USAID FROM THE AMERICAN PEOPLE

CENTRE FOR URBAN AND REGIONAL EXCELLENCE

JSI

BUILDING HEALTHY CITIES

BUILDING HEALTHY CITIES

Indore Participatory Research Report: Phase I Qualitative Results

December 2020

THRIVE NETWORKS

International Organization for Migration (IOM)
The UN Migration Agency

URBAN INSTITUTE

CONTENTS

ACRONYMS

ANM	auxiliary nurse midwife
ASHA	accredited social health activist
BHC	Building Healthy Cities
CURE	Centre for Urban and Regional Excellence
ISCDL	Indore Smart City Development Limited
JSI	JSI Research & Training Institute, Inc.
LPG	liquefied petroleum gas
PMJAY	Pradhan Mantri Jan Arogya Yojana
USAID	United States Agency for International Development

Building Healthy Cities

Building Healthy Cities is a five-year cooperative agreement funded by the United States Agency for International Development (USAID) under Agreement No. AID-OAA-A-17-00028, beginning September 30, 2017. Building Healthy Cities is implemented by JSI Research & Training Institute, Inc. (JSI) with partners International Organization for Migration, Thrive Networks Global, and Urban Institute, and with support from Engaging Inquiry, LLC.

This report is made possible by the generous support of the American people through USAID. The contents are the responsibility of Building Healthy Cities and do not necessarily reflect the views of USAID or the United States Government.

Recommended Citation

Sharma, Bhawna, Samya Rakshit, Sayan Malik, Neeraj Mishra, Damodar Bachani, and Renu Khosla. 2020. *Indore Participatory Research Report: Phase I Qualitative Results.* Arlington, VA: Building Healthy Cities (BHC) project.

Acknowledgements

The authors would like to thank the Chief Executive Officer of Indore Smart City Development Limited and the organizations that contributed to the research. BHC would also like to thank the citizens who are partnering with BHC for this activity for their participation.

EXECUTIVE SUMMARY

The United States Agency for International Development-funded Building Healthy Cities (BHC) project is working to improve healthy urban planning across four cities in Asia. One project initiative in Indore, India is to encourage community and nongovernment organization participation in the planning, implementation, and monitoring of public programs related to the social determinants of health (e.g., environment, urban planning, water and sanitation, women and child development, education). This report summarizes the findings from the first step of this activity, which was a qualitative study of infrastructure and services related to environmental health in eight communities, including slum and non-slum areas in Indore.

BHC contracted Centre for Urban and Regional Excellence (CURE) to support this participatory research study. Qualitative data were collected via a grounded theory approach. Eight urban poor communities (slum and non-slum settlements) were selected based on various characteristics. A total of 31 focus group discussions were completed, in addition to a transect walk to document the physical environment; community-based organization formation and trainings on participatory research methods; and mapping exercises in each community between November 2019 and January 2020.

The results from the qualitative data indicated that the biggest environmental health concerns focused on water access and wastewater management, sanitation, and lack of policy regulations. Table 1 summarizes the key findings and recommendations of the study.

Table 1. Summary of Key Qualitative Findings

Topic	Key Issues	Community Recommendations
Sanitation, drainage, and solid waste	• Choked inspection pits. • No overhead tanks in rehabilitated colony (Arjunpura). • Clogged nallahs[1] and waterlogging.	• Develop protocols to clean choked inspection pits and remove extracted sludge. • Apply engineering solutions (e.g., raising opening of inspection pit). • Procure sludge-sucking machines that can enter narrow lanes. • Prevent industrial effluents from entering nallahs. • Erect fences to prevent children from falling into nallahs.

[1] Surface stream or channel that carries storm and wastewater and sometimes serves as an open drain.

Topic	Key Issues	Community Recommendations
Water source	• Narmada River water not reaching all residents. • Local contamination in Narmada water. • Contaminated aquifers. • Water scarce in summer.	• Conduct community mapping of local infrastructure and mark roads to denote water pipes to prevent accidental damage while digging. • Test Narmada and bore-well water in slums to see if local treatment methods are sufficient. • Harvest rainwater and recharge groundwater.
Fuel use	• Ujjwala Scheme not well known. • Popular use of biofuels like wood and charcoal, especially for heating water.	• Generate awareness.
Maternal health, pregnant women, and menstrual hygiene	• Relatively young age of first-time mothers. • Anganwadis poorly designed. • Anganwadi workers overworked. • Not enough accredited social health activists (ASHAs). • Preference for larger government hospitals.	• Generate awareness. • Develop guidelines for proper Anganwadi structures. • Review responsibilities of Anganwadi workers. • Review ASHA recruitment criteria.
Vaccination and child health	• Lack of awareness of Anganwadi supplementary nutrition scheme. • Poor hygiene practices.	• Generate awareness
Access to health care	• Widespread water- and vector-borne and skin diseases. • Misconceptions about treatment methods. • Lack of awareness about Pradhan Mantri Jan Arogya Yojana (PMJAY). • Preference for larger government hospitals to smaller ones.	• Collect community data and maintain database to facilitate efficient policy decisions. • Provide door-to-door services based on community health database—PMJAY registration, treatment, and counselling for seasonal disease hotspots. • Conduct survey to understand relative preference of different government hospitals.
Addiction	• Substance abuse among children.	• Make addiction a citywide priority. • Ban related products from shops.

The nallahs (drains) were a source of multiple problems and were assigned considerable importance by community members. Although solid waste was managed by the Indore municipality, interviewees said that liquid waste and sludge from inspection pits was neglected, which exacerbated the poor slum environment considerably. While most

places had water piped from the Narmada River, its availability was limited and erratic in some areas. Contamination from industrial waste and leaking sewer pipes above the water pipes were also problems. Suggestions for improvement included community participation, including community mapping, in the Water and Sanitation Plan of Indore will improve upkeep of the infrastructure lines.

In general, there was a lack of community-level feedback on the various health schemes. The study found that most people preferred bigger government hospitals to smaller ones; skin and water-borne diseases were common in all settlements; and there was widespread confusion about the eligibility and registration process for the PMJAY, the health insurance scheme for poor and vulnerable families. Greater awareness-raising on health may be needed in these and similar communities.

Slum rehabilitation plans and policies lacked detail. Collective funding and maintenance of infrastructure in these communities needs to be strengthened.

Anganwadi centers, run by the Integrated and Child Development Services Department of the Indian government, provide pre-school education and nutritional supplements. Anganwadi workers, ASHAs, and auxiliary nurse midwives are ground-level health workers. According to respondents, Anganwadi workers were overburdened with administrative tasks and neglected their teaching duties. Respondents also reported a shortage of ASHAs, and suggested that raising the age limit might allow for hiring additional workers.

Based on these findings, we have compiled an early set of recommendations, to be confirmed and/or refined as we complete the remainder of this participatory study:

- Address nallah issues.
- Include liquid waste in Waste Management Protocol.
- Improve access to clean water.
- Strengthen the Water and Sanitation Plan through community participation.
- Maintain a community –level health database.
- Provide a detailed policy for slum rehabilitation.
- Review Anganwadi and ASHA programs.
- Position addiction as a part of citywide education and health efforts.

The next step for BHC is a quantitative survey, including in-depth research on government programs, facilities, and services related to health, to complement and expand upon the findings of this qualitative study. To complete this process, community members will be trained on advocacy techniques to help them to continue to advance these issues with their local officials in an effective way, when BHC ends.

INTRODUCTION

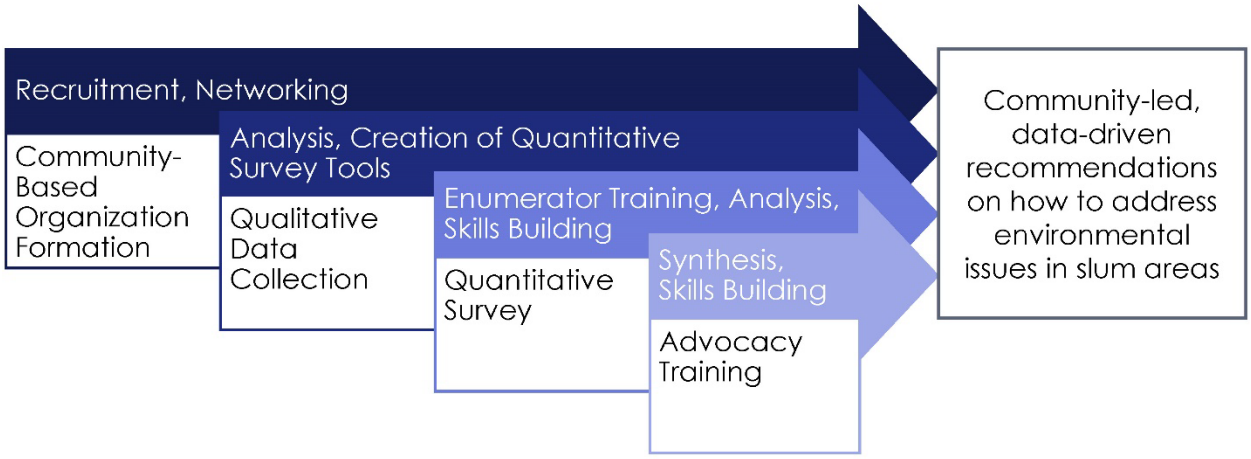
The Building Healthy Cities (BHC) project is funded by the United States Agency for International Development (USAID) and is implemented in Indore City by John Snow India Private Limited and JSI Research & Training Institute, Inc. (JSI). BHC engages with sectors that contribute, directly or indirectly, to citizens' health (particularly women's and children's health) and quality of life. This multi-sector engagement, the first core value of BHC, aims to provide all municipal sectors a common understanding of how they contribute to health. In Indore these sectors include:

- Health
- Women & Child Development
- Urban Planning & Development
- Information & Communications
- Education
- Water & Sanitation
- Waste Management
- Environment & Natural Resources
- Pollution Control Board
- Nutrition & Food Safety

The second BHC core value is to strengthen community engagement in municipal decision-making. Specifically, BHC is dedicated to building community awareness and capacity to convince decision-makers to improve the quality of and access to services and information. BHC's third core value is supporting use of data for planning and decision-making. Informed by these three core values, the project is working to improve healthy urban planning.

One BHC project initiative is to increase community and nongovernment organization participation in the planning, implementation, and monitoring of public programs related to the social determinants of health (e.g., environment, urban planning, water and sanitation, education). The goal of the activity is to strengthen civic involvement of urban poor and marginalized people, including women and children, in Indore.

Figure 1. BHC Indore Participatory Research Study Phases



This report summarizes findings from the first step of this project activity, which was a qualitative study of infrastructure and services related to environmental health in eight communities, including slum and non-slum areas in Indore. As shown in Figure 1, a quantitative survey will be conducted as the next phase of this activity. As a final step, BHC will support advocacy training for community members to share these findings directly with relevant city officials.

BACKGROUND

Indore, with a population of just under 3 million, is the largest city in Madhya Pradesh, and is the state's commercial capital (Macrotrends 2019). It is also a Smart City. While definitions vary by country, Smart Cities in general leverage information and communication technology and the built environment to improve citizens' lives with activities that cut across sectors (Pomeroy-Stevens et al. 2018).

Indore has a long tradition as a location for policy study and experimentation of service delivery strategies. Unusual for an Indian city of its size, Indore has extensive water and sewerage-system coverage. Toilets are also common in Indore, although open defecation remains a problem in some areas. Indore has a widely acclaimed solid waste collection system, and since 2017 has been named the cleanest city in India by the national "Swachh Bharat" ("Clean India") campaign. The city has experienced improvements in air, noise, and water pollution, but concerning environmental risk factors for disease remain (Borkhade 2016). Thus, Indore is seen as having the institutional capacity for continued improvement.

Indore also has a significant slum population, about 30 percent of the total population, or about 838,977 residents (KPMG 2017). There are 646 slums present in the city, of which 599 are notified. The total area of slums combined is 20.35 sq.km, which takes up 8 percent of the total area designated under the Indore Municipal Corporation (Indore Municipal Corporation 2015).

The overall characteristics of slums of Indore per the Indore Development Plan 2021 are (Directorate of Town and Country Planning, Madhya Pradesh 2008):

- Location: Mainly located on river banks, now converted to nallahs.
- Committees: Many of these slums have self-help groups, neighborhood development committees, savings and credit groups, youth clubs, and women's groups due to sustained development efforts.
- Community centers: 119 slums have community centers, which were built under the Indore Habitat Improvement Project.
- Infrastructure: 175 slums, included under the Habitat Improvement Project, have piped sanitation, asphalt roads, piped water supply, and community toilets. However, half of the slum population does not have toilet facility and about a fourth accesses public toilets.
- Working women: 45.6 percent of women in these vulnerable sections work. This is quite high compared to non-slum areas.
- Education: Male and female literacy rates in the slums are 46 percent and 20 percent respectively.

These slums have a diversity of infrastructure, resources, tenancy, and other characteristics. This study was developed to gain a better sense of some of the common environmental health problems across these contexts.

METHODOLOGY

The Centre for Urban and Regional Excellence (CURE) was contracted to support this participatory research study, which involved community members and organizations in the collection, analysis, consensus, and confirmation of results. A grounded theory approach was used to define the methods and develop the semi-structured tools used for the focus group discussions (FGDs). BHC and CURE purposely left the scope of environmental health wide, to allow for community members to bring up issues the team may not have been aware of prior to this study.

Eight urban poor communities (slum and non-slum settlements)[2] were selected for this study based on their various characteristics, including livelihoods, social behavior, environmental conditions, and infrastructure scores from a desk review that CURE conducted. These eight settlements cover approximately 3,366 households. Table 2 lists the selected communities and their characteristics.

Table 2. Details of Selected Communities

Category	Name	Location	Characteristics	# of FGDs
Slum	Rahul Gandhi Nagar	Near Dewas Naka	Near industrial area, poor infrastructure, poor lifestyle	3
Slum	Narwal, Sanwer Road	Center of Sanwer industrial area	Along the nallah,* poor infrastructure	3
Slum	Amar Tekri Slum	Near Patnipura	Near nallah, poor infrastructure	4
Slum	Sikandarabad Colony	Near Kila Maidan Road, Sadar Bazaar	Part of journey mapping area demarcated by JSI, along the nallah, poor infrastructure	5
Slum	Kadav Ghat Basti	Near Silawatpura, Chhatri Bagh	Poor infrastructure, cleanliness issues, poor lifestyle, along Saraswati River	4
Non-Slum	Affordable Housing Society	Lal Bagh Road	Rehabilitated households of Arjunpura slums	4
Slum	Luniya Pura Slum	Gadi Adda, Near Sarwate Bus Stand	Near railway track, poor infrastructure, poor lifestyle	4
Slum	West Indira Ekta Nagar	Near Musakhedi, Eastern Ring Road	Behind nallah, poor infrastructure, dilapidated structures	4

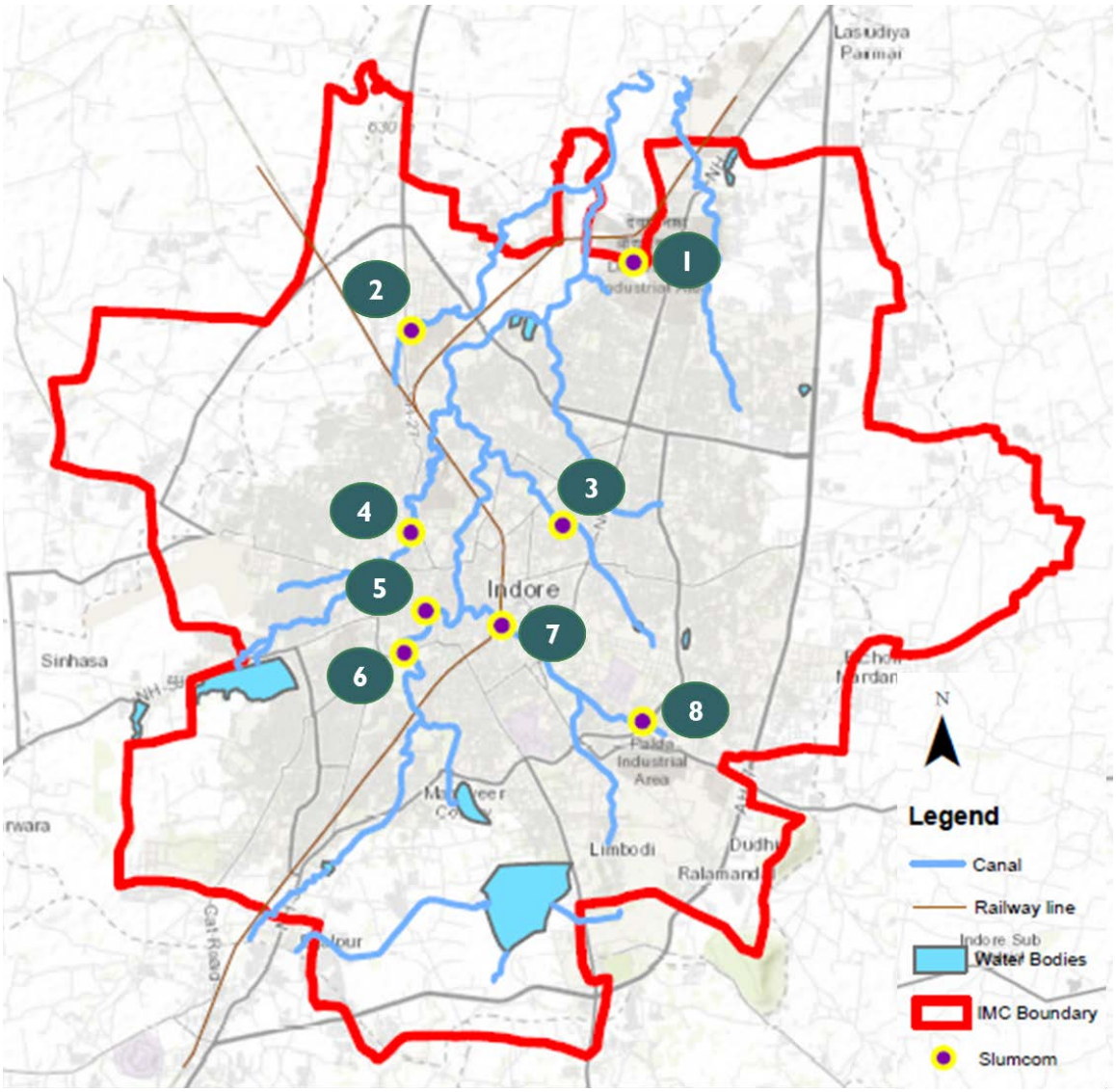
* Surface stream or channel that carries storm and wastewater and sometimes serves as an open drain.

[2]This study uses the Census of India definition of "slum" (Office of the Registrar General & Census Commissioner, India 2013): "All notified areas in a town or city notified as 'Slum' by State, Union territories Administration or Local Government under any Act including a 'Slum Act;' (ii) All areas recognized as 'Slum' by State, Union territories Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act; (iii) A compact area of at least 300 population or about 60–70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities."

A total of 31 FGDs were completed, in addition to a transect walk to document the physical environment, community-based organization formation and trainings on participatory research methods, and mapping exercises in each community between November 2019 and January 2020.

The locations of these eight slums are indicated in the geo-located map in Figure 2.

Figure 2. Location of Selected Slums



Source: CURE Baseline Study and GIS Mapping.

Map No.	Slum Name	Map No.	Slum Name
1	Rahul Gandhi Nagar	5	Kadav Ghat Basti
2	Narwal, Sanwer Road	6	Affordable Housing Society
3	Amar Tekri Slum	7	Luniya Pura Slum
4	Sikandarabad Colony	8	West Indira Ekta Nagar

RESULTS

The results from the qualitative study found that the biggest environmental health concerns focused on water access and wastewater management, sanitation, and lack of policy regulations and enforcement. The latter are specific relating to various environmental and health schemes aimed at low income households. The detailed results of the study are described below, arranged by sector.

General Demographics

Across the eight sampled neighborhoods, the average age of the neighborhood was about 50 years; the oldest were 100 years old, and the newest was the affordable housing project, which was converted from a slum 13 years ago.

The average physical area they covered was 3 hectares (range of 1-4), with an average population density of 850 people (341–1,887) per hectare. This compares to the average population density across Indore of 131, suggesting very high density in these neighborhoods (Goel and Mohan 2020).

The surrounding areas were a mix of industry, residential, commercial, with one slum bordering agriculture land as well. All neighborhoods were considered tenable[3]. Most households had door-to-door waste collection and access to toilets, and all neighborhoods had at least one Anganwadi center—the average was two; the neighborhood with the highest population density had three.

Those living in these areas were a split of majority schedule caste[4], schedule tribe, Muslim, and Hindi, with one slum also housing those of "backward castes.[5]" Most were informally employed (e.g., daily wage earners, contract laborers, factory workers, green grocers, auto drivers, scrap dealers, carpenters, delivery boys, domestic helpers).

Sanitation, Drainage, and Solid Waste

Choked inspection chambers

Although sewer lines were present in all slums, choked and overflowing inspection pits were common. The narrow lanes of slums like Amar Tekri and Kadav Ghat Basti prevented entry of ordinary de-sludging vehicles, and the inspection chambers (many of which have

> *"Sanitation workers just leave the sludge pulled out from inspection chambers on the streets…these lie stinking…becoming a breeding ground for flies…"*
> *— Resident, Amar Tekri, December 2019*

[3] Tenable slums are slums which are not located on hazardous locations and are suitable for human habitation. Additionally, the land is not earmarked for any major public utilities and/or facilities or for green space under the Master Development Plan.
[4] Officially designated groups of people in India, traditionally from lower castes.
[5] Collective term used by the Government of India for those castes which are disadvantaged.

broken covers, causing accidents) could be cleaned only by sanitation workers. These workers usually left the pulled-out sludge lying on the streets because removing it was not part of their duty. Solid waste collection vehicles also refused to take it because it was a mix of organic and non-organic waste, so residents had to hire someone to take it away. Locals called for this gap in waste-removal protocols to be filled by the municipality. They also suggested procurement of vehicles capable of entering the narrow lanes.

Open defecation

Open defecation was a relatively rare problem in the slums of Indore, but those residing in serviced apartments of the rehabilitated slum settlement still practiced it in the adjacent open grounds. Residents said it was because of the large household sizes and the difficulty of carrying water up from the ground floor—the building blocks did not have overhead tanks.

Problematic nallahs

Nallahs were mentioned as a regular source of disease and breeding grounds for mosquitoes. The nearby industries released effluents in the nallahs, contaminating water and damaging underground aquifers. In monsoons, the nallahs typically flooded the neighboring slums, roads, and houses, bringing in dirt and sludge and leading to skin disease and other complications. In the summer, nallahs became dry beds that also spread disease. The residents expressed dissatisfaction with the associated filth and ever-present stench. The municipality has organized a cleaning before monsoons to prevent overflow of the channels, but this has not been enough. The residents suggested better measures such as construction of walls and fences to prevent children from falling in.

Frequent waterlogging

Waterlogging, when water collects in low-lying areas and does not drain, persisted in most slums during monsoons, and year-round in all but two

slums. This was mainly due to overflowing inspection chambers in the low-lying areas, but in one slum was due to excavation done as part of a Smart City project. Open drains tended to clog with solid waste and overflow. Low-lying lanes were also prone to flooding.

Missing the solid waste collection vehicle

A problem in slums was that the solid waste collection vehicle could not enter the narrow alleys of the slums (although sweepers did enter one neighborhood). Another problem was that the music (used by collection vehicles to alert residents to their presence) was often not clearly audible within the lanes of the slum, so residents often missed the vehicle and dumped solid waste elsewhere, such as in adjoining nallahs or a field. Residents of one community stated that the vehicles did not collect excess garbage, which may have been because they served a large area.

Low awareness of 311 app

The 311 app, a grievance redressal system that allows people to submit complaints and concerns to the city, was not well known. Some respondents claimed to have temporary service provided to them through the 311 app, but permanent solutions to problems like overflowing inspection pits were not reached. People usually made complaints to the councilor.

Water Source

Limited Narmada River water distribution

All the slums were connected to Narmada River water pipes, but not all households had direct access: one neighborhood was connected to Narmada water pipes, but did not receive water from them. A similar situation was prevalent in another slum, where Narmada pipelines yielded contaminated water. In the slums next to industry and nallahs, the water from bore-wells (deep groundwater wells that use motorized pumps to pull water from the water table) was contaminated with industrial effluents. In the other slums, the water from Narmada usually appeared dirty at first and cleared after a few minutes. According to dwellers of some slums, the dirt was due to backflow from the individual collection pits. Respondents in one area said that people constructed toilets on top of the Narmada line, contaminating the water.

Non-scientifically tested water treatment methods

During monsoon, water quality decreased and diseases like diarrhea and typhoid were common. Respondents reported using bleaching powder, chlorine, and commercially available solutions to treat water. In two slums, people reported using alum to remove the impurities mixed in the Narmada water.

Respondents mentioned using well-water for secondary purposes like washing. In two slums, wells were in use but the water was slightly turbid, and some private wells were maintained with techniques like adding chlorine every year.

Widespread use of bore-wells

Although all the slums used Narmada water for drinking, they also used bore-wells. There were reports of getting kidney stones from drinking the bore-well water. One slum had a reverse osmosis filtration plant to purify bore-well water. Bore-well water and tankers were the sole sources of drinking water for another slum.

Water sources in Luniya Pura.
Photo: CURE, 2019

Water scarcity in summer

Slum dwellers depended on tankers for water, the delivery of which was unreliable and often only after multiple complaints to authorities. In one instance, water was procured with permission from nearby mill owners because tankers did not come to that slum. In two slums, water from the tanker was not potable.

Fuel Use

Limited awareness of Ujjwala Scheme

Few people were aware of Ujjwala, a government scheme to provide liquefied petroleum gas (LPG) cylinders to new subscribers, and others had not availed it because of complications in the application process.

Common use of secondary fuels

The vast majority of families had an LPG connection. However, when a family ran out of LPG to cook, it typically turned to wood, cow-dung cakes, or cylinders borrowed from neighbors. Water was commonly heated over a wood fire.

Wood fire in Amar Tekri.
Photo: CURE, 2019

Maternal Health, Pregnant Women, and Menstrual Hygiene

Young first-time mothers

A group discussion in one neighborhood brought up the issue of the relative youth (as young as 16) of first-time mothers, while the rest of the neighborhoods reported that most mothers were above 18. The study team will need to explore this further in the quantitative survey. .

Infrastructure and other problems at Anganwadi centers

> *"Anganwadi workers are overburdened with extra tasks. Protocols are more complicated now; that's why they barely get time to teach..."*
> *— Resident, Kadav Ghat, December 2019*

Anganwadi facilities (which provide services to mothers and children) seemed to be present in every slum, but awareness of their availability varied. Problems reported at Anganwadis included no working toilet; not yet operational; inappropriate layout; and no water in the toilets. Residents of one slum said that supplements for pregnant women were not available in the Anganwadi. In another area, residents noted that the third meal was not served to malnourished children and awareness of nutritional requirements for pregnant women was scant. Newcomers to one slum who rented their houses were often excluded from Anganwadi services (as opposed to home owners).

Limited ASHA availability

Accredited social health activists (ASHAs) were often assigned to larger areas than they could cover. In two slums, respondents said that they had not seen any ASHAs, while one more reported very limited availability of ASHAs.

Low awareness of government schemes and policies

More awareness of government-related schemes like ASHAs, auxiliary nurse midwives (ANMs), Janani Suraksha Yojana, and Pradhan Mantri Matru Vandana Yojana was clearly necessary. Sometimes people could not access benefits because they did not have bank accounts or had problems with their documents. Residents said that Matru Vandana applicants received the benefits after a long wait.

Preference for bigger government hospitals for childbirth

Women in three of the slums reported that it was most common to go to government hospitals for childbirth. In one neighborhood that was far from these facilities but had a health center for delivery within five kilometers, women chose to make the trip to the hospital instead. This same issue was noted in another slum, where residents avoided the nearby primary health center, preferring to travel to government hospitals despite complaints about poor treatment at Malharganj Hospital, from which newborns and

mothers were released within three hours of birth and where three newborns had died in the last year. Further research is needed to understand the reasons for these choices.

Vaccination and Child Health

Varied vaccination locations

Vaccination at Anganwadis was common, but detailed knowledge of vaccination among mothers and fathers was lacking. Some respondents took their children to public and private hospitals for vaccination. Vaccination was reportedly conducted weekly or monthly.

Low awareness of Anganwadi food packets

Food packets for children up to five years of age were available in Anganwadis but few people opted for them. Previous BHC research found that these packets were unpalatable. The study team noticed many children were stunted, and BHC will be following up with a survey of under-5 nutrition in the second phase of this study.

Range in school food quality

The quality of midday meals was variously reported to be satisfactory and unsatisfactory. However, it was reported that they were always served in schools (this is backed up by Education Department data showing 100% of government middle and high schools provided mid-day meals).

Poor hygiene practices

Hygiene practices of children appeared to be a problem. Slum dwellers reported washing hands before eating, during cooking, and after defecation. However, small children were seen eating snacks and fruits that fell on the street while the study team visited.

Access to Health Care

Widespread water- and vector-borne and skin diseases

Diarrhea, typhoid, jaundice, malaria, dengue, chikungunya, chicken pox, and viral fever were reportedly common, as were mosquito- and water-borne illnesses. There appeared to be a proliferation of skin disease in all the slums. Further data on prevalence will be collected during the quantitative survey in phase 2 of this study.

Use of allopathic doctors and treatment misconceptions

Residents reported visiting allopathic doctors, and some went to doctors without proper qualification. There was deep faith in saline drip, which seemed to be a standard treatment choice for a wide range of illnesses.

Low awareness of government health facilities and schemes

Often, slum communities were unaware of nearby government dispensaries. Residents of one slum expressed confidence in the government health center (Mangilal Churiya). Most preferred private hospitals because of the long waiting time at government hospitals, but government hospitals were still preferred over the community health centers and some health clinics. Pradhan Mantri Jan Arogya Yojana scheme was not well known or used.

Animal Care

Effective animal feces removal

There was a system in place to dispose of animal feces. Horse feces were usually taken to farmhouses. Feces from other domestic animals were removed by collection vehicles.

Disease risk from stray and domestic animals

Pigs and dogs were observed freely roaming and entering the slums. The residents did not have much knowledge of animal vaccinations. Some dogs were observed drinking out of open wells.

Pollution and Living Conditions

Water pollution

A stench emanated from the neighboring canals in many areas. Dirty water was reported to contaminate drinking water and cause skin ailments. Slum dwellers repeatedly expressed the desire for a playing area for children to prevent them from playing in dangerous areas, like near drains and nallahs. As noted, industrial-adjacent slums reported water contamination from these businesses.

Air pollution

All but one of the eight slums reported asthma and other breathing problems. Some even reported headaches and vomiting from the stench from waste in the neighborhood. The residents of one slum dealt in scrap wood, and there was a lot of dust as a result. The study team observed wood scraps lying around. Surprisingly those living near industrial areas did not have specific complaints about air pollution due to industry; most of their complaints related to water pollution.

Housing

Another significant problem was construction techniques in slum rehabilitation colonies. The lack of coping on parapets in one area resulted in damp walls, while other areas suffered from roof leaks. The study team also observed inadequate ventilation in some households.

Addiction

Pervasive addiction issues

Addiction was reported in all the slums, including among children. While intoxication was not a problem among children in one area, in another area residents mentioned that young boys bought small bottles of alcohol. Intoxication among adults was also a problem in several areas.

Residents pointed out that children often begged for money or did small chores for local shops to buy whiteners or glue, which they used as intoxicants. Some respondents also said that when children were not allowed in schools or barred from midday meals due to late arrival, some ended up using substances to pass the time. The respondents generally expressed concern about the effects of drugs on family stability and domestic wellbeing.

RECOMMENDATIONS

While the final recommendations for how to address these issues will be made by the communities themselves after all phases of this participatory research is complete, BHC has tried to summarize their early suggestions based only on the qualitative work here. We have also identified where Indore Smart City Development Limited's (ISCDL) Smart City initiatives may be most readily able to engage.

Address Nallah Issues

A robust mechanism needs to be put into place to fix issues related to the nallahs. Slums next to nallahs face problems like waterlogging and mosquito-borne diseases. Slums that are near industrial areas also dealt with industrial waste in the nallahs. A prohibition on industrial waste dumping in the nallahs must be enforced and support for industrial waste-treatment plants extended.

Every monsoon, there is flooding in the low-lying slums and the nallahs. This surplus water should be stored and treated through rainwater harvesting and groundwater recharge. Rainwater harvesting is a universally accepted solution to augment and repair the underground aquifers, which will ameliorate water scarcity in peak summer. Rainwater harvesting may also be preferable to groundwater recharging because the aquifers are contaminated.

Fences and boundary walls should be erected to prevent children from falling into nallahs. Low-lying

Nallah at Indira Ekta Nagar. Outlets from toilets and industry pollute these water bodies.
Photo: CURE, 2019.

lanes prone to flooding can be improved (e.g., raising the street level or installing drains below the street) with help from engineers and municipal and private industry funding.

Smart City convergence: Under ISCDL's area-based development scheme, riverfront development of the Kahn River has begun and is a first step in fixing issues related to the nallahs. While the Smart City proposals are in process, temporary protective measures like fences along nallahs should be set up. In addition, decentralized wastewater treatment plants have been proposed under Smart City to prevent wastewater from polluting water sources. These plants should cover industrial effluents as well.

Include Liquid Waste in Waste Management Protocol

Protocols should be established for who removes the sludge extracted from choked inspection pits, which is currently left lying on the street. Conventional de-sludging vehicles cannot enter the slum lanes.

Suggestions to improve choked and overflowing inspection chambers and open drains include engineering solutions like raising the opening of inspection chambers and deepening/widening open drains.

Smart City convergence: Automated street-sweeping vehicles were under procurement by ISCDL as of the writing of this report. Suitable de-sludging vehicles should also be procured.

Inspection chambers often overflow.
Photo: CURE, 2019.

Improve Access to Clean Water

Water in slums near industries and nallahs should be tested to determine if localized treatment processes (mixing alum, using chlorine, and locally available solutions) are sufficient to make the water safe for drinking. Laid-out pipes should be marked on roads/pavement by paint or other indicators to prevent people from digging those areas and damaging the pipes. To this end, community infrastructure mapping would improve local knowledge of service delivery and infrastructural layout.

Authorities should arrange for Narmada water in all slums to be tested for chemical composition to deduce sources of local contamination, and frame guidelines to bring the quality up to potable standards. Water tests must be conducted on bore-well water

Marking infrastructure lines on the road.
Photo: CURE, 2019.

as well, since previous studies indicated that groundwater was contaminated by industrial effluents and polluted nallahs (Shivhare et al. 2017). Authorities should also arrange for bore-well water to be tested to determine if relatively cheap treatment processes can make them usable in times of crisis.

Smart City convergence: The original Smart City proposal mentions augmentation of the water pipeline distribution network. In the process of laying such pipes, clear maps should be developed and the pipe network marked on the road for maintenance.

Strengthen the Water and Sanitation Plan through Community Participation

To tie up the loose ends of its water and sanitation infrastructure delivery system, Indore needs to strengthen its water and sanitation plan through the measures listed above.

Smart City convergence: To BHC's knowledge, no Smart City activities are currently focused on this issue. Responsibility may lie with Indore Municipal Commission or another body to enforce such a plan.

Maintain a Community-level Health Database

Community-led data collection is needed to form and maintain a citywide public and community health database. Such a database can influence government decisions and spending patterns by indicating, for example, inhabitants' preference for particular primary health centers and other government hospitals. Doorstep delivery of services like registration of documents and counselling on widespread or seasonal disease can also be planned using information from such a database. Community-led data collection will also inform efforts to improve awareness of government health-related schemes, healthy practices, and good nutrition. Applications such as ANM online and ICDS-Common Application Software have already been launched by the Ministry of Health and Family Welfare and Ministry of Women and Child Development respectively for front line workers (FLWs) as a step toward digitalization of health and nutrition registers. Community data are supposed to be collected and fed into the apps to improve accuracy and delivery of services, but their use is still limited, largely because FLWs are not trained to use the apps.

Smart City convergence: At present, the 311 app is used for grievance redressal. The citywide health database could evolve to be app-based.

Provide a Detailed Policy for Slum Rehabilitation

The rehabilitated colony at Lalbagh (Arjunpura) has not invested in overhead water tanks, making access to water difficult for those living on higher floors. Community housing groups should be formed to direct spending and maintain basic services.

The water access problem is related to sanitation as well, since larger families practice open defecation. Slum rehabilitation authorities should look into ending this practice in future projects, for example by building community toilets.

The construction of slum housing is also faulty in some places, as in the noted lack of parapets on the roof, which results in percolation of water into the walls.

Smart City convergence: Slum housing has been proposed under Retrofitting and Redevelopment Area-based Development (ISCDL 2020). This housing should be constructed with this study's findings in mind.

Review Anganwadi and ASHA Programs

In workshops and meetings, slum inhabitants said that some Anganwadis are poorly designed. These should be inspected and design guidelines developed according to ground-level feedback. Slum inhabitants also noticed that Anganwadi workers have become overburdened by administrative tasks, leaving them little time to teach children. Anganwadi workers' responsibilities therefore need to be reviewed.

Citizens suggested that age recruitment criteria for ASHAs be extended to include women who are older, because they are more likely to have grown children and thus more free time than young women with children.

Smart City convergence: To BHC's knowledge, no Smart City activities are currently focused on this issue. Responsibilities may lie with the local offices of Health and Family Welfare and Women and Child Development, however ISCDL may be a good partner for any the ICT solutions to reduce workload for these cadres.

Position Addiction as a Part of Citywide Education and Health Efforts

Addiction mitigation must be a citywide effort. This widespread and entrenched problem requires government policy and funding and community collaboration to take actions such as barring particular products from shops, preventing sale of addictive substances to children, and educating the public about addiction.

The Cigarettes and Other Tobacco Products Act prohibits sale of any tobacco product within a 100-meter radius of a school. BHC is implementing a comprehensive Health Promoting Schools program in 148 middle, high, and higher secondary government schools of the city. As part of this program, BHC assessed physical and social environments of the participating schools using the WHO's guidelines. BHC found that only three of every 10 (29 percent) schools had a tobacco-free policy or strategy to phase out smoking and tobacco chewing on the premises and within a 100-meter radius. Few schools (13 percent) had an action plan to eliminate alcohol and illicit drugs in and around school premises and in all school activities. These results indicate the importance of city enforcement of existing regulations and collaboration with schools and health centers to find systemic solutions to this problem.

Smart City convergence: While an expert panel should be convened, this level of critical depth is beyond the scope of the study.

CONCLUSION

These initial findings can guide further data collection and immediate city funding decisions to mitigate pressing environmental health issues in Indore's slum areas. Strengthening community-based organizations and advocacy networks in these communities and similar areas across Indore can improve bottom-up, demand-driven city planning, and improve the equity of access to health services and healthy environments, leading to a healthier Indore for all.

REFERENCES

Borkhade, Kunal. 2016. “Indore Tops in MP Air Pollution Ranking.” *Hindustan Times*, November 3, 2016, Indore Edition. http://www.hindustantimes.com/indore/indore-tops-in-mp-air-pollution-ranking/story-HcPgxNnpAC4jnZXE7tS65O.html.

Directorate of Town and Country Planning, Madhya Pradesh. 2008. "Indore Development Plan 2021." Bhopal, India: Directorate of Town and Country Planning, Madhya Pradesh.

Goel, Rahul, and Dinesh Mohan. 2020. “Investigating the Association between Population Density and Travel Patterns in Indian Cities—An Analysis of 2011 Census Data.” *Cities (London, England)* 100 (May). https://doi.org/10.1016/j.cities.2020.102656.

Indore Municipal Corporation. 2015. "Housing for All Plan of Action." Indore, India: Indore Municipal Corporation.

Indore Smart City Development Limited. 2020. “Redevelopment.” Smart City Indore. https://www.smartcityindore.org/redevelopment/.

KPMG. 2017. “Smart City Indore - Health Initiatives.” Workshop Report. Indore, India: KPMG Advisory Services Private Limited. KPMG.com/in.

Macrotrends. 2019. “Indore, India Metro Area Population 1950-2020.” https://www.macrotrends.net/cities/21278/indore/population.

Office of the Registrar General & Census Commissioner, India. 2013. “Primary Census Abstract for Slum.” New Delhi, India: Office of the Registrar General & Census Commissioner. https://www.censusindia.gov.in/2011-Documents/Slum-26-09-13.pdf.

Pomeroy-Stevens, Amanda, Monica Biradavolu, Damodar Bachani, Fareed Uddin, and Neha Yadav. 2018. “Building Healthy Cities Indore Health Needs Assessment.” Arlington, VA: Building Healthy Cities (BHC) Project. https://www.jsi.com/resource/building-healthy-cities-indore-health-needs-assessment/.

Shivhare, Niharika, Shifa Khan, Naman Patel, Akshay Joshi, and Babita Dutt. 2017. “Effect of Nallahs on Groundwater in Indore City.” *International Journal of Engineering Sciences & Research Technology* 6 (5): 432–44. https://doi.org/10.5281/ZENODO.573531.

JSI RESEARCH & TRAINING INSTITUTE, INC.
2733 Crystal Drive
4th Floor
Arlington, VA 22202
USA
Phone: 703-528-7474
Fax: 703-528-7480
Web: www.jsi.com

JOHN SNOW INDIA PRIVATE LIMITED
Plot No. 5 & 6, Local Shopping Complex
Nelson Mandela Marg (near post office)
Vasant Kunj
New Delhi 110070
India
Phone: +91 11 4868 5050