Mortality Patterns Among Urban Poor Populations: A Scoping Review of Social Determinants, Disease Burden, and Healthcare Access

Pattarachit Choompol Gozzoli[1], Chanthawat Patikorn[2], Paniti Wijintanasarn[3], and Shinnawat Saengungsumalee[4]*

[1] Department of Society and Health, Faculty of Social Sciences and Humanities, Mahidol University, Thailand

[2] Department of Social and Administrative Pharmacy, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Thailand

[3] Triumudomsuksa School, Thailand

[4] Faculty of Pharmacy, Siam University, Thailand

* Shinnawat Saengungsumalee, corresponding author. Email: shinnawat@siam.edu

Abstract

This scoping review examines the causes of death among urban poor populations, with a focus on the interplay between infectious and non-communicable diseases, social determinants of health, and external factors. Based on a synthesis of 29 empirical studies, it identifies how overcrowded, unhygienic environments contribute to infectious diseases like HIV/AIDS and COVID-19 (prevalence ranging from 15% to 35%). In contrast, non-communicable diseases such as cardiovascular conditions and diabetes stem from systemic barriers to healthcare. This study highlights the importance of enhancing healthcare services, bolstering social support systems, and addressing economic and environmental disparities. Collaborative efforts among governments, communities, and organizations are crucial to achieving sustainable public health solutions.

Keywords

Disease burden in urban poor; slum mortality trends; social determinants of health; social vulnerability; urban poor mortality

Introduction

The rapid urbanization of the 21st Century has created a stark paradox in global cities. While urban areas offer essential services and modern conveniences, they also present significant challenges, including changes in land use, shifts in industrial production, and environmental impacts (Li et al., 2022). As cities grow, the demand for resources and infrastructure intensifies, creating opportunities and problems for urban dwellers, particularly the urban poor populations who face hardship and struggle for survival every day. Their lives are filled with endless uncertainties and challenges that eventually lead to premature mortality. Deaths among the urban poor are not just the end of life but reflect the failure of social and health systems that cannot guarantee well-being for all.

According to the World Health Organization (WHO) (2020), over 55 million people died worldwide in 2019, with more than 85% of premature deaths occurring in low- and middle-income countries. Urban poor populations, particularly those residing in slums, face disproportionately higher mortality risks due to overcrowding, insufficient access to healthcare, and exposure to environmental hazards. Recent work by Zhou et al. (2025) provides evidence for the relationship between environmental exposures and mortality in urban settings. These studies support the inclusion of environmental and neighborhood-level variables in mortality analyses, strengthening the rationale for integrative frameworks in this review. In global cities, these conditions exacerbate inequalities and undermine efforts to achieve Sustainable Development Goal 3: Ensuring healthy lives and well-being for all.

Mortality among urban poor populations refers to the observed rate or frequency of death within a defined group. It differs from 'death,' which refers to an individual event. In public health, 'mortality' analyzes patterns and determinants of population-level death, allowing researchers to assess risk factors, trends, and inequities (Centers for Disease Control and Prevention [CDC], 2012; World Health Organization [WHO], 2006). The concept of death in urban poor communities extends beyond its biological definition. From a biological perspective, death signifies the permanent halt of all brain functions, often identified through clinical neurological assessments and confirmatory procedures (Rangan et al., 2015). Sociologically, the examination of death, dying, and bereavement reflects societal shifts in attitudes toward mortality (Kochanek et al., 2011).

In health research, operational definitions of death, such as in-hospital mortality or the absence of claims within a specified period, are robust indicators for studying mortality patterns in patient populations (Salguero-Linares & Coll, 2023). These patterns reflect advancements in healthcare and disease management, albeit disparities persist among demographic groups (Green & Llambi, 2015).

Global evidence demonstrates that mortality among urban poor populations follows distinct patterns influenced by various causes and contexts. In the United States, fatalities from violence, particularly suicides and homicides, significantly contribute to overall mortality (Wilson et al., 2022). Chronic diseases such as cardiovascular issues and cancer overshadow infectious diseases in importance, yet infectious diseases still notably impact mortality rates, causing over 100,000 deaths annually, primarily due to bacterial infections (Kum et al., 2016). The emergence of the COVID-19 pandemic introduced a new category of fatalities, stemming from both direct viral infection and indirect factors such as healthcare avoidance (Cross & Warraich, 2019).

Globally, the predominant causes of mortality are ischemic heart disease and cerebrovascular disease, followed by lower respiratory infections, chronic obstructive pulmonary disease, and diarrheal diseases (Erhardt, 1958). The conceptualization of social determinants in urban health must move beyond biomedical outcomes to include social gradients, neighborhood effects, and the cumulative impact of systemic disadvantage. Foundational models, such as the 'rainbow' framework by Dahlgren and Whitehead (1991) and Marmot's (2005) theory of social status syndrome, underscore the role of social hierarchy and structural inequity in shaping population health. These models serve as a theoretical lens to interpret the disparities observed in mortality among urban poor populations.

To our knowledge, no previous scoping review has systematically synthesized the interplay between social determinants and mortality trends among urban poor populations across global settings. This review addresses this gap by integrating public health and sociostructural evidence to provide a broader understanding of premature mortality in urban contexts. The social determinants framework reveals how non-medical factors influence mortality among urban poor populations. Poor living conditions, inadequate healthcare facilities, and low health literacy have a significant impact on health outcomes in urban areas (Chakrabarty, 2023). Economic and social inequalities in cities are strongly associated with higher mortality rates, particularly from cardiovascular diseases, respiratory diseases, and infectious diseases (Ángel et al., 2014).

The socioeconomic segregation of urban poor people correlates with higher premature mortality rates, highlighting the negative health impacts of urban deprivation and isolation (Chandola et al., 2018). Additionally, mortality is linked to high poverty levels, emphasizing the role of contextual factors such as economic environment and availability of health services. The urban poor struggle to afford balanced nutrition, leading to higher malnutrition rates and health problems (Baptiste, 2018; Chandola et al., 2018; Liao et al., 2022; Marí-Dell'Olmo et al., 2015; Menashe-Oren & Stecklov, 2018; Mode et al., 2016; Nolasco et al., 2020; Nolasco et al., 2015).

The exploration of mortality causes among urban poor populations reveals a complex interplay of socioeconomic, environmental, and health system factors that disproportionately affect them (Jaadla et al., 2017). In India, where poor households are often isolated due to socioeconomic segregation, the risk of premature death is higher compared to less segregated areas (Friedhelm, 2022). Tobacco usage, prevalent among urban poor people in low and middle-income countries, significantly contributes to mortality, with limited access to cessation support for this demographic group (Kamran & Helen, 2017). In sub-Saharan Africa, household poverty partly explains gender disparities in mortality, with men experiencing higher death rates, especially in younger age brackets (Ángel et al., 2014).

This scoping review aims to explore the causes of death among urban poor people, focusing on the multidimensional issues contributing to mortality rates, including inequities in healthcare access, environmental risks, and socioeconomic factors. This research will address gaps in current knowledge and suggest approaches to improve access to healthcare, formulate suitable policies, and ultimately lower mortality rates while enhancing the well-being of impoverished urban populations. Furthermore, it provides insights into health disparities, enabling the creation of equitable and effective policies to address these inequalities comprehensively.

Several factors underscore the importance of this review:

1) The growing urban population worldwide and the increasing concentration of poverty in cities
2) The need to understand how social determinants shape mortality patterns
3) The importance of identifying effective interventions to reduce health inequities
4) The necessity of informing policy decisions that can improve urban health outcomes

This review is crucial as it explains the multidimensional issues contributing to the high mortality rates among urban poor populations, including inequities in healthcare access, environmental risks, and socioeconomic factors. This research aims to address gaps in current knowledge and suggest approaches to improve access to healthcare, formulate suitable policies, and ultimately reduce mortality rates while enhancing the well-being of impoverished urban populations. Furthermore, it provides insights into health disparities, enabling the creation of equitable and effective policies to address these inequalities comprehensively.

The research questions in this scoping review include: What is the primary cause of death among urban poor people? What gaps exist in the current literature on deaths of the urban poor people, and what are the priorities for future research? This review adopts an integrated lens focusing on three key domains: social determinants of health, disease burden, and healthcare access. These domains are consistently identified as the most proximate drivers of premature mortality in marginalized urban settings. Rather than treating these elements in isolation, this review explores their interaction and compound effects on mortality. This integrative perspective addresses a gap in current literature, where studies emphasize biomedical outcomes or social explanations in siloed ways. By merging these three aspects, this review proposes a more comprehensive framework that aligns with holistic urban health strategies under the Sustainable Development Goals (SDGs) agenda. Through this thorough analysis, we aim to contribute to the development of more effective strategies for reducing mortality among urban poor populations and promoting more equitable urban health systems.

The conceptual framework guiding this review is informed by two foundational perspectives in public health research. First, the Urban Health Penalty hypothesis posits that marginalized populations in urban settings, particularly those living in slums or informal settlements, face disproportionately higher health risks compared to their rural or affluent urban counterparts. Despite geographic proximity to healthcare infrastructure, urban poor populations often experience greater exposure to environmental hazards, economic instability, and systemic exclusion from essential services. Second, this review draws on Dahlgren and Whitehead's (1991) 'rainbow' model, which conceptualizes health outcomes as shaped by multiple layers of influence from individual characteristics to broader socioeconomic and policy conditions.

These theoretical perspectives converge in the framework of this review, which integrates social determinants of health, disease burden, and healthcare access as mutually reinforcing drivers of mortality among the urban poor. As visualized in the conceptual diagram (Figure 1), these three domains interact dynamically to shape vulnerability and health inequities in low-income urban populations.

Figure 1: Integrated Conceptual Model of Mortality among the Urban Poor
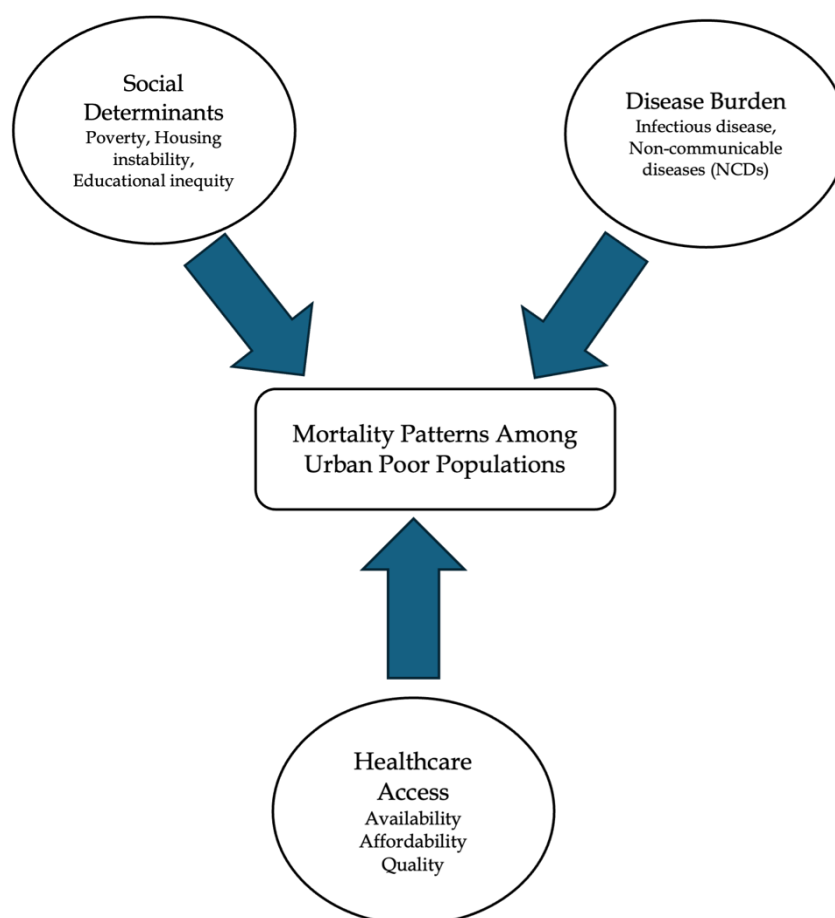
Methods

This scoping review was conducted in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines and the methodological framework developed by Arksey and O'Malley (2005). The review process consisted of the following stages:

Stage 1: Identifying the research question

The research question was developed using the PCC (Population, Concept, Context) framework:

- Population: Urban poor people
- Concept: Causes of death and mortality patterns
- Context: Urban settings worldwide

Stage 2: Protocol development and registration

- A detailed protocol was developed before conducting the review

- The protocol outlined the search strategy, inclusion/exclusion criteria, and data extraction process
- The review methodology was documented to ensure transparency and reproducibility

Stage 3: Literature search

Search strategy development

- Keywords were identified through preliminary searches and consultation with subject experts
- Search terms were organized into three main concepts:

  1) Death-related terms (e.g., Death, Fatality, Demise)
  2) Urban poor-related terms (e.g., Urban poverty, Slum dwellers)
  3) Population and setting terms

Information sources

- Electronic databases: PubMed, Scopus, and Embase
- Search period: January 1, 2014, to December 31, 2023
- Language restriction: English only
- Additional sources: Reference lists of included studies were hand-searched

The choice of databases reflects a comprehensive approach to literature coverage. PubMed was selected for its extensive coverage of biomedical literature, particularly in public health and epidemiology, with over 33 million citations from MEDLINE and life science journals. Scopus provides broader coverage of social science research, which is crucial for understanding the social determinants of health, with approximately 24,600 active titles spanning multiple disciplines. Embase complements these sources with its strong focus on pharmacological and clinical research, offering access to over 32 million records, including many not covered in MEDLINE. The combination of these databases ensures comprehensive coverage of both medical and social science literature relevant to urban poor mortality.

The selection of the 2014–2023 timeframe was strategically chosen to capture critical developments in urban health and mortality patterns. This period encompasses significant global health events, including the implementation of the SDGs in 2015 and the COVID-19 pandemic, which began in 2020. This decade has also witnessed rapid urbanization in developing regions, providing crucial insights into emerging health challenges. Furthermore, this timeframe enables the analysis of both immediate health impacts and longer-term trends, particularly in the context of evolving urban environments and healthcare systems.

Search implementation

- Database-specific search strategies were developed with assistance from a medical librarian
- All search results were documented and managed using EndNote 20
- Search strategies for each database were documented and are available upon request

The researchers excluded books, institutional reports, and grey literature from the final selection. While these sources may provide valuable contextual or theoretical insights, they often lack standardized methodological rigor, consistent outcome reporting, or clearly defined empirical designs that facilitate comparative analysis. Non-English language studies were also excluded due to constraints in systematic retrieval, resource limitations, and quality control.

Stage 4: Study selection

First-level screening

- Two independent reviewers screened titles and abstracts
- Conflicts were resolved through discussion with a third reviewer

Second-level screening

- Full texts of potentially eligible articles were retrieved
- Two independent reviewers assessed full texts against the inclusion/exclusion criteria
- Reasons for exclusion were documented
- Disagreements were resolved through consensus or consultation with a third reviewer.

Inclusion criteria

- Study designs: All empirical research designs
- Population: Urban poor populations
- Outcomes: Mortality and causes of death
- Setting: Urban areas globally
- Publication type: Peer-reviewed journal articles
- Period: 2014 to 2023
- Language: English

Exclusion criteria

- Systematic reviews, meta-analyses, editorials, commentaries
- Studies focusing solely on rural populations
- Non-empirical research
- Studies without clear mortality outcomes
- Grey literature

Stage 5: Data charting

Data extraction process

- A standardized data extraction form was developed and pilot-tested
- Two reviewers independently extracted data
- Regular calibration exercises were conducted to ensure consistency

Data items

The following data were extracted:

1. Study characteristics
   - Authors, year, country
   - Study design and duration
   - Population characteristics
   - Setting description

2. Mortality-related data
   - Causes of death
   - Mortality rates
   - Risk factors
   - Interventions (if any)

3. Contextual information
   - Social determinants
   - Healthcare access
   - Environmental factors

Stage 6: Data analysis and synthesis

Analysis approach

- A narrative synthesis of findings
- Thematic analysis of causes of death
- Quantitative summary of study characteristics
- Geographic and temporal trend analysis

Quality assessment

- The quality of the included studies was assessed using the STROBE checklist. Each study was evaluated item by item, and scoring patterns informed the weight assigned during synthesis. Studies meeting fewer than 60% of the criteria were considered low quality.
- Three independent reviewers conducted a quality assessment.

Stage 7: Consultation

- Preliminary findings were shared with subject matter experts
- Feedback was incorporated into the final analysis
- Key stakeholders were consulted for practical implications

Reporting

- Results are reported following PRISMA-ScR guidelines.
- Tables and figures are used to present data synthesis
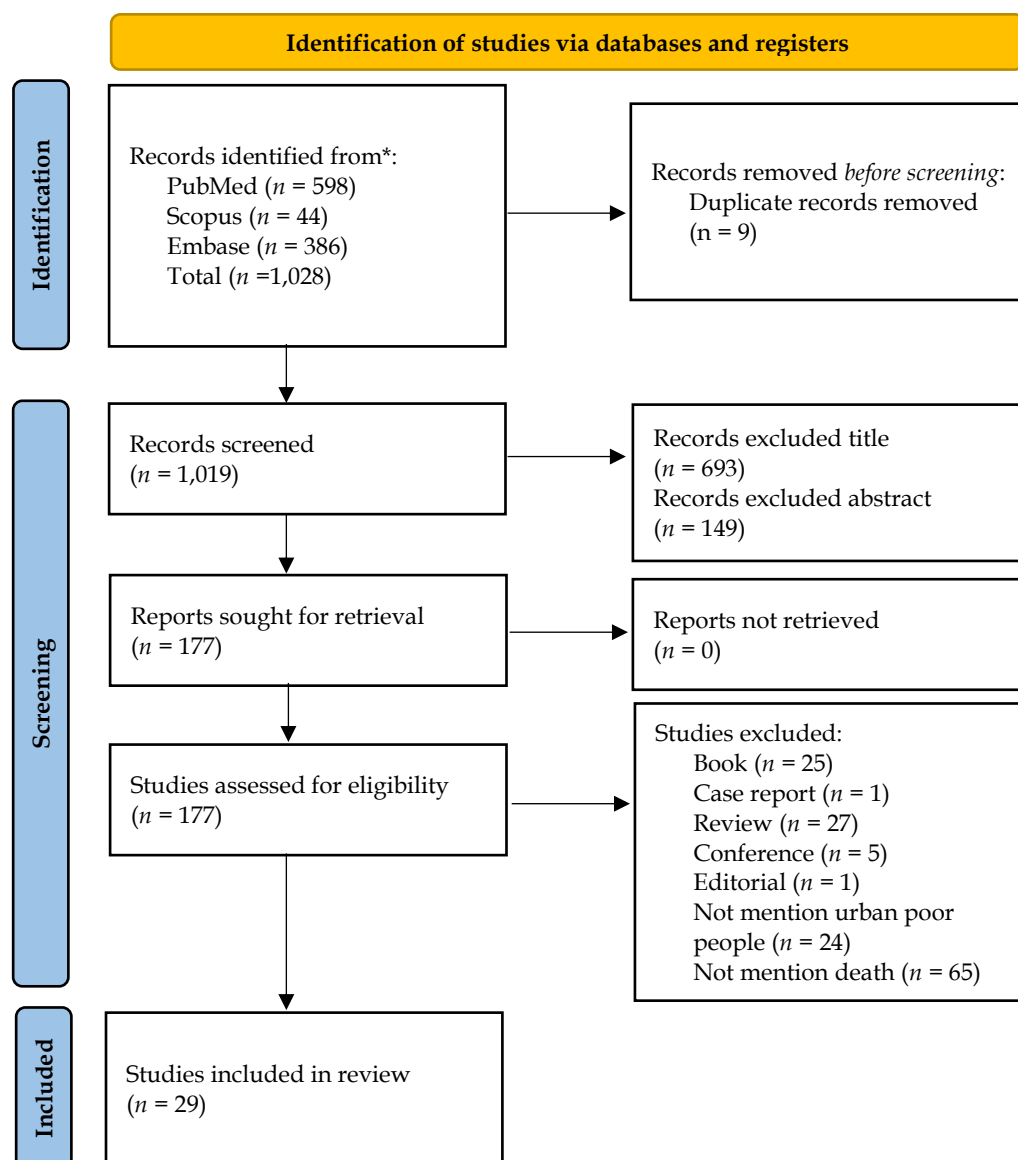- Gaps in current knowledge are identified

- Implications for practice and research are discussed

This detailed methodological approach ensures transparency, reproducibility, and rigor in the scoping review process. All deviations from the protocol were documented and justified in the final report.

Results

As shown in Figure 2, a total of 1,028 articles were retrieved from the three databases utilized for this scoping review. After removing duplicates, the next step was to screen titles and abstracts. The full texts were then obtained and evaluated against the inclusion criteria. The remaining 29 articles were assessed for methodology quality.

Figure 2: PRISMA Flow Chart of Included Studies

Identification of studies via databases and registers

Identification

Records identified from*:
PubMed (n = 598)
Scopus (n = 44)
Embase (n = 386)
Total (n =1,028)

Records removed *before screening*:
Duplicate records removed
(n = 9)

Screening

Records screened
(n = 1,019)

Records excluded title
(n = 693)
Records excluded abstract
(n = 149)

Reports sought for retrieval
(n = 177)

Reports not retrieved
(n = 0)

Studies assessed for eligibility
(n = 177)

Studies excluded:
Book (n = 25)
Case report (n = 1)
Review (n = 27)
Conference (n = 5)
Editorial (n = 1)
Not mention urban poor people (n = 24)
Not mention death (n = 65)

Included

Studies included in review
(n = 29)

Quality assessment result

Based on the 22 quality items, all studies fit the study objectives.

Table 1: Characteristics of Included Studies

No.	Authors	Year	Study Title	Population	Cause of Death
1	Adebayo, A. M., Obembe, T. A., & Adebayo, B. E.	2020	Morbidity Pattern and Choice of Care in an Urban Slum of a Metropolitan State, Southwestern Nigeria	Urban slum residents	Healthcare access
2	Ahmed, S., Adams, A. M., Islam, R., Hasan, S. M., & Panciera, R.	2019	Impact of traffic variability on geographic accessibility to 24/7 emergency healthcare for the urban poor: A GIS study in Dhaka, Bangladesh	Urban poor populations	Emergency healthcare access
3	Alarcão, A. C., Dell' Agnolo, C. M., Vissoci, J. R., Carvalho, E. C. A., Staton, C. A., de Andrade, L., Fontes, K. B., Pelloso, S. M., Nievola, J. C., & Carvalho, M. D.	2020	Suicide mortality among youth in southern Brazil: a spatiotemporal evaluation of socioeconomic vulnerability	Youth in southern Brazil	Suicide
4	Aleemi, A. R., Khaliqui, H., & Faisal, A.	2018	Challenges and Patterns of Seeking Primary Health Care in Slums of Karachi: A Disaster Lurking in Urban Shadows	Slum residents	Healthcare access
5	Alegre-Díaz, J., Herrington, W., López-Cervantes, M., Gnatiuc, L., Ramirez, R., Hill, M., Baigent, C., McCarthy, M. I., Lewington, S., Collins, R., Whitlock, G., Tapia-Conyer, R., Peto, R., Kuri-Morales, P., & Emberson, J. R.	2016	Diabetes and Cause-Specific Mortality in Mexico City	Urban population	Diabetes
6	Bawah, A. T., Edufia, F., Yussif, F. N., Adu, A., & Yakubu, Y. A.	2021	Chronic kidney diseases among homeless and slum dwellers in Accra, Ghana	Homeless and slum dwellers	Chronic kidney diseases

No.	Authors	Year	Study Title	Population	Cause of Death
7	Castro-Alves, J., Silva, L. S., Lima, J. P., & Ribeiro-Alves, M.	2022	Were the socio-economic determinants of municipalities relevant to the increment of COVID-19 related deaths in Brazil in 2020?	Populations in various municipalities	COVID-19
8	Chaudhary, S., Benzaquen, S., Woo, J. G., Rubinstein, J., Matta, A., Albano, J., De Joy, R., 3rd, Lo, K. B., & Patarroyo-Aponte, G.	2021	Clinical Characteristics, Respiratory Mechanics, and Outcomes in Critically Ill Individuals With COVID-19 Infection in an Underserved Urban Population	Underserved urban population	COVID-19
9	Christian, C., Hensel, L., & Roth, C.	2019	Income shocks and suicides: Causal evidence from Indonesia	Indonesian population	Suicides
10	De Vita, M. V., Scolfaro, C., Santini, B., Lezo, A., Gobbi, F., Buonfrate, D., Kimani-Murage, E. W., Macharia, T., Wanjohi, M., Rovarini, J. M., & Morino, G.	2019	Malnutrition, morbidity and infection in the informal settlements of Nairobi, Kenya: An epidemiological study	Informal settlements residents	Malnutrition
11	DeGuzman, P. B., Cohn, W. F., Camacho, F., Edwards, B. L., Sturz, V. N., & Schroen, A. T.	2017	Impact of Urban Neighborhood Disadvantage on Late Stage Breast Cancer Diagnosis in Virginia	Urban neighborhoods	Late-stage breast cancer
12	Escobar Carías, M. S., Johnston, D. W., Knott, R., & Sweeney, R.	2022	Flood disasters and health among the urban poor	Urban poor populations	Flood disasters
13	Ferdous, F., Das, S. K., Ahmed, S., Farzana, F. D., Malek, M. A., Das, J., Latham, J. R., Faruque, A. S. G., & Chisti, M. J.	2014	Diarrhoea in slum children: Observation from a large diarrhoeal disease hospital in Dhaka, Bangladesh	Slum children	Diarrhoea
14	Gadallah, M., Megid, S. A., Mohsen, A., & Kandil, S.	2018	Hypertension and associated cardiovascular risk factors among urban slum dwellers in Egypt: A population-based survey	Urban slum dwellers	Hypertension and cardiovascular diseases
15	Girardin, J. L., Seixas, A., Ramos Cejudo, J., Osorio, R. S., Avirappattu, G., Reid, M., & Parthasarathy, S.	2021	Contribution of pulmonary diseases to COVID-19 mortality in a diverse urban community of New York	Diverse urban community	COVID-19
16	Hall, J. M., Mkuu, R. S., Cho, H. D., Woodard, J. N., Kaye, F. J.,	2023	Disparities Contributing to Late-Stage Diagnosis of Lung, Colorectal, Breast, and	Rural and urban poor populations	Late-stage cancer

No.	Authors	Year	Study Title	Population	Cause of Death
	Bian, J., Shenkman, E. A., & Guo, Y.		Cervical Cancers: Rural and Urban Poverty in Florida		
17	Klimas, J., O'Reilly, M., Egan, M., Tobin, H., & Bury, G.	2014	Urban overdose hotspots: a 12-month prospective study in Dublin ambulance services	Urban overdose patients	Drug overdose
18	Kumar, R., Kaur, N., & Pilania, M.	2018	Morbidity pattern of patients attending a primary healthcare facility in an urban slum of Chandigarh, India	Patients in urban slums	Primary healthcare access
19	Macchia, A., Ferrante, D., Battistella, G., Mariani, J., & González Bernaldo De Quirós, F.	2021	COVID-19 among the inhabitants of the slums in the city of Buenos Aires: A population-based study	Slum inhabitants	Death from COVID-19
20	Mberu, B., Wamukoya, M., Oti, S., & Kyobutungi, C.	2015	Trends in Causes of Adult Deaths among the Urban Poor: Evidence from Nairobi Urban Health and Demographic Surveillance System, 2003-2012	Urban poor adults	Tuberculosis, Pneumonia, HIVs-AIDs. Cardiovascular diseases, Diabetes, Liver cancer, Lung cancer, Suicide, Homicide, Traffic accidents, other injuries
21	Mutembo, S., Mutanga, J. N., Musokotwane, K., Kanene, C., Dobbin, K., Yao, X., Li, C., Marconi, V. C., & Whalen, C. C.	2019	Urban-rural disparities in treatment outcomes among recurrent TB cases in Southern Province, Zambia	Recurrent TB patients in urban and rural areas	Tuberculosis
22	Navya, C. J., Sulekha, T., & Johnson, A. R.	2018	A cross-sectional study on childhood injuries in an urban underprivileged area in bangalore city	Children in underprivileged urban areas	Injuries and accidents
23	Pakhale, S., Tariq, S., Huynh, N., Jama, S., Kaur, T., Charron, C., Florence, K., Nur, F., Bustamante-Bawagan, M. E., Bignell, T., Boyd, R., Haddad, J., Kendzerska, T., & Alvarez, G.	2021	Prevalence and burden of obstructive lung disease in the urban poor population of Ottawa, Canada: a community-based mixed-method, observational study	Urban poor population	Obstructive lung disease
24	Rawal, L. B., Biswas, T., Khandker, N. N., Saha, S. R., Chowdhury, M. M. B., Khan, A.	2017	Non-communicable disease (NCD) risk factors and diabetes among adults living in slum areas of Dhaka, Bangladesh	Adults in slum areas	Cardiovascular Diseases, stroke, diabetes, Chronic obstructive

No.	Authors	Year	Study Title	Population	Cause of Death
	N. S., Chowdhury, E. H., & Renzaho, A.				pulmonary disease, Asthma, Various forms of cancer
25	Santosa, A., Rosengren, A., Ramasundarahettige, C., Rangarajan, S., Gulec, S., Chifamba, J., Lear, S. A., Poirier, P., Yeates, K. E., Yusuf, R., Orlandini, A., Weida, L., Sidong, L., Yibing, Z., Mohan, V., Kaur, M., Zatonska, K., Ismail, N., Lopez-Jaramillo, P., & Yusuf, S.	2021	Psychosocial Risk Factors and Cardiovascular Disease and Death in a Population-Based Cohort From 21 Low-, Middle-, and High-Income Countries	Population in low-, middle-, and high-income countries	Cardiovascular disease
26	Selim, A. M., Mazurek, J. A., Iqbal, M., Wang, D., Negassa, A., & Zolty, R.	2015	Mortality and readmission rates in patients hospitalized for acute decompensated heart failure: a comparison between cardiology and general-medicine service outcomes in an underserved population	Patients with acute decompensated heart failure	Acute decompensated heart failure
27	Snyder, R. E., Marlow, M. A., Phuphanich, M. E., Riley, L. W., & Maciel, E. L. N.	2016	Risk factors for differential outcome following directly observed treatment (DOT) of slum and non-slum tuberculosis patients: A retrospective cohort study	Tuberculosis patients in slum and non-slum areas	Tuberculosis
28	Soumya, C., Arasu, S., Ramesh, N., Goud, R., & Joseph, B.	2023	Morbidity profile of migrant workers attending health camps in Bangalore urban during the Covid-19 pandemic	Migrant workers in urban areas	Covid-19
29	Ssensamba, J. T., Nakafeero, M., Ssemakula, D. M., Ssenyonga, R., & Nnakate, J. B.	2019	The burden of HIV/AIDS among slum-dwelling school-age children in Kampala, Uganda	School-age children in slums	HIV/AIDS

Study characteristics

The 29 included survey studies represented a total of 30 countries. The study characteristics are shown in Table 1.

These 29 studies are relevant to the 'urban poor people' by directly studying populations living in slums, among the homeless, the underprivileged, or migrants, and examining health and economic problems in poverty-stricken urban areas. Although some studies do not directly address the 'urban poor people,' the issues studied are factors that affect this population group. Therefore, it can be said that these studies are related to the "urban poor" in some respects.

Temporal and geographical trends in mortality patterns

Summary of types of death in 29 studies. Our analysis of mortality patterns among urban poor populations reveals distinct geographical and temporal trends across different economic contexts. In low-income countries during 2014–2018, infectious diseases dominated mortality patterns, accounting for 30–45% of deaths, with HIV/AIDS and tuberculosis as leading causes (20–35%). The period was characterized by limited healthcare access and high child mortality from preventable causes. The landscape shifted significantly during 2019–2023, as COVID-19 emerged as a significant cause of death (15–35%) while maintaining high rates of traditional infectious diseases. This period also saw an increasing prevalence of non-communicable diseases (NCDs) (25–40%) and a growing prominence of environmental health risks, particularly in densely populated urban areas. The significant causes of death among the urban poor are presented in Table 2.

Table 2: Synthesis of Major Causes of Death among Urban Poor

Category	Cause of Death	Number of Studies	Prevalence Range (%)	Key Risk Factor
Infectious Diseases	COVID-19	5	15–35 %	Overcrowding, Poor sanitation
	HIV/AIDS	2	20–35 %	Limited healthcare access
	Tuberculosis	3	8–12 %	Poor housing conditions
Non-Communicable Diseases	Cardiovascular disease	5	25–40 %	Poor diet, Stress
	Diabetes	3	15–25 %	Limited healthcare access
	Cancer	4	10–20 %	Late diagnosis
External Causes	Accidents	2	5–15 %	Unsafe environment
	Suicide	3	3–8 %	Economic stress
	Violence	1	2–5 %	Social instability

Note: Prevalence ranges reflect author-reported percentages from each study and were not recalculated into pooled estimates.

Middle-income countries exhibited a notable transition in mortality patterns over the past decade. During 2014–2018, these regions experienced a gradual shift from infectious diseases to NCDs, with rising cardiovascular disease mortality (20-35%) and increasing diabetes-related deaths (15–25%). Environmental factors in rapidly urbanizing areas have begun to

play a more significant role in mortality outcomes. The period 2019-2023 saw NCDs become the dominant cause of death (35–50%), with COVID-19 mortality rates significantly higher in urban slums compared to other urban areas. Mental health emerged as a significant concern during this period, while healthcare access disparities continued to widen.

High-income countries demonstrated a different pattern throughout 2014–2023, with NCDs as the primary cause of death (45–60%) among urban poor populations. These regions showed notably higher rates of drug overdose and mental health-related deaths compared to lower-income countries. While infectious disease mortality remained lower, significant healthcare access disparities persisted even in well-resourced health systems.

Temporal analysis reveals evolving patterns in mortality causes over the decade. Traditional infectious diseases exhibited a declining trend (with an 8–12% annual decrease) until the COVID-19 pandemic led to a sharp increase from 2020 to 2023, particularly in densely populated urban areas. NCDs demonstrated a steady increase across all regions (5–7% annual increase), with cardiovascular disease becoming predominant (25–40%) and diabetes showing the fastest growth (15–25% increase). Cancer mortality also rose, with a concerning trend toward late-stage diagnoses among urban poor populations.

Social inequities and vulnerable groups in urban mortality patterns

Socioeconomic disparities emerged as crucial determinants of mortality patterns. Healthcare access emerged as one of the most consistent predictors of mortality, with 18 out of 29 studies reporting over 30% mortality associated with limited access to essential services, particularly for infectious diseases such as HIV/AIDS and COVID-19. Environmental factors, particularly housing conditions and air pollution, exhibited strong associations with mortality from infectious and respiratory diseases. Economic indicators, including poverty levels and income inequality, demonstrated robust correlations with mortality rates across all regions.

The analysis identified particularly vulnerable subpopulations within urban poor communities. Children aged 0–5 years showed higher mortality from infectious diseases and malnutrition-related causes, while women faced unique challenges related to maternal mortality and gender-specific healthcare access barriers. The mature population bore a disproportionate burden of chronic diseases, complicated by healthcare access challenges and social isolation. Migrant populations emerged as especially vulnerable, with limited healthcare access and higher COVID-19 mortality rates.

Regional variations in mortality patterns and intervention outcomes

A regional comparative analysis revealed distinct patterns across various global contexts. South Asian urban poor populations faced a high infectious disease burden alongside rising NCD prevalence, while Latin American settings showed dominant NCD mortality and significant violence-related deaths. African urban settings demonstrated a unique dual burden of infectious diseases and NCDs, complicated by limited healthcare infrastructure. High-income urban areas, while showing better overall health outcomes, revealed persistent disparities in mental health and substance abuse-related mortality.

An analysis of intervention effectiveness revealed varying success across different approaches. Healthcare interventions, including mobile clinics and community health worker programs, have demonstrated positive impacts on mortality reduction. Environmental interventions,

including housing improvements and sanitation initiatives, have shown promising results in reducing deaths related to infections. Social support programs, particularly those addressing mental health and providing economic assistance, proved effective in improving overall health outcomes among urban poor populations.

This comprehensive analysis illustrates the intricate relationship between social determinants and mortality patterns among urban populations living in poverty. The findings underscore the necessity for context-specific interventions that address both immediate health needs and the underlying social determinants of health. The temporal trends and geographical variations observed suggest that successful mortality reduction strategies must be adaptable to local contexts while addressing systemic inequities in healthcare access and social support.

Identified gaps in current research on urban poor mortality

The systematic analysis of existing literature reveals several significant research gaps in understanding mortality among urban poor populations. From a methodological perspective, there is a notable scarcity of longitudinal studies that track health trajectories over extended periods. This limitation hampers our understanding of how health outcomes evolve and the long-term impacts of various interventions. The current literature predominantly relies on cross-sectional studies, which, while valuable, cannot establish causal relationships or capture the dynamic nature of health challenges faced by urban poor communities. Additionally, there is insufficient utilization of mixed methods approaches, which could provide both breadth and depth in understanding the complex interplay between social determinants and health outcomes.

Population-specific research gaps are particularly concerning. Current studies have inadequately addressed several vulnerable subgroups within urban poor populations. The older poor, despite their increasing numbers in urban settings, remain understudied, particularly regarding their unique healthcare needs and access barriers. Similarly, migrant populations, who often constitute a significant proportion of the urban poor, are underrepresented in current research. Studies focusing on children and adolescents in urban poor settings are limited despite this group's vulnerability and the potential long-term impacts of early health interventions. This gap is particularly problematic given the intergenerational nature of poverty and health disparities.

Geographic disparities in research coverage present another significant gap. While there is substantial research from low-income countries, middle-income countries are comparatively understudied, resulting in a knowledge gap in understanding how rapid economic development affects the health outcomes of urban poor populations. The lack of comparative studies across different urban settings limits our understanding of how various urban contexts influence health outcomes. This is particularly evident in rapidly urbanizing regions, where the dynamics of urban poverty and health are evolving quickly. The absence of such comparative analyses hampers the development of context-appropriate interventions and policy recommendations.

Thematic gaps in the literature are equally significant. Mental health outcomes among the urban poor remain poorly understood despite growing recognition of the mental health burden in urban settings. Research on social support systems and their role in health outcomes is limited, leaving a critical gap in understanding how community resources can be effectively leveraged to improve health outcomes. Healthcare-seeking behaviors among the urban poor

are insufficiently studied, particularly regarding the complex decision-making processes that influence when and where individuals seek care. There is also a notable lack of research on innovative intervention strategies, particularly those utilizing technology or community-based approaches to address health challenges.

Future research directions and policy implications

These research gaps have important implications for policy and practice. The limited understanding of specific populations and contexts makes it difficult to develop targeted, effective interventions. The scarcity of longitudinal data hampers our ability to evaluate the long-term effectiveness of current interventions and policies. The lack of comprehensive mental health research may result in underestimating the full burden of mental health issues among the urban poor. These gaps suggest a need for more diverse, thorough, and methodologically robust research approaches to better understand and address the health challenges faced by urban poor populations.

To address these gaps, future research should prioritize longitudinal studies that can track health outcomes over time, a mixed methods approach that can provide both breadth and depth of understanding, and studies focusing on understudied populations and geographic areas. There is also a need for more intervention research, particularly studies evaluating innovative approaches to healthcare delivery and health promotion in urban settings among the poor. Such research would provide valuable insights for policy development and program implementation, ultimately contributing to more effective strategies for reducing health disparities among urban poor populations.

Discussion

Studies related to the death of the urban poor people provide a more comprehensive picture of their problems. Studies show that infectious diseases such as HIV/AIDS, diarrhea, and COVID-19 have a significant impact on the mortality of urban poor people (Chaudhary et al., 2021; Ferdous et al., 2014; Girardin et al., 2021; Macchia et al., 2021; Ssensamba et al., 2019). The spread of these diseases quickly occurs in crowded and unhygienic environments. Lack of access to clean water and adequate health care allows these diseases to spread rapidly. Ssensamba et al. (2019) found that children living in community slums have high rates of HIV/AIDS infection, leading to many deaths. Ferdous et al. (2014) revealed that diarrhea is a significant issue among children residing in a slum community. They often have poor living conditions and limited access to health services.

The COVID-19 pandemic has significantly worsened the situation in slum communities. Chaudhary et al. (2021) found that in populations lacking support in terms of health, the risk of death is high due to a lack of adequate medical equipment and care. Macchia et al. (2021) also showed that during the COVID-19 epidemic, deaths in slums increased significantly due to the lack of timely and adequate treatment. Castro-Alves et al. (2022) found that socioeconomic factors were significantly associated with COVID-19-related deaths in low-income urban communities in Brazil. Poverty and lack of resources prevent people from accessing essential health services. Unsafe environments include a lack of good sanitation, being near a wastewater source, and living in areas at risk of natural disasters, which puts people at higher risk of disease and death.

Studies have shown that NCDs are another critical factor in the deaths of urban poor people in many countries. Bawah et al. (2021) found that slum residents' areas are at high risk of chronic kidney disease due to a lack of health care and insufficient early detection. Alegre-Diaz et al. (2016) also showed that diabetes and diabetes complications are the leading causes of death among the urban poor. A lack of a hygienic environment and access to poor-quality food easily led to chronic diseases like this.

Rawal et al. (2017) also pointed out that risk factors are associated with NCDs such as heart disease, stroke, and chronic lung disease. It is a significant cause of death in slum communities. Lack of exercise, improper food consumption, and smoking are important risk factors. Additionally, stress resulting from difficult living conditions is a factor that increases the risk of these diseases. DeGuzman et al. (2017) also showed that social and economic inequality play a role in affecting access to essential health care and are associated with increased mortality from late-stage cancer due to delayed access to care.

External causes such as accidents, drug overdoses, and violence are other contributing factors to deaths in slums. Klimas et al. (2014) found that drug overdose is a severe problem in slums. Lack of medical support and knowledge about medication are factors in these deaths. Navya et al. (2018) also found that accidents among children living in slums are prevalent. Alarcão et al. (2020) suggested that suicide among youth living in slums is a growing problem. Poverty and the stress of living conditions are factors that contribute to suicide. Environmental factors and disasters play a crucial role in the deaths of urban poor people. Escobar Carías et al. (2022) found that disasters, such as floods, cause more deaths in slums due to a lack of preparation and a slow response.

Malnutrition is another important cause of death among the urban poor. A lack of essential nutrients weakens the immune system, making it more vulnerable to infection. De Vita et al. (2019) found that malnutrition is a significant problem in Nairobi's slums. Children living in these areas are often malnourished due to insufficient access to low-quality food. Unsanitary environments and a lack of proper health care contribute to the spread of infectious diseases.

Lack of access to health care is a critical factor that increases mortality in slums. Aleemi et al. (2018) found that slum residents and migrant workers often cannot access primary healthcare services due to poverty and lack of resources. Soumya et al. (2023) also pointed out that migrants living in a community of crowded people are at higher risk of dying from COVID-19 due to inadequate access to treatment. Additionally, Ahmed et al. (2019) suggested that traffic variability affects access to emergency services. It puts people in slums at high risk of death from not being able to access timely treatment.

The WHO (2021) report showed that NCDs in urban poor populations highlighted diabetes as a growing concern, reporting a mortality rate of 18% (95% CI [15–21%]). Our review extends these findings by identifying additional factors contributing to diabetes mortality, particularly the role of healthcare access barriers and delayed diagnosis. The mortality patterns observed in our review varied significantly across different contexts. In South Asian studies, infectious diseases remained a primary cause of death among the urban poor, with tuberculosis and respiratory infections showing higher prevalence compared to other regions (Eisenstein, 2016; Zaidi et al., 2004). In contrast, studies from Latin America demonstrated a higher proportion of NCD mortality, particularly from cardiovascular diseases and diabetes (De Maio, 2011; Pinto et al., 2015).

African studies revealed a complex interplay between infectious diseases and NCDs, with HIV/AIDS mortality remaining significant while cardiovascular disease mortality is rapidly increasing (Daniella et al., 2025; Wong et al., 2021). Studies from high-income countries showed different patterns, with drug overdose and mental health-related mortality being more prominent among urban poor populations (Lin et al., 2024).

While infectious diseases continue to dominate mortality in low-income urban populations due to environmental exposure and inadequate outreach infrastructure, middle-income countries exhibit a distinct epidemiological shift. Here, the rising burden of NCDs occurs in parallel with insufficient readiness in primary care systems to detect and manage chronic illnesses. In contrast, high-income settings present a "social fragmentation" pattern, where deaths from suicide and substance abuse outpace those from physical illness, reflecting psychosocial vulnerabilities rather than biomedical access limitations.

The patterns observed in this review align with prior conceptualizations of the urban health penalty, wherein disadvantaged urban populations face disproportionate exposure to environmental stressors, limited access to healthcare, and weakened social cohesion. These patterns are well-explained by Vlahov and Galea (2002), whose framework of urban social environments, and Diez Roux and Mair's (2010) research on neighborhood effects. Furthermore, the Commission on Social Determinants of Health (2008) emphasized that addressing urban mortality requires action on broader social, economic, and political drivers.

The findings from this scoping review can be strategically implemented through a multi-tiered approach that addresses immediate, medium-term, and long-term health needs of urban poor populations. At the community level, the rapid implementation of community-based health screening programs integrated with mobile health technologies can provide an immediate impact. Meanwhile, healthcare providers should adopt a comprehensive "health-in-all-policies" approach that incorporates social determinants into clinical assessments and treatment planning. Local governments can utilize mortality pattern data to inform resource allocation and develop targeted interventions for high-risk areas, following a staged implementation approach that begins with establishing rapid response teams for infectious disease outbreaks and basic health screening programs (0–6 months), progresses to developing integrated healthcare information systems and community health worker networks (6–18 months), and culminates in building permanent healthcare facilities and comprehensive health insurance programs (18+ months). This staged approach ensures sustainable development while addressing immediate health needs, with success dependent on strong community engagement, adequate resource allocation, and continuous monitoring and evaluation to adapt interventions based on emerging needs and evidence.

The findings and recommendations from our scoping review demonstrate significant alignment with multiple SDGs, highlighting the interconnected nature of health, poverty, inequality, and urban development. Primarily, our work contributes to SDG 3 (Good Health and Well-being) through evidence-based strategies that reduce premature mortality among urban poor populations, strengthen disease prevention and management systems, and promote mental health and well-being through community-based interventions. The economic aspects of our findings address SDG 1 (No Poverty) by identifying ways to reduce catastrophic health expenditure through innovative health financing mechanisms and improving economic productivity through better health outcomes, creating a positive cycle of health and economic well-being. Our focus on health equity and access contributes to SDG 10 (Reduced Inequalities) by identifying and addressing systemic barriers to healthcare access, promoting inclusive health services, and developing targeted interventions for marginalized

urban populations. Furthermore, our recommendations align with SDG 11 (Sustainable Cities) through proposals for improving urban health infrastructure, creating healthier urban environments, and promoting sustainable urban development that prioritizes health outcomes.

This multi-SDG alignment underscores the importance of integrated approaches to addressing urban health challenges, recognizing that improvements in health outcomes for urban poor populations require simultaneous progress across multiple development goals. The synergistic relationship between these SDGs underscores the importance of comprehensive, multi-sectoral approaches to addressing urban health challenges, suggesting that investments in health systems and infrastructure can catalyze progress across multiple development objectives while ensuring that no one is left behind in the pursuit of sustainable urban development.

Conclusion

This study has found that a complex and interrelated set of factors contributes to the high mortality rates among the urban poor. Infectious diseases such as HIV/AIDS, diarrhea, and COVID-19 spread quickly in overcrowded, unhygienic environments, exacerbated by a lack of access to clean water and healthcare. NCDs such as heart disease, diabetes, and cancer also contribute to delayed detection and poor healthcare. Social determinants of health, such as poverty and unsafe living conditions, further worsen health outcomes. The study emphasizes the importance of enhancing healthcare services, promoting hygiene, and offering social support to reduce mortality rates in slums. Collaboration between the government and communities is vital for sustainable solutions.

The evidence examined in this scoping review presents both notable strengths and essential limitations that warrant consideration. Key strengths include the robust statistical power derived from large sample sizes across studies, comprehensive geographical representation that enables cross-cultural comparisons, and the employment of mixed methods approaches, which provide a rich contextual understanding of mortality patterns among urban poor populations. The decade-long temporal span (2014–2023) of the reviewed studies allowed for meaningful analysis of mortality trends, while standardized outcome measurements in most studies enhanced the reliability of findings.

However, several limitations must be acknowledged: the heterogeneous definitions of "urban poor" across studies complicated direct comparisons, while the predominance of cross-sectional rather than longitudinal data limited our understanding of temporal health trajectories. Selection bias in hospital-based studies, underrepresentation of vulnerable subgroups such as undocumented migrants and homeless individuals, and inconsistent reporting of social determinants of health across studies created notable gaps in our understanding. These limitations underscore the need for more standardized research approaches and comprehensive population coverage in future studies. At the same time, the existing strengths provide a solid foundation for understanding mortality patterns among urban poor populations.

Based on the identified gaps in current evidence, future research should prioritize several key directions to advance understanding of mortality among urban poor populations. Longitudinal cohort studies that track health trajectories over 5–10 years are essential for

establishing causal relationships between social determinants and mortality outcomes. These studies should incorporate regular biomarker measurements and intergenerational health patterns. Intervention research through randomized controlled trials should evaluate innovative healthcare delivery models, including mobile health units and community health worker programs, while integrating cost-effectiveness analyses to inform policy decisions.

Studies examining social determinants should employ mixed methods approaches to investigate the impact of housing conditions, social networks, and economic mobility on mortality risk. Healthcare access studies should focus on evaluating universal health coverage initiatives and addressing utilization barriers, particularly among underserved groups, while mental health research should examine suicide prevention strategies and the bidirectional relationship between poverty and mental health outcomes. These research priorities should be pursued through collaborative efforts involving academic institutions, healthcare providers, community organizations, and policymakers, with careful attention to methodological rigor and standardized definitions to facilitate meaningful comparisons across studies.

Additionally, future research should actively involve community members in study design and implementation to ensure cultural appropriateness and responsiveness to community needs, ultimately advancing our understanding of mortality patterns among urban poor populations and informing more effective interventions to reduce health disparities.

References

Adebayo, A. M., Obembe, T. A., & Adebayo, B. E. (2020). Morbidity pattern and choice of care in an urban slum of a metropolitan state, southwestern Nigeria. *West African Journal of Medicine, 37*(3), 268–274.

Ahmed, S., Adams, A. M., Islam, R., Hasan, S. M., & Panciera, R. (2019). Impact of traffic variability on geographic accessibility to 24/7 emergency healthcare for the urban poor: A GIS study in Dhaka, Bangladesh. *PLOS ONE*, *14*(9), Article e0222488. https://doi.org/10.1371/journal.pone.0222488

Alarcão, A. C., Dell' Agnolo, C. M., Vissoci, J. R., Carvalho, E. C. A., Staton, C. A., de Andrade, L., Fontes, K. B., Pelloso, S. M., Nievola, J. C., & Carvalho, M. D. (2020). Suicide mortality among youth in southern Brazil: A spatiotemporal evaluation of socioeconomic vulnerability. *Brazilian Journal of Psychiatry, 42*(1), 46–53. https://doi.org/10.1590/1516-4446-2018-0352

Aleemi, A. R., Khaliqui, H., & Faisal, A. (2018). Challenges and patterns of seeking primary health care in slums of Karachi: A disaster lurking in urban shadows. *Asia Pacific Journal of Public Health, 30*(5), 479–490. https://doi.org/10.1177/1010539518772132

Alegre-Díaz, J., Herrington, W., López-Cervantes, M., Gnatiuc, L., Ramírez, R., Hill, M., Baigent, C., McCarthy, M. I., Lewington, S., Collins, R., Whitlock, G., Tapia-Conyer, R., Peto, R., Kuri-Morales, P., & Emberson, J. R. (2016). Diabetes and cause-specific mortality in Mexico City. *New England Journal of Medicine, 375*(20), 1961–1971. https://doi.org/10.1056/NEJMoa1605368

Ángel, S.-B., Ana, E.-G., & Adolfo, F. (2014). Efecto del nivel socioeconómico sobre la mortalidad en áreas urbanas: Revisión crítica y sistemática [Effect of socioeconomic status on mortality in urban areas: Critical and systematic review]. *Cadernos de Saúde Pública, 30*(8), 1609–1621. https://doi.org/10.1590/0102-311X00152513

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, *8*(1), 19–32. https://doi.org/10.1080/1364557032000119616

Bahadur, K. (2023). Social determinants of health in rural and urban communities. *Prāgyik Prabāha, 11*(1), 44–50. https://doi.org/10.3126/pp.v11i1.55505

Baptiste, D.-L. (2018). Who you are and where you live can determine how long you live: What nurses need to know about cardiovascular disease among low-income urban-dwelling minority communities. *Journal of Clinical Nursing*, 27(19–20), 3441–3442. https://doi.org/10.1111/jocn.14486

Bawah, A. T., Edufia, F., Yussif, F. N., Adu, A., & Yakubu, Y. A. (2021). Chronic kidney diseases among homeless and slum dwellers in Accra, Ghana. *Pan African Medical Journal, 38*, Article 340. https://doi.org/10.11604/pamj.2021.38.340.27106

Calabias, J. K. C. B. (2022). Death's Capital: Urban poor political ecology and the aesthetics of salvaging by the Nightcrawlers of Manila. In J. P. Telles, J. C. Ryan, & J. L. Dreisbach (Eds.), *Environment, Media, and Popular Culture in Southeast Asia* (pp. 119–133). Springer Singapore. https://doi.org/10.1007/978-981-19-1130-9_7

Castro-Alves, J., Silva, L. S., Lima, J. P., & Ribeiro-Alves, M. (2022). Were the socioeconomic determinants of municipalities relevant to the increment of COVID-19 related deaths in Brazil in 2020? *PLOS ONE*, 17(4), Article e0266109. https://doi.org/10.1371/journal.pone.0266109

Centers for Disease Control and Prevention (CDC). (2012, May). *Principles of epidemiology in public health practice* (3rd ed.). U.S. Department of Health and Human Services.

Chakrabarty, K. (2023). Exploring the factors affecting health outcomes among urban poor communities in Bangladesh. *Journal of Community Health Provision*, 3(1), 20–26. https://doi.org/10.55885/jchp.v3i1.213

Chandola, T., Mikkilineni, S., Chandran, A., Bandyopadhyay, S. K., Zhang, N., & Bassanesi, S. L. (2018). Is socioeconomic segregation of the poor associated with higher premature mortality under the age of 60? A cross-sectional analysis of survey data in major Indian cities. *BMJ Open*, 8(2), Article e018885. https://doi.org/10.1136/bmjopen-2017-018885

Chaudhary, S., Benzaquen, S., Woo, J. G., Rubinstein, J., Matta, A., Albano, J., De Joy, R., 3rd, Lo, K. B., & Patarroyo-Aponte, G. (2021). Clinical characteristics, respiratory mechanics, and outcomes in critically ill individuals with COVID-19 infection in an underserved urban population. *Respiratory Care*, 66(6), 897–908. https://doi.org/10.4187/respcare.08319

Christian, C., Hensel, L., & Roth, C. (2019). Income shocks and suicides: Causal evidence from Indonesia. *Review of Economics and Statistics*, 101(5), 905–920. https://doi.org/10.1162/rest_a_00777

Commission on Social Determinants of Health. (2008, August 27). *Closing the gap in a generation: Health equity through action on the social determinants of health* (Final report). World Health Organization. https://www.who.int/publications/i/item/WHO-IER-CSDH-08.1

Cross, S. H., & Warraich, H. J. (2019). Changes in the place of death in the United States. *The New England Journal of Medicine, 381*(24), 2369–2370. https://doi.org/10.1056/NEJMC1911892

Dahlgren, G., & Whitehead, M. (1991). *Policies and strategies to promote social equity in health: Background document to WHO strategy paper for Europe* (Working paper). Institute for Futures Studies. https://core.ac.uk/download/pdf/6472456.pdf

Daniella, D., Gayatri, A. A., & Somia, I. K. (2025). Non-communicable diseases in patients with human immunodeficiency virus and their risk factors. Infection & Chemotherapy, 57(1), 131–137. https://doi.org/10.3947/ic.2024.0123

De Maio, F. G. (2011). Understanding chronic non-communicable diseases in Latin America: Towards an equity-based research agenda. Globalization and Health, 7, 36. https://doi.org/10.1186/1744-8603-7-36

De Vita, M. V., Scolfaro, C., Santini, B., Lezo, A., Gobbi, F., Buonfrate, D., Kimani-Murage, E. W., Macharia, T., Wanjohi, M., Rovarini, J. M., & Morino, G. (2019). Malnutrition, morbidity and infection in the informal settlements of Nairobi, Kenya: An epidemiological study. *Italian Journal of Pediatrics, 45*(1), Article 12. https://doi.org/10.1186/s13052-019-0607-0

DeGuzman, P. B., Cohn, W. F., Camacho, F., Edwards, B. L., Sturz, V. N., & Schroen, A. T. (2017). Impact of urban neighborhood disadvantage on late-stage breast cancer diagnosis in Virginia. *Journal of Urban Health, 94*(2), 199–210. https://doi.org/10.1007/s11524-017-0142-5

Diez Roux, A. V., & Mair, C. (2010). Neighborhoods and health. *Annals of the New York Academy of Sciences, 1186*, 125–145. https://doi.org/10.1111/j.1749-6632.2009.05333.x

Eisenstein, M. (2016). Disease: Poverty and pathogens. Nature, 531(7594), S61-S63. https://doi.org/10.1038/531S61a

Erhardt, C. L. (1958). What is "the cause of death"? *Journal of the American Medical Association, 168*(2), 161–168. https://doi.org/10.1001/jama.1958.03000020023005

Escobar Carías, M. S., Johnston, D. W., Knott, R., & Sweeney, R. (2022). Flood disasters and health among the urban poor. *Health Economics, 31*(9), 2072–2089. https://doi.org/10.1002/hec.4566

Ferdous, F., Das, S. K., Ahmed, S., Farzana, F. D., Malek, M. A., Das, J., Latham, J. R., Faruque, A. S., & Chisti, M. J. (2014). Diarrhoea in slum children: Observation from a large diarrhoeal disease hospital in Dhaka, Bangladesh. *Tropical Medicine & International Health, 19*(10), 1170–1176. https://doi.org/10.1111/tmi.12357

Gadallah, M., Megid, S. A., Mohsen, A., & Kandil, S. (2018). Hypertension and associated cardiovascular risk factors among urban slum dwellers in Egypt: A population-based survey. *Eastern Mediterranean Health Journal, 24*(5), 435–442. https://doi.org/10.26719/2018.24.5.435

Girardin, J. L., Seixas, A., Ramos Cejudo, J., Osorio, R. S., Avirappattu, G., Reid, M., & Parthasarathy, S. (2021). Contribution of pulmonary diseases to COVID-19 mortality in a diverse urban community of New York. *Chronic Respiratory Disease, 18*. https://doi.org/10.1177/1479973120986806

Green, D. R., & Llambi, F. (2015). Cell death signaling. *Cold Spring Harbor Perspectives in Biology, 7*(12), a006080. https://doi.org/10.1101/cshperspect.a006080

Hall, J. M., Mkuu, R. S., Cho, H. D., Woodard, J. N., Kaye, F. J., Bian, J., Shenkman, E. A., & Guo, Y. (2023). Disparities contributing to late-stage diagnosis of lung, colorectal, breast, and cervical cancers: Rural and urban poverty in Florida. *Cancers (Basel), 15*(21), Article 5226. https://doi.org/10.3390/cancers15215226

Jaadla, H., Puur, A., & Rahu, K. (2017). Socioeconomic and cultural differentials in mortality in a late 19th century urban setting: A linked records study from Tartu, Estonia, 1897-1900. *Demographic Research, 36*(1), 1–40. https://doi.org/10.4054/DemRes.2017.36.1

Kamran, S., & Helen, E. (2017). Supporting the urban poor to quit tobacco: Adding years to lives. *Thorax, 72*(2), 105–106. https://doi.org/10.1136/THORAXJNL-2016-209435

Klimas, J., O'Reilly, M., Egan, M., Tobin, H., & Bury, G. (2014). Urban overdose hotspots: A 12-month prospective study in Dublin ambulance services. *American Journal of Emergency Medicine, 32*(10), 1168–1173. https://doi.org/10.1016/j.ajem.2014.07.017

Kochanek, K. D., Xu, J., Murphy, S. L., Miniño, A. M., & Kung, H.-C. (2011, December 29). *Deaths: Final data for 2009* (National Vital Statistics Reports, Vol. 60, No. 3). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. https://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_03.pdf

Kum, F., Mahmalji, W., Hale, J., Thomas, K., Bultitude, M., & Glass, J. (2016). Do stones still kill? An analysis of death from stone disease 1999-2013 in England and Wales. *BJU International, 118*(1), 140–144. https://doi.org/10.1111/BJU.13409

Kumar, R., Kaur, N., & Pilania, M. (2018). Morbidity pattern of patients attending a primary healthcare facility in an urban slum of Chandigarh, India. *Journal of Clinical and Diagnostic Research, 12*(1), LC10–LC13. https://doi.org/10.7860/jcdr/2018/31331.11297

Li, X., Yu, Y., Guan, X., & Feng, R. (2022). Overview of the special issue on applications of remote sensing imagery for urban areas. *Remote Sensing, 14*(5), Article 1204. https://www.mdpi.com/2072-4292/14/5/1204

Liao, R., Hu, L., Liao, Q., Zhu, T., Yang, H., & Zhang, T. (2022). Analysis of death causes of residents in poverty-stricken areas in 2020: Take Liangshan Yi Autonomous Prefecture in China as an example. *BMC Public Health, 22*(1), Article 89. https://doi.org/10.1186/s12889-022-12504-6

Lin, C., Cousins, S. J., Zhu, Y., Clingan, S. E., Mooney, L. J., Kan, E., Wu, F., & Hser, Y. I. (2024). A scoping review of social determinants of health's impact on substance use disorders over the life course. Journal of substance use and addiction treatment, 166, 209484. https://doi.org/10.1016/j.josat.2024.209484

Macchia, A., Ferrante, D., Battistella, G., Mariani, J., & Gonzalez Bernaldo de Quiros, F. (2021). COVID-19 among the inhabitants of the slums in the city of Buenos Aires: A population-based study. *BMJ Open, 11*(1), Article e044592. https://doi.org/10.1136/bmjopen-2020-044592

Marí-Dell'Olmo, M., Gotsens, M., Palència, L., Burström, B., Corman, D., Costa, G., Deboosere, P., Díez, È., Domínguez-Berjón, F., Dzúrová, D., Gandarillas, A., Hoffmann, R., Kovács, K., Martikainen, P., Demaria, M., Pikhart, H., Rodríguez-Sanz, M., Saez, M., Santana, P., ... Borrell, C. (2015). Socioeconomic inequalities in cause-specific mortality in 15 European cities. *Journal of Epidemiology and Community Health, 69*(5), 432–441. https://doi.org/10.1136/jech-2014-204312

Marmot, M. (2005). *The status syndrome: How social standing affects our health and longevity.* Bloomsbury Press.

Mberu, B., Wamukoya, M., Oti, S., & Kyobutungi, C. (2015). Trends in causes of adult deaths among the urban poor: Evidence from Nairobi Urban Health and Demographic Surveillance System, 2003–2012. *Journal of Urban Health, 92*(3), 422–445. https://doi.org/10.1007/s11524-015-9943-6

Menashe-Oren, A., & Stecklov, G. (2018). Urban–rural disparities in adult mortality in sub-Saharan Africa. *Demographic Research*, *39*(5), 136–176. https://doi.org/10.4054/DemRes.2018.39.5

Mode, N. A., Evans, M. K., & Zonderman, A. B. (2016). Race, neighborhood economic status, income inequality and mortality. *PLOS ONE*, *11*(5), Article e0154535. https://doi.org/10.1371/journal.pone.0154535

Mutembo, S., Mutanga, J. N., Musokotwane, K., Kanene, C., Dobbin, K., Yao, X., Li, C., Marconi, V. C., & Whalen, C. C. (2019). Urban–rural disparities in treatment outcomes among recurrent TB cases in Southern Province, Zambia. *BMC Infectious Diseases, 19*(1), Article 1087. https://doi.org/10.1186/s12879-019-4709-5

Navya, C. J., Sulekha, T., & Johnson, A. R. (2018). A cross-sectional study on childhood injuries in an urban underprivileged area in Bangalore City. *Indian Journal of Public Health Research & Development, 9*(2), 140–145. https://doi.org/10.5958/0976-5506.2018.00108.0

Nolasco, A., Fernández-Alcántara, M., Pereyra-Zamora, P., Cabañero-Martínez, M. J., Copete, J. M., Oliva-Arocas, A., & Cabrero-García, J. (2020). Socioeconomic inequalities in the place of death in urban small areas of three Mediterranean cities. *International Journal for Equity in Health, 19*(1), Article 214. https://doi.org/10.1186/s12939-020-01324-y

Nolasco, A., Moncho, J., Quesada, J. A., Melchor, I., Pereyra-Zamora, P., Tamayo-Fonseca, N., Martínez-Beneito, M. A., Zurriaga, O., Ballesta, M., Daponte, A., Gandarillas, A., Domínguez-Berjón, M. F., Marí-Dell'Olmo, M., Gotsens, M., Izco, N., Moreno, M. C., Sáez, M., Martos, C., Sánchez-Villegas, P., & Borrell, C. (2015). Trends in socioeconomic inequalities in preventable mortality in urban areas of 33 Spanish cities, 1996–2007 (MEDEA project). *International Journal for Equity in Health*, *14*(1), Article 33. https://doi.org/10.1186/s12939-015-0164-0

Pakhale, S., Tariq, S., Huynh, N., Jama, S., Kaur, T., Charron, C., Florence, K., Nur, F., Bustamante-Bawagan, M. E., Bignell, T., Boyd, R., Haddad, J., Kendzerska, T., & Alvarez, G. (2021). Prevalence and burden of obstructive lung disease in the urban poor population of Ottawa, Canada: A community-based mixed-method, observational study. *BMC Public Health*, *21*(1), Article 183. https://doi.org/10.1186/s12889-021-10209-w

Pinto, M., Bardach, A., Palacios, A., Biz, A., Alcaraz, A., Rodriguez, B., Augustovski, F., & Pichon-Riviere, A. (2015). The rise of noncommunicable diseases in Latin America and the Caribbean: Challenges for public health policies. Latin American Economic Review, 24, 25. https://doi.org/10.1007/s40503-015-0025-7

Rangan, P., N. Singh, S., J. Landau, M., & Choi, J. (2015). Impact of death-related television programming on advertising evaluation. *Journal of Advertising*, *44*(4), 326–337. https://doi.org/10.1080/00913367.2015.1077490

Rawal, L. B., Biswas, T., Khandker, N. N., Saha, S. R., Bidat, C. M. M., Khan, A. N. S., Chowdhury, E. H., & Renzaho, A. (2017). Non-communicable disease (NCD) risk factors and diabetes among adults living in slum areas of Dhaka, Bangladesh. *PLOS ONE*, *12*(10), Article e0184967. https://doi.org/10.1371/journal.pone.0184967

Salguero-Linares, J., & Coll, N. S. (2023). Cell death as a defense strategy against pathogens in plants and animals. *PLOS Pathogens, 19*(4), Article e1011253. https://doi.org/10.1371/journal.ppat.1011253

Santosa, A., Rosengren, A., Ramasundarahettige, C., Rangarajan, S., Gulec, S., Chifamba, J., Lear, S. A., Poirier, P., Yeates, K. E., Yusuf, R., Orlandini, A., Weida, L., Sidong, L., Yibing, Z., Mohan, V., Kaur, M., Zatonska, K., Ismail, N., Lopez-Jaramillo, P., ... Yusuf, S. (2021). Psychosocial risk factors and cardiovascular disease and death in a population-based cohort from 21 low-, middle-, and high-income countries. *JAMA Network Open, 4*(12), Article e2138920. https://doi.org/10.1001/jamanetworkopen.2021.38920

Selim, A. M., Mazurek, J. A., Iqbal, M., Wang, D., Negassa, A., & Zolty, R. (2015). Mortality and readmission rates in patients hospitalized for acute decompensated heart failure: A comparison between cardiology and general-medicine service outcomes in an underserved population. *Clinical Cardiology, 38*(3), 131–138. https://doi.org/10.1002/clc.22372

Snyder, R. E., Marlow, M. A., Phuphanich, M. E., Riley, L. W., & Maciel, E. L. (2016). Risk factors for differential outcome following directly observed treatment (DOT) of slum and non-slum tuberculosis patients: A retrospective cohort study. *BMC Infectious Diseases, 16*, Article 494. https://doi.org/10.1186/s12879-016-1835-1

Soumya, C., Arasu, S., Ramesh, N., Goud, R., & Joseph, B. (2023). Morbidity profile of migrant workers attending health camps in Bangalore urban during the COVID-19 pandemic. *International Journal of Occupational Safety and Health, 13*(1), 78–86. https://doi.org/10.3126/ijosh.v13i1.43081

Ssensamba, J. T., Nakafeero, M., Ssemakula, D. M., Ssenyonga, R., & Nnakate, J. B. (2019). The burden of HIV/AIDS among slum-dwelling school-age children in Kampala, Uganda. *HIV and AIDS Review, 18*(4), 267–272. https://doi.org/10.5114/hivar.2019.89455

Vlahov, D., & Galea, S. (2002). Urbanization, urbanicity, and health. *Journal of Urban Health, 79*(4 Suppl 1), S1–S12. https://doi.org/10.1093/jurban/79.suppl_1.s1

Wilson, R. F., Liu, S. G., Lyons, B. H., Petrosky, E., Harrison, D. D., Betz, C. J., & Blair, J. M. (2022). Surveillance for violent deaths — National Violent Death Reporting System, 42 states, the District of Columbia, and Puerto Rico, 2019. *Morbidity and Mortality Weekly Report, 71*(6), 1–40. https://doi.org/10.15585/mmwr.ss7106a1

Wong, E. B., Olivier, S., Gunda, R., Koole, O., Surujdeen, A., Gareta, D., Munatsi, D., Modise, T. H., Dreyer, J., Nxumalo, S., Smit, T. K., Ording-Jespersen, G., Mpofana, I. B., Khan, K., Sikhosana, Z. E. L., Moodley, S., Shen, Y.-J., Khoza, T., Mhlongo, N., … Pillay, D., & the Vukuzazi Team. (2021). Convergence of infectious and non-communicable disease epidemics in rural South Africa: A cross-sectional, population-based multimorbidity study. The Lancet Global Health, 9(7), e967–e976. https://doi.org/10.1016/S2214-109X(21)00176-5

World Health Organization. (2006). *International statistical classification of diseases and related health problems: 10th revision (ICD-10)* (10th ed.). World Health Organization. https://icd.who.int

World Health Organization. (2020, May 13). *World health statistics 2020: Monitoring health for the SDGs, sustainable development goals* (Global report). World Health Organization. https://www.who.int/publications/i/item/9789240005105

World Health Organization (WHO), United Nations Development Programme (UNDP), & Ministry of Public Health, Thailand. (2021). Prevention and control of noncommunicable diseases in Thailand: The case for investment. United Nations Inter-Agency Task Force on the Prevention and Control of NCDs.

Zaidi, A. K., Awasthi, S., & deSilva, H. J. (2004). Burden of infectious diseases in South Asia. BMJ (Clinical research ed.), 328(7443), 811–815. https://doi.org/10.1136/bmj.328.7443.811

Zhou, X., Sho, K., Qiu, H., Chang, S., & Cen, Q. (2025). Association between exposure to urban neighborhood natural environments and human health: A systematic review of multiple exposure indicators. *Environmental and Sustainability Indicators, 25*, Article 100548. https://doi.org/10.1016/j.indic.2024.100548