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Toxic waters and broken promises: The struggle for health equity in informal settlements

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journals.sagepub.com/home/usjYeshashwini Kadiri¹ 

Abstract

This article examines how health inequities in Film Nagar Basti, Hyderabad, are produced through the uneven governance of water, sanitation and environmental infrastructure. This study draws on six months of ethnographic fieldwork, 50 semi-structured interviews and participatory infrastructure mapping. The article argues that water insecurity operates as a mode of governance through which health risks are unevenly distributed. Contaminated water supply, monsoon overflow and dependence on private water providers expose residents to illness while shifting the burden of coping onto households, particularly women. Although NGOs and health camps provide temporary relief, these interventions remain fragmented and cannot substitute for structural accountability. By linking water insecurity to the production of health inequity, the article contributes to debates on urban infrastructure, informality and health governance in cities of the Global South.

Keywords

health inequity, informal settlements, infrastructural violence, urban governance, water insecurity

¹Urban Studies, University of Kent, UK

Corresponding author:

Yeshashwini Kadiri, Urban Studies, School of Social Sciences, University of Kent, Canterbury CT2 7NZ, UK.

Email: ykenquiries@gmail.com

摘要

本文探讨了印度海得拉巴市 (Hyderabad) 电影城贫民区 (Film Nagar Basti) 的健康不平等是如何通过水资源、卫生设施和环境基础设施的不均衡治理而产生的。研究依托为期六个月的人类学田野调查、50 场半结构化访谈以及参与式基础设施制图。本文认为, 水资源不安全构成一种治理机制, 健康风险借此形成不均衡分布格局。供水污染、季风雨季溢流以及对私人供水商的依赖, 使居民面临患病风险, 同时将应对负担转嫁至家庭, 尤其是女性身上。尽管非政府组织 (NGO) 和健康营提供临时救助, 但此类干预措施仍然呈现碎片化特征, 无法替代结构性问责机制。通过将水资源不安全与健康不平等的生成联系起来, 本文丰富了全球南方城市基础设施、非正规性以及健康治理领域的相关讨论。

关键词

健康不平等、非正规住区、基础设施暴力、城市治理、水资源不安全

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Introduction

At 3 a.m., Maryamma forces herself awake, rubbing her eyes as she reaches for the empty plastic pots stacked by the door. Her hut, like many others in this cluster of makeshift houses, has no individual water connection. She and her neighbours walk 10 minutes to a communal tap near the temple, a temporary arrangement granted by the temple committee three years ago to accommodate dozens of families whose houses do not qualify for municipal water.

The Hyderabad Metropolitan Water Supply and Sewerage Board provides water to her area every other day, but the timing is unpredictable. The communal tap might start flowing anytime between 3 a.m. and 5 a.m., forcing Maryamma and others to queue in the dark, hoping the supply lasts long enough to fill their pots. Some mornings, she is lucky. Other days, she returns home empty-handed, forced to ration the previous supply or to borrow from a neighbour. By sunrise, she must decide whether to boil water for drinking, set aside some for her granddaughter's bath or save enough for cooking.

These decisions are beyond water management; they are about survival in a city where infrastructure does not operate uniformly. In Film Nagar Basti, water insecurity, environmental toxins and uneven provision of sanitation services stem from selective governance and its uneven presence.

Despite proximity to Hyderabad's luxury apartments and private hospitals, the 'basti' remains structurally excluded from the city's health and sanitation systems. Residents face layered exclusions through inadequate waste disposal and limited access to public healthcare. These are structural expressions of urban power where access to basic services is contingent on visibility, legality and political value.

The term 'basti' commonly refers to low-income settlements characterised by economic precarity, legal ambiguity and infrastructural marginalisation (Bhan, 2012). Film Nagar Basti, formed in the late 1970s by rural migrants seeking economic opportunities, exemplifies these conditions. While some households have gradually secured tenure and municipal tap connections, large sections, particularly tenants, newer migrants and hut dwellers like Maryamma,

remain in a state of legal and infrastructural limbo. Spread across 18 colonies, the basti covers approximately 20% of Film Nagar, yet its spatial footprint has not translated into stable infrastructure provision.

A growing body of urban scholarship has shown that infrastructural systems such as water, sanitation and drainage play a critical role in shaping everyday health outcomes in informal settlements (Graham and Marvin, 2001; McFarlane, 2012; Subbaraman et al., 2015). In cities of the Global South, inadequate infrastructure, intermittent service provision and fragmented governance arrangements frequently function as key social determinants of health inequities. The World Health Organization defines health equity as the elimination of unjust and avoidable health differences shaped by political and social determinants, not just medical access (WHO, 2023). In informal settlements, these determinants are deeply embedded in uneven and selective forms of urban governance (Bhan, 2016; Roy, 2005). As Braveman and Gruskin (2003) argue, addressing health equity requires confronting the systems that expose poor communities to preventable health risks. This article extends that argument by showing how health inequity functions as an infrastructural condition produced by legal ambiguity, environmental degradation and selective public investment.

To understand how these dynamics unfold in practice, this study examines the relationship between water infrastructure, governance and health in Film Nagar Basti. The analysis is guided by three key questions: (1) How do governance structures produce and sustain health inequities in Film Nagar Basti? (2) How does water insecurity function as a governance mechanism that deepens public health risks? (3) What interventions can challenge these exclusions and reframe water access as a fundamental health equity issue?

Film Nagar Basti offers an entry point into understanding how health inequity is structured across informal settlements in the Global South. This article makes two contributions. First, it demonstrates how water insecurity operates as a mode of urban governance that distributes health risks unevenly across populations. Second, drawing on ethnographic research in Film Nagar Basti, it shows how everyday interactions with unreliable water systems produce cumulative and gendered forms of health vulnerability. Women bear much of the daily labour of securing water, managing contamination and caring for sick family members. While scholarship on urban infrastructure has extensively examined governance, access and informality, this article shifts attention to the embodied consequences of these systems and their implications for health inequity.

The next section reviews scholarship on urban infrastructure, informality and health inequity, followed by a discussion of the research methodology. The empirical sections then examine contaminated water supply, environmental hazards and access to healthcare in Film Nagar Basti, before discussing the broader implications of these findings for debates on urban infrastructure and health inequity.

Literature review: Infrastructure, informality and health inequity

Urban infrastructure has long been understood as central to the production of social inequality in cities. Scholars of infrastructure have shown that the provision of urban services is deeply political, often producing uneven access and differentiated forms of urban belonging. In many cities of the Global South, infrastructure systems operate unevenly, creating fragmented landscapes of provision and exclusion (Graham and Marvin, 2001; Larkin, 2013; McFarlane, 2012). In some contexts, these infrastructural

arrangements actively generate harm through what Desai (2018) describes as 'infrastructural violence', where uneven maintenance and service provision expose marginalised communities to environmental and health risks.

Research on urban infrastructure has increasingly emphasised how service provision reflects broader governance arrangements. As Anand argues through the concept of hydraulic citizenship, access to water often becomes a key mechanism through which residents are recognised or excluded by urban authorities. Water connections, repairs and service reliability frequently depend on bureaucratic recognition and political negotiation rather than universal provision (Anand, 2017). Similarly, Simone describes urban infrastructure as embedded within social relations, where everyday practices and informal arrangements shape how services function in practice (Simone, 2004).

These dynamics are particularly visible in informal settlements, where infrastructure provision is often mediated through legal ambiguity and political negotiation. Scholars have shown that urban informality is a mode of governance through which the state selectively manages space and population (Roy, 2005, 2009). Informal settlements are frequently incorporated into urban systems through partial recognition, discretionary service provision and fragmented regulatory frameworks. As Chatterjee argues, residents of informal settlements often engage the state through forms of 'political society', where access to resources is negotiated through patronage, mediation and political claims rather than formal citizenship rights (Chatterjee, 2004). Research on Indian cities similarly demonstrates how urban governance frequently produces uneven infrastructures that disproportionately burden low-income communities (Bhan, 2016; McFarlane, 2008).

Within these unequal infrastructural landscapes, water insecurity has emerged as a major determinant of health inequality. Studies across informal settlements have documented how unreliable water supply, contamination and inadequate sanitation contribute to a wide range of health risks, including waterborne disease, chronic illness and environmental exposure (Price et al., 2019; Subbaraman et al., 2015). Research on urban 'slum' environments further shows that these risks are shaped by infrastructural deficits and chronic underinvestment rather than inherent conditions of informal settlements (Ezeh et al., 2017). Access to safe water is closely tied to broader socio-economic inequalities, particularly in urban slums where infrastructural deficiencies intersect with poverty, insecure tenure and limited political representation (Parikh et al., 2015).

Research also highlights the gendered dimensions of infrastructural inequality. Women in informal settlements frequently bear the primary responsibility for securing water, managing sanitation and caring for sick household members, placing them at the centre of everyday negotiations with unreliable infrastructure (Chant, 2013; Sultana, 2020). Water insecurity therefore shapes beyond environmental and health outcomes, through everyday social relations within households and communities.

At the same time, scholars have increasingly drawn attention to the relationship between infrastructure and environmental risk in informal settlements. In contexts where drainage systems, waste management and water networks operate unevenly, residents are frequently exposed to multiple overlapping hazards, including contaminated water, flooding and pollution (McFarlane, 2008; Nixon, 2011). Living with such hazards often produces what Auyero and Swistun (2009) describe as 'toxic uncertainty', where communities rely on everyday

sensory and embodied knowledge to assess environmental risks in the absence of reliable information.

A growing body of scholarship has examined water governance and infrastructure provision in Indian cities. Studies of water systems in cities such as Delhi, Mumbai and Bangalore feature how infrastructure access is shaped by political negotiation, institutional fragmentation and uneven state investment (Björkman, 2015; Kennedy and Zerah, 2008). These studies demonstrate that water provision in Indian cities frequently operates through hybrid arrangements that combine formal networks, informal connections and private providers.

Research has also explored how water governance intersects with urban informality. Studies of Delhi have shown that unreliable public supply often produces a complex ecology of coping strategies, including private tankers, groundwater extraction and informal distribution networks that supplement municipal systems (Zerah, 2000). These arrangements show how access to water in many cities of the Global South operates through hybrid infrastructures combining state provision, private markets and informal intermediaries. Similar patterns have been documented in Jakarta, where informal practices become embedded within urban water systems rather than simply disappearing as formal networks expand (Kooy, 2014). This body of scholarship has significantly advanced our understanding of how informal water provisioning operates through hybrid arrangements of infrastructure, markets and political mediation.

In the context of Hyderabad, existing scholarship has examined how rapid urban expansion and infrastructural development have reshaped patterns of water provision and urban inequality. Studies by Das and Skelton (2011) show how Hyderabad's growth as an IT hub has produced uneven geographies of water infrastructure, where

new urban enclaves receive prioritised investment while other neighbourhoods face chronic shortages and unreliable supply. Research on peri-urban Hyderabad similarly highlights how urban water demand increasingly depends on groundwater extraction and informal water markets in surrounding regions, creating new forms of water insecurity (Prakash 2014). Policy-orientated analyses have also noted the persistence of intermittent supply, the underinvestment in distribution networks and the proliferation of informal coping strategies across Indian cities, including Hyderabad (Fan and Rao, 2011; Zerah and Jaglin, 2011).

Together, these studies demonstrate that water provisioning in Indian cities operates through fragmented systems shaped by uneven investment, governance arrangements and hybrid formal informal supply mechanisms. These fragmented systems are also sustained and negotiated through the actions of multiple actors, including municipal authorities, private water suppliers, community intermediaries and non-governmental organisations.

While this literature provides important insights into the governance and spatial politics of water infrastructure, less attention has been paid to how these infrastructural conditions translate into everyday health risks within informal settlements. Existing studies have primarily examined infrastructure provision, water governance and urban informality as separate domains, focusing on patterns of service access, institutional arrangements or urban political negotiations. By contrast, this article examines how unreliable water infrastructure, environmental contamination and bureaucratic exclusion intersect in everyday life to produce recurring illness and chronic health vulnerability. Drawing on ethnographic research in Film Nagar Basti, the analysis shows how water insecurity operates as a mechanism through which health risks are unevenly

distributed and normalised within urban governance systems. In doing so, the article extends existing scholarship on urban water governance in Hyderabad and contributes to broader debates on infrastructure, informality and health inequity in cities of the Global South.

Recent contributions in Urban Studies have significantly advanced understanding of urban infrastructure and informality in Indian cities. Narain et al. (2023) establish how water access in peri-urban Delhi is produced through hybrid assemblages that blur distinctions between formal and informal systems. Chitra (2022) similarly shows how drainage infrastructures are reconfigured through climate adaptation and flood management, often reproducing socio-spatial inequalities. Castán Broto and Sudhira (2019) feature how the historical co-evolution of water and electricity infrastructures in Bangalore has generated differentiated forms of urban citizenship, while Schindler (2014) shows how informality itself is continually produced through everyday governance practices. In Hyderabad, Pierce (2020) shows how residents collectively mobilise to secure improvements in basic services through engagement with state institutions.

While these studies have substantially deepened debates on infrastructure, governance and urban informality, they focus primarily on how infrastructures are organised, governed, negotiated or contested. Relatively less attention has been paid to how fragmented infrastructural arrangements become translated into embodied experiences of illness, environmental exposure and everyday health vulnerability within informal settlements. This article addresses that gap by examining how water insecurity functions as a mechanism through which health risks are unevenly distributed in Film Nagar Basti. In doing so, it extends Urban Studies debates from the governance

of infrastructure to the production of health inequity through infrastructure, demonstrating how urban infrastructures shape everyday bodily wellbeing.

Methodology

This study employs a qualitative, multi-method approach to examine how uneven governance arrangements, infrastructural neglect and environmental hazards shape health inequities in Film Nagar Basti, Hyderabad. Fieldwork unfolded progressively over the six-month research period. The initial phase focused on participant observation and rapport building within the settlement, allowing everyday practices around water access, sanitation and environmental conditions to be documented. Interviews with residents were introduced during this stage, while participatory infrastructure mapping was carried out alongside these conversations to identify water access points, drainage overflow areas and contamination hotspots. In the later stages of fieldwork, interviews with government officials, NGO workers and other stakeholders were conducted, drawing on insights and spatial information gathered within the settlement.

Ethnographic fieldwork

Between January and July 2024, I lived within Film Nagar Basti, documenting everyday experiences of water infrastructure, environmental hazards and health risks. Participant observation focused especially on women, whose daily routines such as waiting at taps, managing household sanitation and seeking medical care reveal how gendered labour sustains life amid infrastructural inefficiency.

Recognising the internal diversity of the basti, I conducted fieldwork across housing types from thatched huts to multi-storey houses, to capture disparities in access. Evening gatherings in hut settlements

became key spaces for collective discussion, where women spoke of shortages, contamination and illness. These engagements surfaced the informal strategies that residents rely on in the absence of reliable services.

My observation followed a three-stage immersion inspired by Guest et al. (2012) from initial observation, rapport building through shared routines and deep engagement. Over time, trust enabled more candid conversations about governance failures and the emotional toll of navigating broken systems.

Semi-structured interviews

A total of 50 in-depth interviews were conducted with residents and key stakeholders. These included 31 women from diverse housing and socioeconomic backgrounds, four men including basti leaders involved in local infrastructure negotiations and 15 stakeholders such as urban planners, officials from the Greater Hyderabad Municipal Corporation (GHMC), water board employees, NGO workers, journalists and local politicians. Snowball sampling helped reach more marginalised voices, including single women, undocumented tenants and recent migrants often excluded from formal governance processes.

The in-depth interviews were designed to capture residents' experiences of water access, contamination, environmental hazards and interactions with municipal institutions. While participant observation documented everyday practices around water collection, sanitation and household coping strategies, interviews provided a deeper understanding of how residents interpreted these conditions and the health risks associated with them. Interview questions therefore focused on several key themes, including experiences of water supply reliability, perceptions of water quality and contamination, health impacts within households, strategies used to manage

shortages or environmental hazards and residents' interactions with government agencies and local organisations.

All interviews were transcribed and coded using an inductive thematic approach in NVivo. Themes were developed iteratively through repeated engagement with interview transcripts and fieldnotes. Initial open codes captured recurring issues raised by participants, including water access, contamination, illness, governance interactions and household coping strategies. These codes were then grouped into broader analytical categories linking infrastructural conditions, governance arrangements and everyday health vulnerabilities. This iterative coding process enabled patterns to emerge from the data while remaining grounded in participants' experiences and observations from fieldwork.

Infrastructure mapping and spatial analysis

To capture the material and spatial dimensions of water insecurity, I conducted transect walks across the basti and used EpiCollect for real-time data on water access points, drainage overflows and contamination hotspots. Residents also contributed mental maps (Lynch, 1960), revealing how they navigate infrastructure gaps, unsafe water points and disease-prone zones. These participatory maps became powerful visual tools when shared with municipal actors, often contradicting official claims and exposing denial of infrastructural decay.

Reflexivity and ethical considerations

As a Telugu-speaking woman from Hyderabad, I moved through the basti as both insider and outsider (Dwyer and Buckle, 2009; Mullings, 1999). My cultural fluency enabled ease of interaction, but class distinctions were always present. I

consciously minimised visible markers of privilege and embedded myself in everyday routines accompanying women to markets, waiting at taps, sitting with them during evening gatherings. While early conversations were cautious, trust deepened over time. Participants gradually shared more difficult stories about health fears, neglect and everyday adaptations. These relational dynamics shaped the depth and candour of the fieldwork. To protect the anonymity of participants and the community, identifying spatial details such as precise maps or geolocated imagery are not included in the article.

Findings

The findings are organised around three interconnected dimensions. The first examines the everyday condition of water infrastructure in the settlement and how governance arrangements shape access to water and exposure to contamination. The second explores the environmental hazards produced by inadequate drainage and waste management, showing how these infrastructural conditions deepen public health risks. The third examines how residents navigate these challenges through coping strategies and how institutional actors, including government agencies and NGOs, respond to the infrastructural challenges in the settlement.

Contaminated water and everyday health risk

In Film Nagar Basti, water contamination is a persistent feature of everyday life. Aging pipelines, delayed maintenance and irregular water pressure frequently result in leaks and cross-contamination within the local network. Unlike nearby formal neighbourhoods with stable water systems, residents regularly encounter water that appears discoloured, carries sediment or emits an unpleasant smell. In the settlement's low-lying lanes,

pipeline damage is common and repairs are frequently delayed. Rather than facing a complete absence of water, households confront a different problem that water is available but its safety is uncertain.

Lakshmamma, a 52-year-old resident, explained how she has learned to distrust the supply. Holding up the brass pot where she stores drinking water, she remarked, 'Even when it looks clean, I know better'. Like many residents, Lakshmamma relies on visual and sensory cues to assess whether the water is safe to use. As she spoke, Lakshmamma tilted the brass pot slightly towards the doorway where sunlight filtered in, pointing to the faint residue that had settled at the bottom. She explained that many households had developed similar routines of inspecting water before using it, often comparing its colour, smell and taste before deciding whether it was safe to drink. Through such small everyday practices, residents had learned to navigate uncertainty around water quality in the absence of reliable monitoring.

Municipal officials themselves acknowledge uneven service provision. One water board employee noted that complaints from formal neighbourhoods are typically addressed quickly, while requests from informal settlements often remain unresolved for weeks. In practice, this means that pipeline leaks and contamination in the basti persist longer, increasing the likelihood that unsafe water will enter the household storage. Without reliable monitoring, residents develop their own strategies to manage uncertainty. Water is judged by smell, colour and taste. Some households boil drinking water despite the additional cost of LPG. Others rely on bottled water for children and the elderly while using untreated water for cooking or washing. These decisions reflect a constant negotiation between financial constraints and health risks. Over time, these everyday adjustments normalise

contamination as part of daily life. Residents learn to manage unsafe water rather than expect consistent service improvements.

These vulnerabilities intensify during the monsoon season. Each year, heavy rainfall overwhelms the basti's fragile drainage system, allowing sewage to mix with the piped water supply. Overflowing *nalas* (natural or artificial streams serving as urban drainage systems or open sewers carrying wastewater) and exposed pipes create conditions in which contamination spreads rapidly through household taps.

Sai Akka, a mother of three, described the anxiety that accompanies the rainy season: 'Each monsoon I worry. Will the water smell of sewage again? Will my children fall sick?'. Sai Akka's concern reveals the uncertainty that many households described during the monsoon season, when contamination becomes more visible and illness more common. During conversations with residents, the arrival of the monsoon was often described as a period of heightened vigilance. Women spoke of checking the smell of water before cooking, boiling drinking water more frequently and closely monitoring children for signs of fever or stomach illness. These seasonal routines demonstrated how the risks associated with contaminated water were woven into everyday household practices. During this period, cases of diarrhoea, fever and skin infections increase noticeably. Yet access to medical care remains limited. Residents often rely on home remedies or private clinics, delaying treatment because of cost. Municipal responses to these problems are typically temporary. Rather than investing in improved drainage or repairing exposed pipelines, authorities treat monsoon contamination as a seasonal disruption. As a result, similar outbreaks occur every year.

In response to unreliable municipal supply, many households turn to private alternatives



Figure 1. Delivery of bottled drinking water by a private vendor in Film Nagar Basti.

Source: The author.

such as tanker water, bottled water or simple filtration practices (Figure 1). Small-scale vendors regularly deliver bottled drinking water to the settlement, supplying households that cannot rely on the municipal network for safe drinking water. Similar dynamics have been documented in other Indian cities where an unreliable public supply has produced informal water markets and private tanker economies (Ranganathan, 2014).

Residents described these purchases as a necessary but recurring expense, particularly for families with children or elderly members. Although the cost of bottled water varies depending on the supplier, several households noted that they purchase containers multiple times each week during periods of unreliable supply. These purchases show how the financial burden of securing safe drinking water is shifted onto households when municipal infrastructure fails to provide consistent service.

These options provide temporary relief but also impose significant financial burdens. Boiling water increases fuel consumption, while bottled water represents an expense that many households cannot sustain. Some

residents filter water through cloth or simple household devices, even though these methods remove visible sediment but not harmful contaminants. Instead of infrastructure ensuring reliable access, residents must continuously evaluate the cost and safety of different water sources.

The health consequences of contaminated water are both immediate and gradual. Residents frequently report stomach infections, diarrhoea and skin conditions linked to unsafe water. These illnesses are often treated as routine occurrences rather than exceptional events. During a health camp held in March 2024, medical workers identified signs of fluorosis among several women in the settlement. Fluorosis initially appears as tooth discoloration but can eventually lead to joint pain, stiffness and long-term bone damage. A 26-year-old law student who grew up in the basti reflected on the delayed recognition of the problem: 'For years we thought our joint pain was unrelated. Even now most people don't know it is because of fluoride in the drinking water'. Conversations like this came up repeatedly during fieldwork. Many residents spoke about chronic pain or joint problems without immediately connecting these symptoms to the quality of drinking water. For many residents, chronic pain is attributed to aging or physically demanding labour rather than environmental exposure. As a result, the link between water quality and long-term health often goes unrecognised. The effects of contaminated water accumulate gradually, making them difficult to attribute to a single cause.

Environmental hazards and infrastructural exposure

The settlement's open *nala* and polluted lake expose residents to flooding, disease and environmental degradation. Residents recall

that the lake once served as a relatively clean water source. Over time, however, nearby apartment complexes, commercial buildings and hospitals began discharging waste into the surrounding drainage system. The lake gradually transformed into a polluted reservoir receiving untreated sewage.

The *nala* that runs through the basti reflects similar patterns of neglect. While drainage systems in formal neighbourhoods are typically enclosed and regularly maintained, the *nala* in Film Nagar Basti remains open and poorly managed. Without a concrete base, waste accumulates quickly and requires repeated desilting. Municipal engineers acknowledge these problems but describe them as difficult to control. One GHMC engineer explained: 'Even if we clean the *nala* today, by tomorrow it will be filled with waste again. We have found everything in there from plastic bottles to mattresses'. During interviews with municipal officials, similar explanations often framed drainage problems as the result of resident behaviour rather than infrastructural design. Such responses shift responsibility onto residents while leaving underlying infrastructural problems unresolved. Wacquant (2008) describes such narratives as territorial stigma, where marginalised neighbourhoods are portrayed as inherently problematic in ways that justify their continued exclusion from urban investment and infrastructural improvement.

The open *nala* also creates conditions for mosquito breeding and other environmental hazards. Stagnant water and accumulated waste attract insects and rodents, increasing the risk of diseases such as dengue and malaria. Sai Akka explained: 'We sleep with the sound of mosquitoes. We wake up with fever'. Residents living close to the drainage channel repeatedly described nights disrupted by mosquitoes during the monsoon months. Children who play near the *nala*



Figure 2. Garbage accumulation next to huts in Film Nagar Basti.

Source: The author.

frequently return home with rashes or infections. Households attempt to manage these conditions using mosquito nets, coils and repellents, but such measures provide only temporary relief.

During the monsoon season, the *nala* also becomes a pathway for snakes entering nearby homes. Raji Akka described how snakes often appear inside houses during heavy rains: ‘When it rains, they come inside. It is very scary’. Bhavani, who lives in a tin-sheet structure near the drainage channel, recalled encountering a snake while bathing in an open washing area.

Environmental hazards are further compounded by the absence of reliable waste management. In the absence of consistent garbage collection, vacant plots and drainage channels frequently become dumping grounds. Waste accumulation next to their houses is a common concern raised by residents (Figure 2).

Residents report that both locals and outsiders discard waste near the lake and along the *nala*. Shantamma described how trucks and motorcycles often arrive at night to dump garbage: ‘If we catch them, we shout at them, but they still come back’. Several residents described confronting people who

dumped garbage near the lake, though these efforts rarely prevented the practice from continuing. Even municipal sweepers sometimes push collected waste into the drainage channel instead of transporting it to official disposal sites.

These practices contribute to environmental degradation and health risks. Burning garbage releases toxic smoke, while accumulated waste attracts mosquitoes and rodents. Despite municipal campaigns promoting door-to-door collection, residents describe waste services in the basti as irregular and inconsistent. Managing garbage therefore becomes another form of gendered infrastructural labour, often falling on women, who must maintain cleanliness around their homes despite surrounding waste.

Mediating health insecurity: Governance, bureaucracy and NGOs

The governance of health services in Film Nagar Basti reflects similar patterns of uneven provision. In 2017, the settlement’s only government-run hospital was destroyed by flooding. During the period of fieldwork, seven years later, the facility had still not been rebuilt. Although political leaders periodically promise reconstruction during election campaigns, these commitments rarely translate into concrete action. As a result, residents rely on distant government hospitals, private clinics or informal care networks.

Radha, a 30-year-old tailor, described the frustration that many residents feel: ‘During elections they give money and food. But when we ask for a hospital, they act like we never spoke’. Healthcare access is further complicated by bureaucratic requirements. Government programmes often require identification documents such as Aadhaar cards or residency certificates. For many residents, incomplete records or minor discrepancies make it difficult to qualify for services.

Women in particular face significant barriers when navigating these procedures. Visiting government offices requires taking time off work, travelling long distances and waiting in long queues with uncertain outcomes. As a result, healthcare access often depends on the ability to navigate bureaucratic systems rather than simply the need for treatment.

In the absence of consistent public services, NGOs play an important role in providing limited support. Health camps, training programmes and educational initiatives offer valuable resources but operate on a temporary basis. Access to these programmes is often mediated through informal networks or local relationships. Padma Akka described how some NGO programmes appear accessible in principle but remain uneven in practice: 'Their tailoring centre is supposed to be for everyone, but mostly they help people from their own group'.

Funding cycles also limit the sustainability of these initiatives. Many of these programmes are funded through corporate social responsibility initiatives, which often operate through short-term project cycles rather than long-term infrastructural commitments. One volunteer described how a small clinic operated successfully for several years before funding expired, forcing the programme to close. As a result, NGO interventions provide intermittent assistance without addressing the broader infrastructural conditions shaping health risks in the settlement.

Discussion

The evidence from Film Nagar Basti shows that water flows through municipal pipelines, drainage systems exist and government health programmes periodically appear in the settlement. Yet these systems operate unevenly, producing conditions in which residents are persistently exposed to environmental and health risks. The findings

demonstrate how infrastructure itself becomes a mechanism of governance, structuring differentiated access to safety and protection. While earlier research on Hyderabad has documented uneven water provisioning and the expansion of informal supply systems (Das and Skelton, 2011; Prakash, 2014), the findings presented here show how these infrastructural conditions translate into everyday health risks within informal settlements.

This pattern aligns with existing scholarship showing that infrastructure in cities of the Global South often produces fragmented landscapes of provision (Graham and Marvin, 2001; McFarlane, 2012). The case of Film Nagar Basti extends this insight by demonstrating how such infrastructural fragmentation translates directly into health vulnerability. Contaminated water supply, open drainage systems and unreliable waste management expose residents to recurring illness.

The findings also reinforce arguments that urban informality operates as a form of governance (Roy, 2005, 2009). In Film Nagar Basti, residents are neither fully excluded from urban infrastructure nor fully incorporated into it. Instead, they experience partial inclusion through intermittent water supply, delayed repairs and temporary health interventions. Access to services therefore depends on bureaucratic recognition, political negotiation and the ability of residents to navigate institutional systems. Water provision becomes a key site through which urban belonging is mediated, described by Anand as hydraulic citizenship.

This finding extends recent Urban Studies scholarship on infrastructure and informality by shifting attention from how fragmented infrastructures are organised and negotiated to how they become embodied as everyday health inequities. In Film Nagar Basti, uneven water, sanitation and drainage systems generate recurring illness,

environmental exposure and gendered labour. At the same time, the findings show how residents actively navigate these conditions through everyday practices. Women were central to the daily management of infrastructural insecurity. They monitored water quality, queued for supply, rationed household use and cared for family members when illness occurred. In this sense, the health effects of unreliable infrastructure were also gendered because the labour of coping with infrastructural failure was disproportionately absorbed into their everyday routines.

Sensory assessments of water quality, reliance on private suppliers and informal strategies for managing environmental hazards demonstrate how communities adapt to infrastructural uncertainty. Urban life in informal settlements is sustained through continuous negotiation with unreliable systems rather than stable service provision. By foregrounding the relationship between infrastructure and health inequity, this study contributes to debates on urban health governance. Much research on health inequality focuses on access to healthcare services, yet the conditions observed in Film Nagar Basti suggest that health risks are deeply embedded in the material organisation of urban environments. Water systems, drainage networks and waste infrastructure shape the everyday conditions through which illness emerges and circulates. By linking everyday water insecurity to the production of health risks, this study shows how urban infrastructure operates as a mechanism through which health inequities are governed.

Conclusion

This article has argued that water insecurity and health inequity in Film Nagar Basti are the result of governance arrangements characterised by uneven investment and selective

recognition (Bhan, 2016; Roy, 2009). In this context, infrastructure functions as a political instrument that regulates citizenship and belonging, shaping which urban populations are protected from environmental risk and which are left to absorb its consequences.

The everyday consequences of these arrangements are visible in the persistence of open *nalas*, uncollected waste and unreliable water supply that structure daily life in the settlement. As Raji Akka, a resident who has lived in the basti for over two decades, stated during a conversation about COVID-19, 'We live in filth every day, so our bodies have adjusted. Maybe that's why COVID didn't affect us much'. Her words expose how chronic infrastructural neglect becomes normalised within everyday life. In such contexts, public health is shaped by the material conditions through which urban environments are governed.

This study is based on ethnographic research conducted within a single informal settlement in Hyderabad, and the findings should therefore be interpreted within the specific social and infrastructural context of Film Nagar Basti. The settlement's proximity to elite neighbourhoods and its history of urban development shape patterns of water access and infrastructural neglect in distinctive ways. As such, the empirical observations presented here are not intended to be representative of all informal settlements. However, the analysis offers broader analytical insights into how uneven infrastructure provision and governance arrangements can translate into everyday health vulnerabilities. In this sense, the study contributes to wider debates on infrastructure, governance and health inequity in cities of the Global South.

As climate change intensifies urban vulnerability, these exclusions are likely to deepen. Addressing them requires moving beyond temporary interventions towards structural commitments that treat access to water, sanitation and healthcare as fundamental urban rights. By demonstrating how

water insecurity operates as a governance mechanism that produces everyday health vulnerability, this study features the importance of addressing infrastructural inequality as a central component of urban health governance.

ORCID iD

Yeshashwini Kadiri  <https://orcid.org/0009-0002-3201-6966>

Ethical considerations

This study was approved by the University of Kent Research Ethics Committee.

Consent to participate

Verbal informed consent was obtained from all participants included in the study.

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Data availability statement

The data that support the findings of this study are not publicly available due to ethical and privacy considerations.

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