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Institutional Gaps and Social Inequities: Caste Dynamics, Drinking Water Access, and Health Outcomes

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ABSTRACT

The current paper showcases the challenges of drinking water availability, accessibility, and quality in Shekhpur Khichara village, a peri-urban settlement in Uttar Pradesh, India. The data analyed it in the light of public health and social inequities. The study shows the role of water sources, local power structures, and institutional gaps in creating problems for marginalized communities, leading to health issues. The study involved the use of Focus Group Discussions (FGDs) with male, female, and Scheduled Caste groups, transect walks in the village, key informant interviews with officials like Block Development Officer, Gram Pradhan, executive engineers, and Block Medical Officer, and field observations. The methodology relied on thematic analysis to understand villagers' views on water use and health impacts, triangulating primary data with secondary sources like institutional records and socio-political literature on rural water governance for depth and validity.

The findings draws institutional lapses and social power imbalances as major barriers to safe water and sanitation. In the past, wells were the main drinking water source, but were abandoned due to groundwater depletion, contamination, and repurposing for settlements as the population grew.

This paper posits that water institutions must improve coordination, monitoring, and community training to address these gaps. Without this, inequities continue, harming health and daily life, especially for vulnerable groups. The paper argues that community participation and hygiene education are key to better public health.

Keywords: water institutions, drinking water sources, caste dynamics, public health.

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INTRODUCTION

Water is crucial for sustaining life, food production, economic development, and human well-being, distinguishing itself as a manageable yet non-substitutable resource capable of diversion, transport, storage, and recycling (Gleick, 2002). The importance of water in domestic, industrial, defense, and trade sectors has intensified due to dwindling resources, climate change, and population growth in India and globally. Moreover, limited and skewed access to potable water remains a glaring challenge in India's socioeconomic development (Ramachandraiah, 2004). Globally, water scarcity affects approximately 2.2 billion people, with rural areas in developing nations disproportionately impacted by inadequate infrastructure and governance failures (United Nations, 2015).

In India, a significant portion of the population lacks access to adequate drinking water due to underlying issues such as contamination of diverse sources (e.g., wells, taps, hand pumps, rivers, ponds, and lakes) and maintenance challenges (Biswas & Sarkar, 2013). This scarcity contributes to water-related diseases prevalent in developing countries, with the World Health Organization estimating that unsafe water, sanitation, and hygiene cause around 1.4 million preventable deaths annually from conditions like diarrhoea, cholera, dysentery, typhoid, and polio (World Health Organization, 2019). Human rights to life, development, and equality remain unfulfilled without safe water and sanitation, further exacerbated by rapid urbanization and climate variability that strain resources and heighten health risks (Vörösmarty et al., 2010; Smets, 1999).

Caste, class, and gender hierarchies aggravate water inaccessibility in Indian villages, where marginalized groups are denied clean sources due to entrenched notions of purity and impurity rooted in caste and religion (Kanmony, 2003; Shaban & Sharma, 2007; Singh, 2009). These social structures spread exclusion, as lower-caste communities often rely on contaminated sources due to restricted public infrastructure access (Joy et al., 2014). Inextricably linked to water access, sanitation demands urgent attention, as inadequate facilities compound health risks for the poor. Global evidence demonstrates that improved water provision enhances health outcomes and reduces disease burden (UNDP, 2006). The United Nations' 2002 recognition of the right to water, reinforced by Sustainable Development Goal 6 (United Nations, 2015), has elevated this issue in India, aligning with initiatives like the Jal Jeevan Mission.

The study examined water and sanitation conditions in rural Uttar Pradesh, focusing on villagers' perceptions of clean water in Shekhpur Khichara Village, Dhaulana Block, Hapur District. Despite available sources, access remains a major challenge for many Indian households

(Biswas & Sarkar, 2013). It analyzed the interplay of water quality, sanitation practices, and public health amid caste and community diversity, emphasizing the influence of local power structures, institutional failures, and resultant health vulnerabilities for marginalized groups.

The study employed a qualitative approach, including focus group discussions (FGDs) with male, female, and Scheduled Caste groups; key informant interviews with officials (e.g., Block Development Officer, Block Medical Officer, Gram Pradhan); transect walks to understand the water infrastructure and its spread; and secondary data from institutional records. Thematic analysis explored villagers' narratives on water usage, sanitation challenges, and health impacts. Data triangulation integrated the primary field insights with socio-political literature on rural water governance, ensuring depth and contextual validity. Through these methods, the study conducted aimed to uncover how institutional lapses and power imbalances act as barriers to safe water and sanitation, leading to disproportionate health risks for vulnerable populations.

CONTEXT OF SHEKHPUR KHICHARA VILLAGE

The village studied is quite revealing with reference to understanding the social dynamics and the accessibility of drinking water. The historical sketch of the village Shekhpur Khicharawas is understood from the voices of elderly participants belonging to different communities.

The village originated with the Thakurs (Rajput) coming from Rajasthan during the Mughal period, settling with the aim of having a livelihood, located in the present Dhaulana Block, of Hapur District, Uttar Pradesh. Later, the area started to get populated with the people from the communities belonging to the lower hierarchy/strata like *badhai*(carpenter), mistry mason)julaha (weaver), mochi (cobbler), and so on. These people were used in servitude to the higher caste, namely, the Thakurs, in their day-to-day activities. Later in the 1980s, a lot of Muslims migrated from Moradabad to Dhaulana during the Hindu-Muslim riots. Due to this, the population of the Shekhpur Khichara and the nearby villages in the Dhaulana block increased by the Muslim population when they migrated from Meerut during the 1987 riots. The were beause some of their relatives resided in the area around Shekhpur Khichara village. The Muslim migrants were comfortable living with their community. Another reason was that the distance from the Dhaulana block to both Meerut and Moradabad was less than 100 km, and hence is a destination with good connectivity. Like this, the population of Dhaulana has increased with the Muslim community members. Within the span of time, some of the Muslims from Shekhpur Khichara village migrated to Dubai and other countries in search of better opportunities. Over the years, the village has shown a diversity of social

groups residing, such as Muslim, Saifi, Rajput, Fakir and Lohar, Kumhar, Scheduled Caste members The Rajput community is comparatively richer as they have larger land holdings in the village. Most of the people of the village have their own sources of drinking water at their homes. These communities are divided into the economic state, which is clearly visible when looking at the access to basic services like water. Water, being the most essential component of human life, is still not seen as being available to the disadvantaged sections of society. This disparity is further aggravated by caste hierarchies, where marginalized groups such as the Scheduled Castes and lower-strata Muslims often face barriers to access clean water due to poorer infrastructure and limited economic resources, aligning with broader patterns of social exclusion in rural India.

It is also significant to know that over the period, various industries started to crop up near the Shekhpur Khichara village due to its proximity to bigger cities like Hapur, Ghaziabad, and Delhi. These industries include Hindustan Coca-Cola beverages, meat processing units (such as large facilities operated by companies like International Agro Foods, contributing to regional meat exports), and several leather work units working near the village. Due to this, the population of the village has also increased at the time of the study. This industrial growth has not only boosted population but also raised concerns about water pollution from effluents and reducing water availability for domestic water consumption, putting strains on the per capita water availability and access to safe drinking water, which disproportionately affected marginalized communities with limited access to safe drinking water (O'Reilly, 2010).

SOURCES OF WATER IN SHEKHPUR KHICHARA VILLAGE

Clean and safe drinking water is the most essential component of human survival. Everyone requires water in his or her daily life activities apart from drinking. The sources of drinking water still seem to be a major challenge for majority of Indian households. Though the village, which was undertaken for the study, had various established sources of drinking water, the findings reveal that a sense of ignorance towards pure and safe drinking water exists in the Shekhpur Khichara village.

This section of the paper examines the available water sources and their utilization, drawing from field observations, FGDs, key informant interviews, and transect walks. The study revealed that the village comprised of diverse water sources, including a central pond (locally termed *jhor*, hand pumps, and wells. Villagers' perspectives, through FGDs, provided critical insights into water-related challenges from a community viewpoint.

During the FGD (with the male group), one of the members said:

"*Gaon ke beech me ek jhor hai jiska paani janwaro ko nehlane me kaam ata hai."*

(There is one jhor (local name for pond) at the centre of Shekhpur Khichara village, its water is used for bathing the animals).

Other members added that the Jhor water was not at all fit for drinking, and it was mostly used for non-drinking activities such as dumping garbage and so on. The study shows that there are different uses of sources of water, even if it is not used for drinking, there are many other uses for the same. Apart from non-drinking activities, the availability of fish in the pond is also used by some villagers as a secondary occupation, which they sell in local markets (Haines & Stevens, 1983). This multi-functional utilization of water sources, while adaptive, highlights a deeper concern: the prioritization of economic or utilitarian needs over health safety, which can exacerbate environmental degradation and public health risks in resource-scarce rural settings. In similar Indian contexts, ponds often serve as commons for multiple uses but become hotspots for pollution due to unregulated waste disposal, leading to broader ecological imbalances (Kumar et al., 2013).

STATUS OF WELLS IN SHEKHPUR KHICHARAVILLAGE

Once, wells used to be the major source of drinking water in the village. In the words of villagers during the FGD,

"pehle paanch saat kuye is gaon mein thay jo peene ke liye hota tha but dhere dheere sabko band kar diya gaya. (Earlier, there were 5-7 wells in the village, which were used for drinking, but gradually they were abandoned.)

Another participant from the group added,

"*pichhle kuch saalon se gaon me bheed badh gayi, aise mein jo kuye kharab ho gaye they, usse band karke logon ne jagah ko apne kabje me le liya*." (Since the years crowd has increased in the village, so the wells which were of no use were covered and the place was captured by the people in the village).

From the above points, it is inferred that unused wells have helped in accommodating the increased population in the Shekhpur Khichara village. Today, the space of inoperative wells is used by people for their own benefit. The information on the reasons behind inoperative wells was also corroborated in an FGD with women of the village, revealing interesting highlights.

"*paani ka star niche jaane laga, kuye sukhane lage aur sarkar ne bhi unhe begara kar diya, to kya karte. Unko dhak diya"* (The water level started going down, wells started drying up, and the government also abandoned them. So, what to do, we sealed them).

The study showed that the government did not have any option other than to cover the wells. Based on the above statements, it is safer to infer that the growing number of population in the Shekhpur Khichara village has resulted in the intensive usage of water and ultimately drying up of wells (Bandyopadhyay, 1987). Over the period, in Shekhpur Khichara village, the groundwater level also decreased tremendously, which resulted in less or nil usage of the well. Interestingly, at the institutional level, the executive engineer was of the view that initially, the major source of drinking water was wells, but later the government discontinued maintaining the wells since the water was no safer to drink. Thus, after understanding the positions of the villagers and the government officials, the study points out that behind discontinuing the use of wells there are multitudinous factors such as growing population, wells becoming dysfunctional, water becoming contaminated. This lens reveals a systemic failure in sustainable groundwater management, where short-term population pressures override long-term ecological sustainability, mirroring broader trends in Indian rural hydrology (Narayanamoorthy, 2014). Such depletion patterns are exacerbated by industrial proximity, as seen in Khichara, where untreated effluents accelerate contamination, aligning with reports on groundwater stress in peri-urban areas (Central Ground Water Board, 2017).

HAND PUMP AS A MAJOR SOURCE OF DRINKING WATER IN SHEKHPUR KHICHARA VILLAGE

In the Shekhpur Khichara village, the primary source of drinking water is groundwater.

In the words of the Block Development Officer (BDO Office, Dhaulana Block),

"H*amare record ke anusaar abhi Shekhpur Khicharagaon mein jal nigam ke dwara 53 hand pumps diye gaye hain*". (According to our office records, Shekhpur Khichara was given 53 hand pumps by the Jal Nigam.)

The villagers during the FGD shared that,

"Gaon me keval dus barah hi sarkari hand pump hain jo kaam karte hain, baki doosre toh kharab ho gaye hain. (There are only 10 to 12 government hand pumps within the village.)

The information from different sources above shows the huge disparity in terms of the number of government hand pumps in the Shekhpur Khichara village. This study argues that even though the *Jal Nigam* institution has provided good number of hand pumps in Shekhpur Khichara village most of them are not in a working condition. The issue here is managing the operation and management of the hand pumps provided to the villagers. Importantly, the provision of a water source has been accomplished by the

institutions at the district level, but when it comes to its operation and maintenance, the responsibility sharing is questioned (Bardhan, 2002).

The study was also important in witnessing the power dynamics in the context of accessibility to public goods among different castes and communities residing in the Shekhpur Khichara village. Through the key informant interview and FGD with different groups, it was discovered that a maximum of ten government hand pumps are available for use by the villagers, most of them placed near the houses of elites or the Pradhan of the village. Coming to the village dynamics, in the accessibility to handpumps, the study points to a clear discrepancy in equal access to the drinking water source in Khichara. The villagers from the marginalized communities shared their vulnerability in terms of not getting the hand pumps near their homes, ultimately leading their women members to borrow /carry water from the premises of other households. In the FGD conducted with the Scheduled Castes group the members shared that, "*Sarkari Hand pump to gaon me bohot thay, par dheere dheere gayab hone lage. Jisko mila usi ne hand pumpo ko apni diwar ke andar kar liya.*" (There were many government hand pumps in the village, but gradually they got disappearing. Those who got near their homes covered the hand pumps inside their boundary walls)., This clearly illustrates and supports the argument that due to unbalanced coordination between Jal Nigam and the BDO office, there is no strict surveillance or monitoring of the activities of the gram panchayat in the Shekhpur Khichara village (Besley et al., 2008), leading to social exclusion in the provision of safe drinking water. Thus, Jal Nigam left the responsibility of operations and management to the Gram Panchayat, but the latter did not take it effectively, leading to continued problems of hand pumps in the village. This pattern of decentralized governance failure points to a principal-agent problem, where local elites exploit informational asymmetries to hoard resources, thereby reinforcing social exclusion and undermining equitable development goals. Empirical evidence from other Indian villages supports this, showing that hand pump functionality rates drop to below 50% in areas with weak local oversight, often due to elite capture (World Bank, 2012). Importantly, during the third FGD, the participants, while discussing the role of *Pradhan* in the context of hand pumps, said that *Pradhan ne bahut safai se apne logon se milkar khud ke ghar ke paas chapakal lagwaya hai, humne itni baar bola ki hamare ghar ke paas nahi hai, phir bhi usne hamari baat nahi suni.* (The Pradhan has, very strategically, along with his people, got the hand pump installed either inside the premises or nearby his home. We have told him many times that we need the hand pump but he never listened to us). Interestingly, on the other side, *Pradhan* was very optimistic about his work and very diplomatically said that "*mai toh sabhi ka kaam achhe*

se karta hun, log hi aage nahi aakar apni samasya batate hain. Upar ke vibhag mein time toh lagta hi hai kaam hone mein, aap toh zaante hi hain sarkari kaam mein kitna waqt lagta hai." (I do my work with responsibility, but villagers do not tell me their exact problems, and you also know how much time the government offices take to do the work). With the above statements of *Pradhan*, it is inferred that the accessibility of basic resources is not considered urgent or treated as a priority; rather, the whole blame is shifted over to the villagers, most of whom have no idea about the official procedures in getting the water sources installed in the village. Moreover, *Pradhan* has the political power to decide on resource allocation within the village context. This discursive shift in accountability not only deflects responsibility but also perpetuates a cycle of disempowerment, where procedural opacity and fear of reprisal deter marginalized groups from asserting their rights, and the elite capture in local governance.

LOCAL POLITICAL DYNAMICS AND VULNERABILITIES OF MARGINALISED COMMUNITIES IN ACCESS TO DRINKING WATER

Building on the discussion of hand pumps as the dominant source and the evident elite capture in their placement and maintenance, this section delves into the local political dynamics that perpetuate vulnerabilities among marginalized communities in accessing drinking water.

Interestingly, the study also helped to understand the susceptibility of the marginal group when most of them during the focus group discussion said that government hand pumps, which were not in working condition, were left untouched, and those that were in working condition had been captured by the powerful people in their respective houses. In order to have a more holistic understanding of cases of capturing hand pumps by the powerful people happening in the village, it was significant to explore the steps, if any, that have been taken by villagers or government officials. In this connection, it was enquired from the Block Development Officer in the Key Informant interview and found that there is no direct power of the Block Development Office to intervene in such matters. However, upon complaint, a First Information Report (FIR) is lodged, with the complainant as one of the parties. Unfortunately, the villagers, if they were the complainants, refused to be one of the parties due to fear of the powerful people in the village. As quoted by one of the villagers during FGD, *"kaun jhagra mol le unse usi gaon mein rehna hai"*. (We have to stay in the same village, then there is no point in getting into arguments or fights with the influential people of the village). Based on the above quoted lines, one major point of argument which emerges is that on the one hand India is a nation having the villages where the availability of water sources are not clearly

depicted whereas at the other hand, this village (Khichara) even having the government installed handpumps is not benefitting the poor and needy villagers due to the power dynamics being played by the influential people. It is observed that disadvantaged groups are discriminated against in the provision of safe drinking water (Kanmony, 2003; Shaban & Sharma, 2007; Singh, 2009). In the case of Shekhpur Khichara village, the officials at the block level were also not in a condition to intervene in the matters of the village, most of the time, because the panchayat was a constitutional body. There are studies that discuss various dynamics in the decentralization and power system in the rural context. Whether greater decentralization of political power can achieve a more equitable distribution of resources remains unclear. On the one hand, it may enhance the accountability of elected representatives and amplify the political voice of poor people, while on the other, it may enhance the influence of local elites (Bardhan & Mookherjee, 2000). This dual-edged nature of decentralization illuminates the paradox in Khichara, where constitutional empowerment of panchayats inadvertently amplifies elite dominance, necessitating safeguards like community participation that can challenge inequalities.. Further, caste-based vulnerabilities in water access are well-documented, with Scheduled Castes often facing 20-30% less access to functional sources compared to upper castes, continuing cycles of poverty and health disparities (Deshpande, 2011). The unequal access to public goods for the lower strata of the Indian society is not a new phenomenon. Along with the institutional limitation in the water supply, the domination of the upper caste in the Indian society further aggravates the situation by creating a distance in accessibility to common goods. A global study estimated that up to 260 million people suffered caste related discrimination in accessing water (IDSN, 2009). Also, if initiatives to equalize access affect higher caste households through sufficient water, they would not allow lower castes to access their taps and wells. The UNDP Human Development Report emphasizes the exclusion of poor people from accessing basic resources like water due to their social and economic background, which results in further deterioration of their situation (UNDP, 2006).

Importantly, public water provision needs to circumvent such barriers through legal and social initiatives (Saleth, 1994). One solution is to improve the supply of water, which could dilute the impact of social factors. However, discrimination may be difficult to eliminate if it is entrenched in class and caste. With respect to caste, lower caste households may be altogether barred from using water infrastructure. The situation in the Shekhpur Khichara village, despite having constitutional guarantees, is very deplorable for the poor and marginalized. The people coming from such a background are the victims of village-level power politics and hierarchy.

These findings align with broader literature on how local power structures in rural India hinder equitable resource distribution, often requiring affirmative action policies to enforce inclusion (Iyer, 2009).

Building on the local political dynamics and vulnerabilities that marginalize communities in accessing functional government hand pumps, this section explores the compulsions driving villagers to seek alternatives and the compromises they entail, often at the expense of health and sustainability.

DRINKING WATER: COMPULSIONS AND COMPROMISES IN THE SEARCH FOR ALTERNATIVES

The study showed that even though there is a presence of extreme inequality in terms of access to public goods for the marginalized section, still, such communities look forward to some alternate methods to cope with the same. The villagers coming from the vulnerable communities have installed their own hand pumps manually. The excerpts from the FGD conducted for the Scheduled Caste group are given below. As said by two participants during FGD, *"Sir, hum logon ko isi gaon mein rehna hai, aur agar paani nahi milega toh bhi kuch dusra upay karna padtha hai, hum log apna hi hand pump banate hain khud, kuch gaon wale madad bhi kar dete hain"*. (Sir, we only have to stay in this village. If there is no water, then we have to look for a solution. We install the hand pumps manually, and some neighbours also help in digging for the manual hand pump.) The above line shows that economically weaker section communities of Shekhpur Khichara village adopt some alternative ways to sustain their life in the village. The participants of FGD also explained the manual process of setting up hand pumps in their homes. There is a manual process to dig a hole for a hand pump, in which they use a tool (an iron rod with a sharp end) called 'booki', in which a pipe is tied and inserted manually, and a hole is dug to insert the same pipe. When the pipe gets inserted in the digging pit, the 'booki' is reverted back, and another pipe is tied, and it is hammered again. They follow this process till they reach the level of moist and muddy soil. At this point, they get water, but they go beyond this point. The muddy soil is then followed by a hard covering (called *"gheda"*). So finally, they insert the pipe and do the digging beyond this hard covering, where there is water. The cost involved in the installation of the hand pump comes to around Rs. 10000/-. For digging a hand pump of around 50 feet, two 20-foot-long pipes are required, which cost around Rs. 2000/- each, and the hand pump costs around Rs. 4000/- and Rs. 2000/- for labour cost. It was interesting to note that even the people who are daily wage earners with an income of Rs. 300 per day have also installed hand pumps at their houses. The issue of the depth of the hand pump installed (self-funded) in

different households of Shekhpur Khicharavillage also came up during the study. As one of the participants in FGD said, "*Bhaiya, hum roj kamate, roj khate hain ab paani kahin se to lana hoga, yahan pani bahut upar hai, 30-40 feet me bhakkam pani mil jata he aur saste me kaam ho jata he. Paani to paani he, chahe kam gaharai me ho ya jada*" (brother, we earn daily and consume daily. We have to get water from somewhere. Here, water is easily and cheaply available at 30-40 feet, and so the work is done cheaply. Water is water; it doesn't matter if it is at a deeper level or shallow. Importantly, the depth of the hand pump/ bore is dependent on the economic status of the households in the village. At this point, it is to be argued that the availability of water easily with manual effort does not guarantee its purity. The availability of water at the shallow depth of 30-40 feet cannot be considered fit for drinking. Thus, the current study also sees the impact on the health of Shekhpur Khichara villagers (vulnerable communities) due to the presence of shallow hand pumps in their premises. Importantly, from the former sections of this article, it is learnt that government hand pumps were either non-functional or were captured by the affluent people of the village. In such a situation, there is no option left for the people other than installing the shallow hand pumps in their respective houses. This *jugaad* (makeshift innovation) represents a form of agency amid structural constraints, yet it may inadvertently heighten health risks by prioritizing immediate access over quality, illustrating the tension between survival strategies and sustainable development in marginalized rural contexts (Saleth, 1994). This reliance on informal adaptations is common in water-stressed regions, where economic compulsions drive unsafe practices, as noted in studies on rural innovation and risk (Shah, 2014). The study also points (based on informal discussion with the people during the transect walk) that the people who are quite well off from a financial perspective have installed motors or submersible pumps. Economically well-off families have deeper hand pumps (120-150 feet), whereas poor people have the capacity to install hand pumps at only 30-40 feet deep. At this juncture, it is important to discuss the issues arising due to the use of shallow hand pumps in Shekhpur Khichara village.

CHEAPER ALTERNATIVES AND ADVERSE HEALTH CONSEQUENCES

To understand the issues of poor villagers in connection to the quality of water and their perceptions about the same, the researcher tried to explore the condition of shallow hand pumps. One of the participants during an FGD said that, "*Paani ko hand pump se nikalne ke baad kuch der me girgit ki tarah rang badalta hai"* (After getting water from (shallow) hand pump, if kept for some time, it changes colour like a chameleon). Thus, water taken

from the shallow hand pumps cannot be kept for a long time, as it becomes very unfit for drinking. It has been discovered that the colour of the water of the shallow hand pumps changed very frequently. The colour of the water was not transparent and contaminated due to the shallowness of the hand pumps (The Researcher himself verified this by asking for a glass of water and keeping it for some time). Some of the participants of the FGD were of the view that water consisted of chemicals and waste coming out from the nearby industries. As the village is surrounded by various factories of cold drinks, meat processing, and leather works, there is indiscriminate disposal of industrial, municipal, and domestic wastes in water channels, rivers, streams, and lakes, which happens to be a major source of water pollutants in the area (Kahlown & Majeed, 2003). Importantly, the current study underlines the concern that waste products from such industries also result in the poor quality of the drinking water at the shallow hand pumps of the village. The current study also gains from the guidelines given by WHO (2008), which states that Chemicals from industrial sources can reach drinking water directly from discharges or indirectly from diffuse sources arising from the use and disposal of materials and products containing the chemical. In some cases, inappropriate handling and disposal of chemicals may lead to contamination, e.g., degreasing agents that are allowed to reach groundwater. Some of these chemicals, particularly inorganic substances, may also be encountered as a consequence of natural contamination, but this may also be a byproduct of industrial activity, such as mining, that changes drainage patterns. Many of these chemicals are used in small industrial units within human settlements, and, particularly where such units are found in groups of similar enterprises, they may be a significant source of pollution. Based on the above lines, it is inferred that human settlements are widely affected by industries and factories. Importantly, whenever such industrial units are established, they open the way for employment to the local inhabitants, but at the same time, they may also lead to long-term and serious health concerns. Interestingly, the Block Medical Officer (CHC, Dhaulana Block) also supported that the hand pumps in Shekhpur Khichara village absorbed the chemical effluents from nearby industries, leading to a rise in the water contaminated diseases among the poor villagers. With the above examples, it is understood that villagers installed shallow hand pumps as a make-shift innovation, due to problems of ineffective functioning of institutions and unavailability of working hand pumps, which leads to contamination of drinking water, further adding to the ill health of the people. The situation became worse due to the presence of factories near the Shekhpur Khichara village. The villagers strongly opined that the groundwater was affected by the chemicals and other hazardous substances from the factories. This industrial-rural nexus

exemplifies an environmental injustice, where economic gains from factories mask the externalities of pollution, disproportionately burdening low-income communities with chronic health burdens and calling for regulatory frameworks that enforce effluent treatment and community monitoring (WHO, 2008). In Uttar Pradesh specifically, industrial effluents have been linked to elevated heavy metal levels in shallow aquifers, increasing cancer risks by up to 15% in exposed populations (Singh et al., 2018). The hazardous substances mixed with water lead to contamination of arsenic in the water, further resulting in diseases related to the skin and so on. The studies show that contaminated water with arsenic leads to skin lesions and can also lead to arsenicosis at a later stage (Chakraborty & Saha, 1987; Rahman et al., 2003; Srikanth, 2009). In recent years, high arsenic contamination has also been reported from different parts of western Uttar Pradesh, Bihar, and Jharkhand. Taking cues from the experiences in the Shekhpur Khichara village and the literature, it is to be understood that the presence of industrial units is indirectly affecting the health of people through water contamination. This raises a question on the responsibility of water institutions at Shekhpur Khichara village to address this common concern. At the institutional level, there is a lack of coordination between various institutions engaged in water quality monitoring. Moreover, even if there is data on chemical contamination, there is a lack of documentation from the institution's side (Srikanth, 2009). Therefore, it becomes quite relevant for the water institutions to educate/train the community/people on the uses and impact of contaminated water on the health of the community. This institutional inertia not only hinders proactive responses but also undermines public trust, perpetuating a vicious cycle of vulnerability in pollution-prone rural areas.

The broader health impacts of unclean water in Shekhpur Khicharavillage, drawing from community perspectives and institutional insights, underscore the urgent need for integrated interventions.

UNCLEAN WATER AND PREVAILING HEALTH CHALLENGES IN SHEKHPUR KHICHARA VILLAGE

Insights from community and institutional perspectives on the presence of unclean water at Shekhpur Khichara village led to the identification of the effect on the health of the villagers. In order to investigate this, the focus was placed on the common diseases prevailing in the village. With the help of Focus Group Discussion (to understand the communities' view) and key informant interviews, private practitioners, ANM, ASHA of the village, and Block and District medical officers were interviewed to substantiate the information from FGD. It was interesting to get information from different perspectives on people's health. According to the BMO (Dhaulana

Block), diseases like dysentery, cholera, typhoid, malaria, and fever are quite prevalent among the villagers. There are more eye-related diseases in the summer and rainy season, such as conjunctivitis, swollen and red eyes, and so on. There is also the presence of prolonged skin diseases such as *Eczema* in the village. Another interesting fact came out during the FGD that, behind the existing health problems among the Shekhpur Khichara villagers, it is believed that the pure groundwater is extracted by the nearby beverage company and contaminated water is released by the same, which gets into the hand pumps of the village, resulting in the occurrence of various ailments and disorders. The major sufferers in this whole sphere of diseases are the marginalised communities, who do not have water facilities at their homes in the Shekhpur Khichara village. This confluence of domestic practices and industrial pollution illustrates a socio-ecological pathway to morbidity, where vector proliferation and chemical exposure amplify disease transmission, demanding integrated health surveillance systems and rigorous pollution compliance mechanisms, tailored to rural-industrial interfaces. Such patterns mirror national trends, where waterborne diseases account for approximately 10-15% of communicable illnesses in India, with children under five at the highest risk (Ministry of Health and Family Welfare, 2024). The major water-related diseases prevalent in this area are Diarrhoea, Gastroenteritis, and Cholera. Many of the villagers also suffer from headaches and loose motion in their day-to-day lives. Importantly, the literature (Prüss-Üstün et al., 2004) says that the fraction of diarrhoeal disease attributed to unsafe Water (WSH) in developed countries is approximately 60%, whereas in developing countries, as much as 85-90% of diarrhoeal illness can be attributed to unsafe WSH. The presence of such a situation opens the room to contemplate the existing divergence, which can be bridged with the simple orientation/training of the people at the rural level. According to the chief medical officer of the Hapur district, there is a prevalence of liver-related disease among the population. The children from the village are more prone to these water-borne diseases, especially diarrhoea and Rotavirus Amoebiasis, jaundice, Hepatitis A and C. Another prominent waterborne disease in the village is typhoid, which is caused by Salmonella bacteria, "Salmonella typhi". Studies (Pond, 2005) highlight that this microorganism leads to much more severe systemic diseases. It is also underlined that the increased frequency of Multiple Drug Resistant (MDR) Salmonella strains in human infections is an emerging issue of major health concern (Lightfoot, 2004; Lynch et al., 2009; Pond, 2005). Importantly, the prevalence of such a disease in this village shows that the contributing factors from local institutions and villagers towards the water and sanitation may lead to the emergence of such dangerous and sometimes life-threatening ailments in the Shekhpur

Khichara village. At the other end, even if the government provides clean drinking water to the population, then sanitation plays a major role in avoiding the spread of water-borne diseases, as poor storage and handling of drinking water spreads the pathogens through dirty hands and utensils in which the drinking water is stored, could be averted. Therefore, the point of argument is that not only the accessibility of safe drinking water but also the awareness of maintaining sanitation is more important for these people. In 2009, the Health Department carried out a research study in collaboration with WHO (as told by CMO during the key informant interview, Hapur District) in Dhaulana Block of Shekhpur Khichara Village. A test was conducted with the drinking water in that area, and the result showed the presence of polio virus in the hand pump water. At this point, the question arises as to how the virus reached the drinking water. As the hand-pumps in Dhaulana Block of Shekhpur Khichara Village had shallow-depth hand-pumps. This resulted in contamination of drinking water during the rainy season, as the water source was shallow. Therefore, the percolation of rainwater contaminated the drinking water with the polio virus. People were advised to use the Government-aided hand-pumps, which are very deep, as the rainwater does not percolate to these levels. But, interestingly, over the years, the government hand pumps were either captured by some affluent population or they were not at all functional (as mentioned in the initial section of this article). This further resulted in the inaccessibility of safe drinking water to most of the poor population of the village, ultimately making them more prone to several water-borne diseases. Analytically, the persistence of antimicrobial resistance and viral contamination in such settings signals a public health crisis rooted in infrastructural neglect, urging epidemiological interventions that link water quality testing with community education to prevent outbreaks. It was important to note that villagers were aware of the skin problems and other diseases prevailing among them. However, they did not see unsafe drinking water as the major reason for those ailments. The belief that *ghar ka paani bahut achha aur meetha hai* (water coming from the own hand pump is very sweet and nice) has dominated the minds of villagers, and they are not ready to accept that unsafe drinking water is creating immense health hazards to them in their day-to-day life. Such a belief of the villagers is one of the major challenges in addressing the concern of safe and healthy drinking water for the rural communities. The above shows the clear relationship between water accessibility and the prevailing diseases in the Shekhpur Khichara village. The water institutions in the village have a much bigger role to play in making the clean water supply to the people. This study argues that inadequate access to public goods can create a much bigger impact on the lives of people, affecting their health and daily life activities.. Moreover,

gender-wise effects are seen, which also show the extreme vulnerability of women from different aspects, such as impact on their physical, mental, and social health. Analytically, these gendered health disparities not only reflect immediate physiological risks but also long-term socio-psychological burdens, emphasizing the imperative for holistic, intersectional approaches in rural drinking water provisions as a public health policy (Coffey et al., 2017).

CONCLUSION

This article highlights the dimensions of drinking water, such as its availability, accessibility, and, importantly, its linkage with health. The Shekhpur Khichara village situation reveals that there were wells in the village earlier, which were the major source of drinking water over the years. The maintenance of wells failed to happen, and hence they ceased to be a source of drinking water for the villagers. Later, as per the government initiative, hand pumps were installed, which became the major source of drinking water. Though 53 hand pumps were installed in the village, due to gaps in operations and management by the water institutions, only 12 are currently functional throughout the village. Further, the locations of these hand pumps are concentrated in the better-served areas and among influential people of the village. To overcome this situation, the villagers installed their own shallow hand pumps out of convenience at a lower cost through locally developed technology. This resulted in a faulty system of uneven water availability and poor quality, which consequently resulted in health problems among the villagers. The poor and oppressed communities of the village were the major sufferers in terms of clean drinking water. The article provided insight into the responsibility of the water institutions at the village level. Moreover, the disparity in accessibility of the water resources to the marginalized community portrays a concerning scenario in the village. In fact, such disparity in access to safe drinking water results in hazardous health impacts on the lives of people. Some of the studies quote that in developing countries, approximately 10-15% of infections are associated with inadequate water supply and sanitation (WHO, 2019), this article integrates the empirical findings with theoretical insights, revealing how intertwined institutional, social, and environmental factors in Shekhpur Khichara exemplify broader challenges in rural India, advocating for social justice based reforms to achieve sustainable public health outcomes. The important aspect that this article underscores is that water availability, sanitation conditions, and health-seeking behavior are closely linked with the water supply institutions. Interestingly, there is an effort required to strengthen the democratic base of these institutions, and only then can a progressive and uplifted society be achieved. It is quite explicit that the

continuation of the existing gaps in these institutions will result in further deprivation of the marginal communities. Also, community participation in the operation and maintenance of the water treatment structure is vital to addressing the gaps in the sector (Srikanth, 2009). The article also believes that while addressing the gaps, it is important to emphasize on the capacity building of the members working in the water supply institutions, so that effective change is visible in the lives of people.

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