E-ISSN 3048-0329 Vol. 2, Issue 4 (2025)
Doi: https://doi.org/10.37899/mjds.v2i4.226

Mahogany Journal De Social

Urban Informal Settlements and Access to Public Services: A Case Study of Surabaya

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Article Info

Article History:
Received: 18 September 2025
Revised: 17 November 2025
Accepted: 9 December 2025

Keywords:
Informal Settlements
Public Services
Surabaya

Abstract

Urban informal settlements remain one of the most pressing challenges for rapidly growing cities in the Global South, where the expansion of population is not always matched by equitable access to essential services. This study examines the conditions of informal settlements in Surabaya, Indonesia, focusing on how residents access basic public services such as water, sanitation, health care, education, and transportation. A mixed-methods approach was employed, combining household surveys, in-depth interviews, and spatial mapping to capture both quantitative and qualitative dimensions of service provision. The findings reveal persistent inequalities: while electricity and basic education are relatively more accessible due to government programs, services such as clean water, sanitation, and affordable health care remain limited and unevenly distributed. Spatial analysis further shows that most public facilities are concentrated in formal neighborhoods, forcing informal settlement residents to rely on costly or unsafe alternatives. Households also bear a disproportionately high financial burden, as a large share of their income is spent on transportation and education, reinforcing cycles of poverty. Despite these constraints, communities demonstrate resilience through collective strategies, including neighborhood cooperation and partnerships with NGOs, although these measures remain insufficient to address structural exclusion. The study underscores the importance of inclusive urban governance that recognizes informal settlements as integral to the city, calling for targeted investments and policies that promote equity in service delivery.

INTRODUCTION

Urbanization has become one of the most transformative processes of the twenty-first century, shaping not only the dynamism of national economies but also the everyday realities of inequality in cities. The rapid pace of migration to urban centers in the Global South has created a double-edged situation. On one hand, cities provide opportunities for employment, education, and social mobility. On the other, they reproduce patterns of exclusion where the urban poor are unable to fully access the benefits of development (Ferdian & Wikarta, 2023; Galbi et al., 2021). This exclusion

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is most visible in the growth of informal settlements, where residents live with insecure tenure, limited infrastructure, and restricted access to essential public services (UN-Habitat, 2020; Suhartini & Jones, 2023). These communities highlight the paradox of urban growth in which prosperity and marginalization unfold side by side.

The situation is particularly pronounced in Southeast Asia, where decades of rural-to-urban migration have intensified pressures on housing and infrastructure (Selod et al., 2021; Spencer, 2022). Cities in Indonesia, the Philippines, and Vietnam illustrate how informal neighborhoods have expanded into environmentally precarious areas such as floodplains, riverbanks, and unused industrial land (Nguyen et al., 2020; Firman, 2016). These locations are often bypassed by government investments, leaving residents dependent on informal service provision. Comparative studies in Manila and Bangkok have shown that the barriers faced by informal settlements are not simply products of poverty but also outcomes of planning systems that deliberately exclude informal areas (Rigg et al., 2021; Nicoletti et al., 2022). The resulting vulnerabilities whether lack of clean water, sanitation, or healthcare become structural features of urban life, reproduced across generations.

In Indonesia, these dynamics intersect with the historical presence of *kampung kota*, densely populated settlements that have long been integral to urban life yet marginalized in terms of planning and service delivery. Cities such as Jakarta, Bandung, and Surabaya reveal how informal settlements coexist with ambitious urban modernization projects (Bayu Anindito et al., 2019; Kusno, 2013). Surabaya, in particular, presents an intriguing case. The city has been praised for governance innovations, participatory upgrading projects, and environmental management strategies (Silver, 2008; Wang et al., 2022; Bua & Bussu, 2023). However, beneath this narrative of progress, large disparities remain in access to water, sanitation, health, and education (Dewi & Santoso, 2022; Arieffiani & Ekowanti, 2024). Many informal neighborhoods rely on shared taps and poorly maintained communal latrines, while unstable electricity connections and costly transportation deepen the burden on households (Wulandari & Laksono, 2019; Hospital Utilization in Indonesia, 2022). These conditions highlight how uneven geographies of services persist despite the city's broader achievements.

The academic literature on Indonesian informal settlements has primarily focused on land tenure and housing, paying less attention to everyday struggles with public services (Siagian, 2021; Mesgar & Ramirez-Lovering, 2021; Tauran, 2021). Yet access to education, health, and mobility is not merely a matter of infrastructure but of social equity and citizenship (Setiawan & Nurbaya, 2020; Informal City, 2024). Case studies from Surabaya demonstrate how upgrading initiatives improve physical environments but often fail to transform institutional attitudes toward informal communities (Kooy & Bakker, 2008; Mesgar & Ramirez-Lovering, 2021). At the same time, community-based strategies such as mutual aid, neighborhood associations, and collaborations with NGOs show the resilience of residents, even as they remain insufficient substitutes for systemic reform (Dynamic Policy Network, 2023; Prayitno et al., 2021).

Against this backdrop, Surabaya offers a rich context to investigate how informal settlements navigate the unequal distribution of public services within a city that is otherwise recognized as progressive. This study addresses the gap by combining quantitative, qualitative, and spatial approaches to examine access to public services in Surabaya's informal settlements. It explores levels of service provision, the economic burden on households, the spatial distribution of facilities, and the coping strategies developed by communities. By situating these findings within debates on inclusive urban governance, the study not only documents inequality but also interrogates how informal settlements can be meaningfully integrated into the urban

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fabric. In doing so, it contributes to scholarly and policy discussions on how cities in Indonesia and across the Global South might achieve more equitable pathways to sustainable urban development.

METHODS

This study employed a mixed methods research design to examine patterns of access to public services in urban informal settlements in Surabaya. The integration of quantitative, qualitative, and spatial approaches was selected to capture both measurable inequalities and the lived experiences of residents. Mixed methods are widely recommended in urban studies because they enable researchers to simultaneously assess structural conditions and social processes shaping service access. Quantitative methods were used to measure levels of access, expenditure burdens, and spatial distances, while qualitative methods were applied to explore perceptions, coping strategies, and institutional barriers. Spatial analysis using Geographic Information Systems was incorporated to visualize the uneven distribution of public facilities across formal and informal urban areas. This triangulated design strengthened the analytical depth and enhanced the validity of the findings.

The research was conducted in several informal settlement clusters located in different parts of Surabaya. Site selection was carried out purposively based on three main criteria, namely high population density, limited basic infrastructure, and proximity to formal urban neighborhoods. These criteria were used to ensure that the selected sites reflected the typical characteristics of urban informality in Surabaya while also allowing comparison with nearby formal areas. The settlements represent riverbank communities, inner city kampung, and peri-urban informal zones that have developed outside formal planning regulations. The diversity of locations allowed the study to capture variations in service access influenced by spatial position and administrative recognition.

The target population of this study consisted of households residing in the selected informal settlement areas. Household representatives were chosen as the primary respondents for the quantitative survey because they were considered the most knowledgeable about access to water, sanitation, electricity, education, health care, and transportation. A total of 210 households participated in the survey. Respondents were selected through purposive sampling to ensure representation across different settlement clusters and socioeconomic conditions. In addition to household respondents, key informants were selected for the qualitative component, including community leaders, local government officials from relevant agencies, health workers, school administrators, and representatives of non-governmental organizations involved in service provision. These informants were selected based on their direct involvement in urban governance and community service delivery.

Data collection was carried out through three main techniques comprising structured household surveys, in-depth interviews and focus group discussions, and spatial mapping. The household survey instrument was designed to collect data on access to each category of public service, levels of adequacy, frequency of use, and household expenditure related to service acquisition. The questionnaire also captured basic socioeconomic characteristics including household size, income level, education of household head, and employment status. Prior to full deployment, the survey instrument was tested through a pilot survey with 20 households in a neighboring informal settlement to assess clarity, reliability, and internal consistency. Feedback from the pilot was used to refine several items related to expenditure reporting and service adequacy perception.

The qualitative data collection involved semi structured in-depth interviews with 20 key informants and three focus group discussions with community residents.

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Interviews explored residents' experiences in accessing services, perceived barriers, interactions with government agencies, and reliance on informal service providers. Focus group discussions were conducted to capture collective perspectives on daily service struggles, neighborhood cooperation, and mutual aid practices. Direct field observations were also carried out to document the physical condition of housing, water points, sanitation facilities, electricity connections, roads, and access routes to public facilities. Observation notes were used to complement interview data and to verify the consistency between reported access and actual field conditions.

Spatial data were collected through a combination of municipal secondary data and field based GPS mapping. Information on the location of health clinics, schools, public transport stops, markets, and water supply infrastructure was obtained from local government planning offices and updated through on-site verification. Geographic coordinates of informal settlement clusters were recorded using handheld GPS devices. These data were processed using GIS software to calculate distances between settlements and public facilities, generate service accessibility buffers, and produce spatial overlays comparing formal and informal areas. The spatial component enabled the visualization of physical exclusion that cannot be fully captured through surveys and interviews alone.

Quantitative data from the household survey were analyzed using descriptive statistical techniques to determine levels of adequate access, limited access, and no access for each service category. Frequency distributions, percentages, and mean values were calculated to summarise household conditions. To examine the relationship between socioeconomic characteristics and service access, regression analysis was applied, focusing on the influence of income, education, and employment status on the likelihood of having adequate access to services. Household expenditure data were analyzed to determine the proportion of monthly income allocated to water, electricity, transportation, health care, and education. These calculations formed the basis for evaluating the economic burden of service access among informal settlement residents.

Qualitative data from interviews and focus group discussions were analyzed using thematic analysis. All interviews were transcribed verbatim and coded manually. Initial open coding identified recurring concepts related to barriers to access, informal service arrangements, institutional exclusion, and community coping mechanisms. These codes were then grouped into broader thematic categories that reflected structural, economic, and social dimensions of service inequality. To enhance analytical rigor, the coding process was conducted iteratively, with constant comparison between interviews, focus group discussions, and observation notes. Discrepancies were discussed until thematic consistency was achieved.

RESULTS AND DISCUSSION

This section presents the empirical findings of the study based on household survey data, in-depth interviews, focus group discussions, and spatial analysis conducted in informal settlements across Surabaya. The results are organized to reflect patterns of access to public services, household economic burden, spatial accessibility to facilities, and community coping mechanisms. These findings are interpreted in relation to existing literature on urban informality, service inequality, and spatial exclusion in Indonesian and Southeast Asian cities.

Access to Basic Public Services in Informal Settlements

The survey and fieldwork conducted in informal settlements across Surabaya revealed significant disparities in access to public services. Out of the 210 household respondents, most had some form of access to electricity and education, while water,

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sanitation, and health care services remained uneven and often inadequate. The descriptive results are presented in Table 1.

Table 1. Access to Public Services in Informal Settlements of Surabaya (n=210)

Public Service	Adequate Access (%)	Limited Access (%)	No Access (%)	Notes
Clean Water Supply	58.6	32.9	8.5	Many households rely on communal taps or vendors
Sanitation Facilities	46.2	39.0	14.8	Shared latrines are common, with poor maintenance
Electricity	82.4	13.8	3.8	Informal connections and unstable supply persist
Health Care	41.0	44.3	14.7	Clinics are distant, informal midwives often used
Education (Primary & Secondary)	69.5	24.3	6.2	Distance to schools remains a challenge
Public Transportation	52.9	37.1	10.0	Accessibility varies, costs are burdensome

The household survey reveals substantial inequalities in access to basic public services among residents of informal settlements in Surabaya. As summarized in Table 1, electricity and education display relatively higher levels of access compared to other services, while clean water, sanitation, and health care remain severely constrained. Electricity access reaches 82.4 percent of surveyed households, indicating near-universal coverage. However, field observations and interview data reveal that a significant portion of this access is obtained through informal connections, which are prone to instability and safety hazards. Residents reported frequent power outages and fluctuating voltage that affected household appliances and small home-based economic activities. These conditions are consistent with findings in other Indonesian cities, where informal electrification networks compensate for gaps in formal service provision but simultaneously increase household vulnerability.

Access to education is also relatively higher, with 69.5 percent of households reporting adequate access for primary and secondary schooling. Interview data suggest that national education assistance programs have contributed to improved enrollment rates, particularly for primary education. Nonetheless, distance to schools and transportation costs remain substantial barriers, especially for secondary education. Several parents reported that although tuition fees are subsidized, indirect expenses such as uniforms, books, and daily transport impose a heavy burden. These findings align with earlier research indicating that informal settlement children face a higher risk of school discontinuation due to hidden educational costs and spatial barriers (Setiawan & Nurbaya, 2020).

In contrast, access to clean water and sanitation remains highly problematic. Only 58.6 percent of households report adequate access to clean water, while 32.9 percent experience limited access and 8.5 percent have no direct access at all. Many households rely on communal taps, shallow wells, or water vendors whose prices fluctuate depending on seasonal availability. Sanitation access is even more constrained, with only 46.2 percent of households reporting adequate facilities. The prevalence of shared latrines with poor maintenance was confirmed through field observation, which documented unsanitary conditions and limited privacy. These findings mirror regional studies in Southeast Asia that demonstrate how informal

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settlements continue to experience systemic deficits in water and sanitation infrastructure despite broader urban development (Nguyen et al., 2020; Kusno, 2011).

Health care emerges as one of the most critical service gaps in Surabaya's informal settlements. Only 41 percent of households report adequate access to health services, while 44.3 percent experience limited access and 14.7 percent report no access. Interviews reveal that formal health centers are often geographically distant, overcrowded, or perceived as socially unwelcoming to informal residents. As a result, many households rely on informal midwives, neighborhood healers, or self-medication. These patterns reflect broader national trends in which urban poor populations face both financial and social barriers to utilizing formal health care services (Dewi & Santoso, 2022; Hospital Utilization in Indonesia, 2022). Public transportation access also shows significant disparities. While 52.9 percent of households report adequate access, more than 47 percent experience either limited or no access. The reliance on informal transportation modes such as motorcycle taxis and unregulated vans increases travel costs and exposes residents to safety risks. Interview participants emphasized that limited transport access directly constrains employment opportunities, particularly for those working in distant industrial or commercial zones. This condition reflects what has been conceptualized as mobility poverty in Southeast Asian cities, where inadequate and unaffordable transport systems reinforce urban inequality (Rigg et al., 2021; Kong et al., 2021; Homer et al., 2024; Matsuyuki et al., 2024).

Household Economic Burden of Public Service Access

Table 2. Household Expenditure on Public Services (n=210)

Category	Average Monthly Expenditure (IDR)	Percentage of Household Income (%)
Clean Water (vendors, communal taps)	180,000	12.5
Electricity (formal and informal connections)	220,000	15.3
Transportation (public and informal)	350,000	24.7
Health Care (clinics, midwives, medicine)	150,000	10.6
Education (fees, transport, supplies)	250,000	17.7

Beyond physical access, the results reveal that households in informal settlements bear a disproportionately high economic burden in securing basic public services. As presented in Table 2, transportation constitutes the largest share of household expenditure at an average of 350,000 IDR per month, equivalent to 24.7 percent of household income. This is followed by education expenditures at 17.7 percent and electricity costs at 15.3 percent. Clean water and health care each account for more than ten percent of monthly household income, reflecting the commodification of services that are ideally publicly subsidized.

The high cost of transportation is closely linked to spatial isolation and limited availability of affordable public transport routes serving informal areas. Residents reported that daily commuting costs significantly reduce disposable income, leaving minimal financial flexibility for savings or emergency needs. Education expenditures also remain substantial despite tuition fee assistance programs. Parents reported that recurring costs such as transportation, school supplies, and informal fees at school levels accumulate into significant monthly expenses (Rodriguez et al., 2024).

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Electricity costs are elevated due to the prevalence of informal connections, which often involve intermediary payments to third-party providers or the need to share infrastructure with multiple households. Water expenditure similarly reflects reliance on vendors and communal systems rather than piped household connections. During dry seasons, water prices reportedly increase sharply, exacerbating household financial stress. Health care expenditure, while lower in absolute terms compared to other services, remains burdensome for low-income households. Many residents delay seeking treatment due to cost considerations, opting instead for cheaper informal care options. This pattern reinforces what has been described in previous studies as the poverty illness trap, where financial barriers lead to delayed treatment and worsening health outcomes (Dewi & Santoso, 2022).

Spatial Accessibility to Public Facilities

Table 3. Distance to Nearest Public Facilities from Informal Settlements

Facility Type	Average Distance (km)	Average Travel Time (minutes)	Notes
Health Clinic	3.1	25	Few located inside informal areas
Public School	2.4	20	Secondary schools further away
Market/Basic Shops	1.2	10	Mostly informal vendors
Public Transport Stop	1.8	18	Often requires walking through narrow alleys

Spatial analysis further reveals the uneven geographical distribution of public facilities across Surabaya. As shown in Table 3, the average distance from informal settlements to the nearest health clinic is 3.1 kilometers, with an average travel time of 25 minutes. This distance is particularly burdensome for elderly residents, pregnant women, and young children. Public schools are relatively closer, with an average distance of 2.4 kilometers, yet secondary schools are often located even farther from informal areas, increasing dropout risk for older students.

Markets and basic shops are the most spatially accessible facilities at an average distance of 1.2 kilometers, although many of these are informal vendors operating without regulatory oversight. Public transport stops are located at an average distance of 1.8 kilometers, requiring residents to walk through narrow alleys and poorly maintained access routes. These spatial constraints were repeatedly highlighted in interview narratives as key factors shaping daily mobility and service utilization.

GIS mapping confirms that most public facilities are clustered in formal residential and commercial districts, while informal settlements remain peripheral in spatial planning frameworks. The spatial overlay analysis demonstrates clear service deserts within the informal settlement zones, particularly for health facilities and sanitation infrastructure. This pattern of spatial exclusion is consistent with earlier studies documenting how urban planning systems systematically favor formally recognized areas while neglecting informal neighborhoods (Kooy & Bakker, 2008; Nicoletti et al., 2022).

The spatial marginalization of informal settlements also exacerbates economic inequality by increasing transportation costs and limiting timely access to essential services. Residents frequently reported that emergency medical situations become life-threatening due not only to financial limitations but also to long travel times to clinics and hospitals. These findings illustrate how spatial distance functions as a structural barrier that reinforces social vulnerability in informal settlements.

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Community Coping Mechanisms and Informal Service Provision

Table 4. Community Coping Mechanisms in Addressing Service Gaps (Qualitative Coding, n=210)

Coping Strategy	Percentage of Respondents (%)	Example
Collective community savings	47.1	Savings groups to cover education and health costs
Informal service providers	41.9	Using water vendors, midwives, informal electricity hookups
NGO or religious organization support	28.6	Free tutoring or health checkups
Mutual aid among neighbors	53.3	Sharing water taps, lending money for transport

The most common strategies include mutual aid among neighbors (53.3 percent) and collective community savings (47.1 percent). These coping mechanisms demonstrate resilience but also reveal the absence of systematic support from the government.

The findings from Surabaya's informal settlements highlight the persistent inequalities in public service provision between formal and informal urban areas. While Indonesia has made progress in infrastructure development, the exclusion of informal settlements from planning frameworks perpetuates disparities in service delivery.

The relatively high level of electricity access can be attributed to the government's national electrification program. However, the reliance on informal connections undermines both safety and reliability. Similar findings were observed in Jakarta, where informal settlements reported frequent power outages and electrical hazards despite near-universal access (Prasetyo & Hidayat, 2021). This indicates that access alone does not equate to service quality. Water and sanitation represent a more severe concern. Nearly half of the surveyed households have limited or no access, forcing reliance on communal taps, vendors, or poorly maintained shared latrines. These conditions align with regional studies in Southeast Asia, where inadequate sanitation in informal settlements contributes to heightened health risks such as diarrhea and dengue fever (Nguyen et al., 2020; Kusno, 2021). In Surabaya, the reluctance of municipal authorities to invest in "illegal" neighborhoods exacerbates the problem, reinforcing cycles of marginalization.

Health care access was revealed as the most pressing issue. Distance to clinics, high costs, and social stigma prevent residents from seeking formal medical care, leading them to rely on informal midwives or unlicensed practitioners. Dewi and Santoso (2022) found similar dynamics in Yogyakarta, where informal residents avoided hospitals due to both cost and perceived discrimination. The GIS mapping results confirm that most clinics and hospitals are clustered in wealthier districts of Surabaya, leaving informal settlements underserved. This spatial inequality highlights the structural nature of exclusion.

Education outcomes are somewhat better, with 69.5 percent of children enrolled in school. Government programs such as *Kartu Indonesia Pintar* have reduced barriers, yet distance and associated costs remain significant challenges, particularly for secondary education. Research in Bandung and Semarang also found that while enrollment rates are improving, informal settlement children are more likely to drop out due to hidden costs like uniforms and transportation (Setiawan & Nurbaya, 2020).

Transportation access is another layer of inequality. Although more than half of households report adequate access, affordability is a major obstacle. Many residents

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depend on informal motorcycle taxis or vans, which are both costlier and less safe than formal public transport. Studies in Manila and Bangkok have highlighted the concept of "mobility poverty," where limited transport options reduce employment opportunities and restrict social mobility (Rigg et al., 2021). The situation in Surabaya mirrors this pattern, with poor transport integration further isolating informal communities. Beyond access, the expenditure data reveal the heavy financial burden borne by households. Families spend nearly half of their monthly income on essential services, with transportation and education being the most expensive. This reflects how exclusion is not only spatial but also economic, as informal residents must pay disproportionately high costs for services that are either free or subsidized in formal neighborhoods.

The coping mechanisms identified in this study illustrate both resilience and vulnerability. Community savings groups, neighborly support, and NGO interventions provide temporary relief, but they cannot replace systemic solutions. Reliance on informal providers perpetuates risks, while dependence on external aid highlights the fragility of these arrangements. As shown by recent studies in Latin America and Africa, community resilience is often celebrated, but without institutional reforms, it becomes a substitute for state responsibility (Roy, 2020; Watson, 2021). The case of Surabaya is no exception.

CONCLUSION

The findings of this study demonstrate that residents of informal settlements in Surabaya face persistent inequalities in accessing essential public services. While electricity and basic education appear relatively more accessible due to national programs and policy interventions, other vital services such as clean water, sanitation, health care, and transportation remain inadequate and unevenly distributed. Spatial analysis shows that public facilities are concentrated in formal neighborhoods, leaving informal areas marginalized and forcing residents to rely on costly and often unsafe alternatives. These conditions highlight the structural exclusion embedded in urban planning and governance processes that continue to overlook informal settlements as legitimate parts of the city.

The study further reveals that access to services in informal settlements is not only limited spatially but also economically burdensome. Households spend a disproportionately high share of their income on essential services, particularly transportation and education. Such expenditures highlight the hidden costs of urban inequality, where residents of informal areas pay more for services that are subsidized or more readily available in formal neighborhoods. This financial strain reduces household resilience and perpetuates cycles of poverty across generations. Despite these challenges, the resilience of informal settlement communities is evident through collective coping strategies, such as community savings groups, mutual aid networks, and partnerships with NGOs and religious organizations. These mechanisms provide temporary relief and reflect strong social cohesion, yet they are not sustainable substitutes for formal institutional support. Without structural reforms, reliance on informal arrangements risks reinforcing the marginalization of these communities rather than empowering them. the case of Surabaya underscores the urgent need for inclusive urban governance that integrates informal settlements into citywide service provision. Addressing these gaps requires targeted investment in water, sanitation, and health infrastructure, expansion of affordable transport systems, and greater institutional recognition of informal communities. More importantly, policies should move beyond treating informality as an obstacle to urban development and instead acknowledge these neighborhoods as integral parts of the urban fabric. Only through such inclusive approaches can cities like Surabaya ensure equitable access to services and improve the quality of life for all urban residents.

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