reflecting a nuanced perspective on its intrinsic value.

However, the prevalent issue of water pollution in Chak introduces a significant hurdle to the education of school-going children. The contaminated water sources negatively impact the health of these students, leading to frequent illnesses that hinder their ability to attend school regularly. When school-going children fall ill due to polluted water, their absence takes a toll on their educational performance and overall academic progress. Compounding this challenge is the reported inadequacy of clean drinking water facilities within schools. Numerous respondents have raised concerns about the lack of access to clean water in schools, contributing to various stomach-related ailments among students. The absence of proper sanitation infrastructure further exacerbates the risk of waterborne illnesses, creating an unhealthy environment that directly impedes the educational experience for students. *According to Farrell (2013): "Few concepts are as important to explaining social life as are moral ideas namely, social constructions of right versus wrong and good versus bad, what is desirable, and what justice, equality, and the 'good life' look like. How individuals and social groups relate to the environment is also deeply tied to moral beliefs about what is good and right vis-à-vis the environment*[11]*."*

[11]Farrell, Justin. "Environmental activism and moral schemas: Cultural components of differential participation." *Environment and Behavior* 45, no. 3 (2013): 399-423.

Conclusion

In conclusion, the health and well-being of the community in Chak 142 are deeply intertwined with the persistent issues of water pollution and inadequate sanitation. The compromised water quality, stemming from both visible and hidden sources of contamination, poses significant risks to public health, making it imperative to address these challenges through targeted interventions. Recognizing the root causes, such as the traditional "hole-system" of waste disposal and the lack of proper sewerage infrastructure, is essential for implementing effective solutions. Improving waste management practices, establishing proper sewerage systems, and raising awareness about the importance of maintaining a clean environment are critical steps toward safeguarding the community's health. Moreover, the interconnected nature of these challenges cannot be overlooked. Poor sanitation and

water pollution are not just environmental issues but are deeply linked to the socio-economic conditions of the community. Addressing these problems requires a comprehensive approach that considers the broader context of poverty, education, and community well-being. For instance, the lack of access to clean water and proper sanitation disproportionately affects children's education, as health issues stemming from polluted water lead to absenteeism and poor academic performance. By improving water quality and sanitation facilities in schools, the community can create a more conducive environment for learning and development.

Additionally, the cultural and religious beliefs of the community play a significant role in shaping perceptions of environmental issues. In Chak, where illiteracy is prevalent, religious interpretations often influence how people understand and respond to water pollution. Bridging this gap through education and awareness campaigns is crucial. By imparting scientific knowledge and aligning religious reverence with practical measures for water conservation, the community can foster a more informed and proactive approach to addressing these challenges. The consequences of water pollution and poor sanitation extend beyond physical health, affecting family dynamics, social interactions, and even political stability. The growing disillusionment with the political system, fueled by the failure to address these pressing issues, threatens civic engagement and trust in governance. To rebuild this trust, meaningful action must be taken to tackle the water pollution crisis and demonstrate a commitment to improving the community's quality of life. In summary, the situation in Chak 142 underscores the urgent need for comprehensive interventions that address water pollution, improve sanitation, and promote socio-economic development. By taking a holistic approach that integrates environmental, educational, and cultural dimensions, the community can work toward a healthier, more sustainable future. Protecting the well-being of Chak's residents requires not only immediate action but also long-term strategies to ensure lasting change and resilience.

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