



A Systematic Review of Multidimensional Urban Poverty and Deprivation Indicators

Çok Boyutlu Kentsel Yoksulluk ve Yoksunluk Göstergelerine Yönelik Sistematik Bir İnceleme

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Abstract /Öz

UNDP (2022) data shows that 1,2 billion people in 111 developing countries live in acute multidimensional poverty. Rapid population growth can strain limited resources and infrastructure, especially in low-income areas, further perpetuating urban deprivation expressed through indicators such as limited access to basic services and amenities, housing, etc. Poverty and deprivation emerge as two closely related concepts often used interchangeably but with distinct meanings. Fast and uncontrolled urbanization leads to an increase in poverty in densely populated urban areas and may even exacerbate urban deprivation. Accurate measurement of poverty and deprivation in urban areas serves development of effective policies and assessing-alleviating social and economic inequalities. To analyze how scientific literature is addressing the measurement of multidimensional poverty and deprivation to tackle such urban challenges, a systematic review following the PRISMA guidelines was performed in the Web of Science and Scopus databases. After screening according to inclusion criteria, 49 studies were identified that analyzed poverty and deprivation indicators in an urban context. Among these selected studies, most of them were utilizing Alkire-Foster (AF) method for measuring and evaluating the non-monetary dimension of poverty and deprivation. However, this review also highlighted that there appears to be a gap in the literature concerning the exploration of urban deprivation indicators in the context of urban planning and spatial dimensions.

UNDP (2022) verileri, gelişmekte olan 111 ülkede 1,2 milyar insanın çok boyutlu yoksulluk içinde yaşadığını göstermektedir. Hızlı nüfus artışı, özellikle düşük gelirli bölgelerde sınırlı kaynakları ve altyapıyı yetersiz bırakabilmekte, bu çalışmanın konusunu oluşturan ve temel hizmetlere ve donatılara yetersiz erişim, konut yetersizliği, vb. göstergelerle ifade edilen kentsel yoksunluğu da yaygınlaştırmaktadır. Yoksulluk ve yoksunluk kavramları birbiriyle yakından ilişkili olan ve genellikle birbirlerinin yerine kullanılmasının yanı sıra birbirlerinden farklı anlamlara da sahip olan iki kavram olarak karşımıza çıkmaktadır. Hızlı ve çarpık kentleşme, yoksulluğun nüfus yoğunluğu yüksek kentsel alanlarda daha da artmasına yol açmakta, hatta kentsel yoksunluğu şiddetlendirebilmektedir. Kentlerde yoksulluk ve yoksunluğun doğru göstergeler ile ölçülmesi, etkili politikaların geliştirilmesine, sosyal ve ekonomik eşitsizlikleri azaltmaya hizmet etmektedir. Bu çalışmada, yoksulluk ve yoksunlukla ilgili literatürü analiz etmek üzere, Web of Science ve Scopus veri tabanlarında PRISMA yönergeleriyle sistematik bir derleme çalışması yapılmıştır. İçerme kriterlerine göre yapılan taramanın ardından, kentsel bağlamda yoksulluk ve yoksunluk göstergelerinin analiz edildiği 49 çalışma belirlenmiştir. Seçilen çalışmaların bulguları, yoksulluğun ve yoksunluğun parasal olmayan boyutunu ölçmek ve değerlendirmek için Alkire-Foster (AF) yönteminin yaygın olarak kullanıldığına işaret etmekte; aynı zamanda kentsel yoksunluk göstergelerinin kent planlama ve mekan boyutunun araştırılmasında, literatürde önemli bir boşluk olduğu göstermektedir.

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1. Introduction

Poverty is manifested by lack of income, limited access to public services and resources, and various aspects of insufficient well-being. Although it has been recognized that poverty encompasses non-monetary indicators, the measurement and analysis of poverty are mainly linked to monetary indicators (Bourguignon & Chakravarty, 2003).

One-dimensional approaches are based on income or consumption. According to Wagle (2005), the unidimensional approach implicitly assumes that an individual's status in relation to one dimension significantly predicts that individual's status on the other dimensions. However, the unidimensional measure of poverty is insufficient to capture multiple deprivations. By acknowledging the inability of a one-dimensional approach in poverty measurement, research interests have shifted to the multidimensional understanding of poverty.

This interest in multidimensionality and the literature on development economics have been greatly influenced by Sen's capability approach (Sen, 1984; 1993). By highlighting the importance of agency and empowerment, and multidimensional analysis form, this approach has contributed to development and poverty discourses (Frediani, 2010). According to the capabilities approach, an individual's ability to achieve certain capabilities, which includes a variety of reachable functioning, such as health, education, and shelter, is what's the most important for well-being. In order to identify relevant capabilities or functioning for empirical studies, there is a need for creating a set of domains and indicators for particular well-being characteristics. In this context, the set of appropriate indicators in multidimensional poverty studies is related to specific information on multiple deprivations.

Following Sen's capability approach that extends the concept of poverty beyond conventional explanations, a multidimensional poverty approach has been acknowledged. It has been recognized that income level is insufficient to define poverty, and a new definition of poverty includes lack of capabilities and opportunities, lack of public services, social exclusion, powerlessness, and physical and social well-being. Thus, the new poverty concept from a multidimensional perspective has been understood through two poverty indices: the monetary poverty index and the non-monetary (deprivation) poverty index.

The global acceptance of the multidimensional poverty approach and the methodological framework for the multidimensional measures of poverty is based on the works of the Oxford Poverty and Human Development Initiative (OPHI). In order to build capacity and reduce poverty, OPHI developed an international measure of poverty, the global Multidimensional Poverty Index (MPI). The MPI was first published in the key working paper 'Acute Multidimensional Poverty: A New Index for Developing Countries' by Alkire and Santos (2010). This approach defines poverty and identifies poor people who fall short of the resources, needs, or levels of functioning to maintain a basic standard of living (Alkire & Santos, 2014; Walker, 2015). The MPI indicates a different pattern of poverty than income-based poverty through the utilization of deprivation indicators. Therefore, this multidimensional poverty measurement goes beyond the one-dimensional poverty approach by complementing monetary (income-based) poverty measures with multiple deprivations (non-monetary) measures.

The MPI is composed of three dimensions: health, education, and standards of living, and these are measured with ten indicators: (health): nutrition, child mortality, (education): years of schooling, school attendance, (living standards): cooking fuel, sanitation, drinking water, electricity, housing, and assets. These dimensions are weighted equally, and also each indicator of these three dimensions is equally weighted too. To evaluate multidimensional poverty according to these indicators, the Alkire and Foster (2007, 2009) method based on counting the different types of deprivation was developed.

This article investigates a wide range of studies in the Scopus and Web of Science databases with a systematic review approach for gathering all the monetary and non-monetary indicators related to multidimensional poverty and urban deprivation in the literature. Overall, this research aims to find what are the key thematic focuses, geographical context, most common methodologies, databases, and a unit of analysis. Therefore, the initial questions that guide this analysis are: 1) How do we conceptualize multidimensional poverty and urban deprivation in the context of literature within Scopus and Web of Science databases? 2) How is it possible to translate these conceptualizations into domains of deprivation and indicators which are utilized in the measurements of derivation within the literature review? 3) What are the lacks/gaps of urban planning dimension in evaluating/measuring urban deprivation?

2. Method

This study systematically reviews the scientific literature for collecting, analyzing, and synthesizing existing research evidence on multidimensional poverty and deprivation studies. Based on specific research questions on the multidimensional approach in poverty measurement, this study involves extracting relevant data from included studies to synthesize deprivation domains and indicators. The overall objective of this review is to examine the methodological approaches of multidimensional poverty studies, understand the degree to which deprivation indicators are considered within poverty measures, and provide a comprehensive summary of the research evidence.

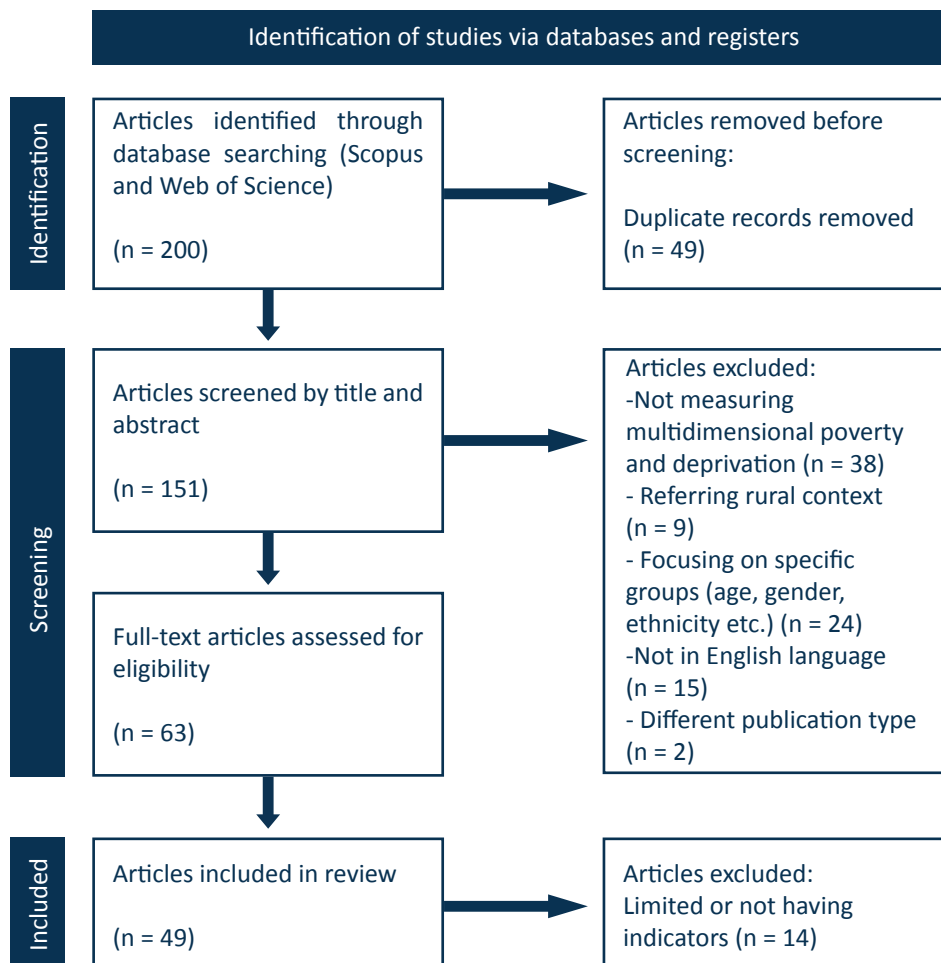
To achieve this, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology was followed. PRISMA is a set of elements for systematic reviews and meta-analyses reporting, which is supported by evidence. The procedure entails a series of 27 steps to be considered for the review, such as specifying information sources and databases to identify studies, specifying eligibility criteria, specifying study selection and data collection processes, and reporting the results of syntheses. In particular, this study adopted PRISMA 2020 (Page et al., 2021) flow diagram for identification of studies (Figure 1).

The systematic review is a suitable method for identifying key concepts, dimensions, and indicators by extracting data from poverty and deprivation studies included in the review. To identify the most relevant studies, the Web of Science and Scopus databases were used. The search strategy aimed to limit records to find empirical studies on multidimensional poverty measurement based on deprivation indicators within urban contexts, and thus the following search terms were used: ["urban" OR "city" OR "cities"] AND ["multidimensional" AND "poverty" AND "deprivation"] AND ["measurement" OR "index"].

After the identification of articles through database searching, duplicated studies were eliminated before screening via Rayyan software (Ouzzani et al., 2016). In that sense, the initial search resulted in 200 publications, which were reduced to 151 after removing duplicates. The screening process was conducted mainly in two steps: first, articles were screened by title and abstract according to eligibility criteria, and then the full-text screening was performed to select studies included in the review for analysis. The eligibility (inclusion and exclusion) criteria used for screening articles were specified to refine study selection towards the statements: (1) articles measuring multidimensional poverty and deprivation within a certain context were included, (2) studies that did not address multidimensional deprivation indicators or studies with limited indicators were excluded, (3) articles using metrics developed at a national-to-local level were included, (4) articles referring urban context were included, rural studies were excluded, (5) studies measuring the poverty of specific groups with particular characteristics such as age, gender, or ethnicity were excluded, and (6) studies in languages other than English were excluded.

In the step of screening by title and abstract, 151 articles were analyzed, and 63 articles were specified as eligible for the full-text review. A total of 88 articles were excluded due to studies in a different language (n=15), studies did not apply multidimensional poverty and deprivation analysis (n=38), studies referred to specific social groups (n=24), studies referred to rural context (n=9), and studies in different publications type (n=2). After reviewing full-text articles, 14 more articles were excluded because those studies had limited or no indicators regarding the multidimensional poverty index. Finally, 49 articles were selected for detailed analysis. The details of the selection process are shown in Figure 1 with PRISMA 2020 flow diagram.

Figure 1. Flow diagram of study selection



Source: Prepared by the authors following the PRISMA 2020 Guideline (2021).

3. Findings

3.1. Findings on systematically analyzed studies

The initial findings section presents a detailed summary of the systematically reviewed literature, examining several key factors. The geographical scale of the studies, whether they were conducted at the national or sub-national level, is outlined. Additionally, the context of the studies is specified, indicating whether they focused on specific cities or entire countries. The study approach and methodology are also discussed, highlighting whether a cross-sectional or longitudinal approach was employed, as well as the utilization of the Alkire-Foster method. Furthermore, the source of data used in the studies is identified, distinguishing between census data or survey responses. The unit of analysis, whether it pertained to individuals or households, is noted as well. Finally, the measurement dimensions and indicators utilized in the reviewed studies are outlined in Table 1. It is noteworthy that a considerable portion of the literature consisted of cross-sectional studies conducted at the national level within a single country.

The geographical distribution of the studies reveals a clear concentration of attention on Asia and South/Latin America, which collectively accounted for the majority of the research (50% and 22.7% respectively). The significance of these regions is further emphasized by the fact that more than half of the studies were conducted in Asia. Within Asia, India and Pakistan emerged as the leading contributors, with a substantial number of studies focused on poverty and deprivation. In South/Latin America, Brazil stood out with the highest number of articles dedicated to poverty studies, showcasing the country's prominent role in advancing research in this area. In contrast, Europe and African countries received relatively less attention in terms of the number of studies conducted. The Middle East and Arab States lagged behind, indicating a potential gap in research on multidimensional poverty in these regions. The analysis of the articles included in this systematic review reveals that a significant portion of the studies focused on national-level assessments of multidimensional poverty and deprivation. These studies aimed to provide a comprehensive understanding of the extent of poverty and deprivation experienced by individuals and households across countries. They often incorporated comparisons between urban and rural areas to highlight the disparities that exist within the national context. For instance, Yu (2013) conducted an in-depth examination of multidimensional poverty in China, revealing stark differences between urban and rural regions. The study emphasized the importance of addressing these disparities to achieve more equitable development. In contrast, a notable proportion of the studies examined sub-national scales, focusing on specific regions or cities within a single country. These sub-national studies aimed to provide localized insights into the prevalence and characteristics of multidimensional poverty within urban areas. For example, Beccaria et al. (2023) focused their analysis on the City of Buenos Aires, estimating multidimensional poverty rates for all households in that specific urban setting. Such sub-national studies offer valuable insights into the unique dynamics and challenges faced by urban populations within a particular geographic context. Overall, more than half of the articles reviewed in this study (69.4%) were conducted at the national scale, while the remaining 30.6% were at the sub-national scale. The majority of the studies focused on a single country (73.5%), while 26.5% involved a comparative analysis of multiple countries. Both national and sub-national scale studies contribute to our understanding of multidimensional poverty and deprivation. They shed light on the varying levels, patterns, and drivers of poverty across different geographical contexts. By identifying and addressing these issues, policymakers and practitioners can work towards implementing effective strategies and policies to reduce poverty and promote inclusive development at both national and local levels.

In terms of the research design, a significant majority of the articles (61.2%) utilized a cross-sectional approach to collect data at a specific point in time. This approach allowed researchers to capture a snapshot of multidimensional poverty. On the other hand, a notable proportion of the studies (38.8%) adopted a longitudinal approach, enabling them to investigate changes in multidimensional poverty over time. For instance, Djahini-Afawoubo and Couchoro (2020) chose a longitudinal approach to analyze changes in multidimensional poverty in Togo between 2006 and 2015. Their research revealed that multidimensional poverty witnessed significant reductions across various deprivation dimensions, particularly in urban areas. In terms of the unit of analysis, approximately one-fifth of the articles (20.4%) focused on analyzing multidimensional poverty at the individual level. This individual-level analysis allowed researchers to explore the specific experiences and deprivations faced by individuals. Conversely, the majority of the articles (79.6%) conducted their research at the household level. Analyzing multidimensional poverty at the household level provided a broader perspective on the overall well-being and living conditions of households. These findings underscore the importance of both cross-sectional and longitudinal approaches in understanding and addressing multidimensional poverty. Additionally, considering multiple units of analysis, such as individuals and households, contributes to a more comprehensive understanding of the complexities and nuances of poverty experiences.

In the field of multidimensional poverty and deprivation measurement, the Alkire-Foster method stands as the most widely utilized approach for constructing measurements. This method offers a robust framework that combines individual deprivations across multiple dimensions, providing a comprehensive overview of poverty. Additionally, various statistical techniques have been employed to enhance the measurement process. Factorial analysis, for instance, enables the identification of underlying factors that contribute to poverty and deprivation. Latent class analysis (LCA) allows for the classification of individuals into distinct groups based on shared characteristics, shedding light on different patterns of poverty. The fuzzy approach introduces a degree of uncertainty in the measurement process, acknowledging the subjective nature of poverty. Multiple correspondence analysis is used to examine relationships between different variables and dimensions of poverty. By utilizing these diverse methodologies, researchers can capture the complexity of multidimensional poverty and deprivation, fostering a more nuanced understanding of these phenomena.

Table 1. Systematization of the multidimensional poverty and deprivation studies

Authors	Context	Methodology	Database	Unit	Dimension	Indicator	Weighting
Abdelkhalek & Ejjanoui [2012]	Marrakesh / Morocco	Multiple correspondence analysis (MCA)	General Population and Housing Census	Individual	4	12	Weighted
Ataguba et al. [2013]	Nsukka / Nigeria	The Alkire-Foster method, FGT class indices	Nigerian Living Standard Survey (NLSS), General Household Survey	House-hold	8	16	Weighted
Bruder & Ünal [2017]	EU (Austria, Hungary, Poland, Czech Republic, Slovakia)	Logistic regression analysis	EU-SILC	House-hold	NA	9	Weighted
D'Ambrosio & Imanishi [2008]	São Paulo / Brazil	Yitzhaki's index, the ER polari-zation index, the BDP index	Demographic Census (CENSO)	Individual	4	11	Un-weighted
Dewilde [2004]	Belgium, Britain	Latent Class Analysis (LCA)	Panel Study on Belgian Households, British Household Panel Survey	House-hold	3	13	Weighted
Dewilde [2008]	EU (Denmark, Belgium, Netherlands, France, Austria, Ireland, Italy, Spain, Portugal, Greece)	Latent Class Analysis (LCA)	European Community Household Panel (ECHP)	Individual	3	10	Weighted
Dirksen et al. [2022]	Haiti, India, Niger, Pakistan, Papua New Guinea, Tajikistan	The Alkire-Foster method	Demographic and Health Surveys (DHS)	House-hold	2	8	Equally weighted
Djahini-Afawoubo & Couchoro [2020]	Togo	The Alkire-Foster method	Household Surveys	Individual	6	23	Equally weighted
Golgher [2015]	Brazil	Fuzzy-set approach	Brazilian Household Budget Survey (POF)	House-hold	3	13	Equally weighted
Golgher [2010]	Brazil	Multivariate analysis	Brazilian Demographic Census	House-hold	4	10	NA
Khan et al. [2014]	Sindh / Pakistan	The Alkire-Foster method, Foster Greer Thorbecke (FGT) class of measure	Household Integrated Economic Survey (HIES), Pakistan Social and Living Standard Management Survey	Individual	3	10	Equally weighted

Khan et al. [2014]	Rawalpindi / Pakistan	The Alkire-Foster method	Household Integrated Economic Survey (HIES), Pakistan Social and Living Standard Management Survey	House-hold	3	10	Equally weighted
Yuheng et al. [2022]	South Asia (Bangladesh, Pakistan, India, Nepal, Bhutan, Sri Lanka, Maldives)	The Alkire-Foster method	NA	House-hold	3	10	Equally weighted
Machado et al. [2014]	Brazil	The Alkire-Foster method	Brazilian National Household Survey	House-hold	4	13	Equally weighted
Mahmood & Hussain [2020]	Pakistan	The Alkire-Foster method	Pakistan Social and Living Standard Measurement Survey (PSLM)	House-hold	5	12	Weighted
Mohanty & Vasishtha [2021]	India	The Alkire-Foster method, Multilevel analysis	National Family Health Survey (NFHS-4)	House-hold	4	13	Equally weighted
Pham et al. [2021]	Vietnam	Fuzzy method, Multilevel analysis	Vietnam Housing Living Standard Surveys (VHLSS)	House-hold	6	19	Weighted
Roncancio et al. [2020]	Cameroon, Guatemala, India	The Alkire-Foster method	Washington Group Extended Questionnaire	Individual	4	12	Equally weighted
Saboor et al. [2015]	Pakistan	The Alkire-Foster method	Household Integrated Economic Survey (HIES), Pakistan Social and Living Standard Management Survey	Individual	3	10	Equally weighted
Saleem et al. [2019]	Pakistan	The Alkire-Foster method	Pakistan Social and Living Standard Measurement Survey (PSLM)	House-hold	4	11	Weighted
Sevinc [2020]	United Kingdom	The Alkire-Foster method	EU Statistics on Income and Living Conditions Survey (EU-SILC)	House-hold	4	13	Weighted
Steinert et al. [2016]	KwaZulu-Natal / South Africa	Composite Poverty Index	Household survey	House-hold	3	22	Weighted
Tedong et al. [2022]	Song Sarawak / Malaysia	The Alkire-Foster method	Household survey	House-hold	3	10	Equally weighted
Vollmer & Alkire [2022]	LICs, LMICs (low-income to low-middle-income countries)	Multiple correspondence analysis (MCA)	Demographic and Health Surveys (DHS), Multiple Indicators Cluster Surveys (MICS), National Surveys	House-hold	11	41	Weighted
Bialowolska [2014]	EU countries	The Alkire-Foster method	EU-SILC	House-hold	3	17	Weighted
Yang & Pundarik [2021]	China	Alkire-Foster method, Foster-Greer-Thorbecke (FGT) poverty index	China Household Income Project Survey (CHIP)	Individual	NA	4	Equally weighted

Beccaria et al. [2023]	Buenos Aires / Argentina	Consensual approach	The Annual Household Survey (EAH)	House-hold	5	17	Equally weighted
Hernández & Zuluaga [2022]	Colombia	Feasible Generalized Least Squares (FGLS) method	Colombian Longitudinal Survey (ELCA)	House-hold	5	13	Equally weighted
Correa et al. [2022]	Ilhéus, Itabuna / Brazil	Multivariate analysis	IBGE Demographic Census	House-hold	10	16	Weighted
Martínez-Martínez et al. [2022]	Mexico City / Mexico	The Alkire-Foster method	The Social Welfare Survey	House-hold	16	24	NA
Das et al. [2021]	India	The Alkire-Foster method	National Sample Survey Organization (NSSO)	House-hold	3	9	Equally weighted
Chan & Wong [2020]	Hong Kong / China	Structural equation modelling (SEM)	Random sample survey	Individual	NA	21	NA
Iqbal et al. [2020]	Punjab / Pakistan	The Alkire-Foster method	Multiple Indicators Cluster Survey (MICS)	House-hold	5	7	Equally weighted
Abu Bakar et al. [2020]	Malaysia	Machine Learning (ML) ap-proach	Household Expenditure and Income Survey (HEIS)	House-hold	4	11	Weighted
Bikorimana & Sun [2020]	Rwanda	Multidimensional Poverty Index (MPI), Alkire-Santos	Rwanda Demographic Health Survey (RDHS), Integrated Household Living Conditions Survey (EICV4)	House-hold	3	10	Equally weighted
Chen et al. [2019]	Taiwan	The Alkire-Foster method	National Health Interview Survey (NHIS)	Individual	5	8	Equally weighted
Tanwar et al. [2019]	Haryana / India	The Alkire-Foster method	NSSO Survey	House-hold	3	10	Weighted
Pham & Pundarik [2018]	Vietnam	Fuzzy approach	Vietnam Household Living Standards Survey (VHLSS)	House-hold	7	21	Weighted
Rahman [2018]	Bangladesh	The Alkire-Foster method	Bangladesh Health and Demographic Survey (BDHS), Household Income Expenditure Survey (HIES)	House-hold	3	10	Weighted
Tanwar & Hooda [2018]	Haryana / India	The Alkire-Foster method	National Sample Survey Office (NSSO)	House-hold	2	10	Equally weighted
Berenger et al. [2013]	Egypt, Jordan	Counting approach, The Al-kire-Foster method	Demographic and Health Surveys	House-hold	3	9	Equally weighted
Alkire et al. [2017]	LICs, LMICs, UMICs	The Alkire-Foster method	Demographic and Health Survey (DHS)	House-hold	3	10	Weighted
Angulo et al. [2016]	Colombia	The Alkire-Foster method	Colombian Living Standards Measurement Surveys (LSMS)	House-hold	5	15	Equally weighted

Mahadevana & Hoangb [2016]	Vietnam	Latent Class Model (LCM)	Vietnamese Household Living Standard Survey (VHLSS)	House-hold	NA	13	NA
Bader et al. [2016]	Lao People's Democratic Republic	The Alkire-Foster method	Lao Expenditure and Consumption Survey	House-hold	3	9	Equally weighted
Salvucci et al. [2012]	Mozambique	Fuzzy approach	Mozambican Household Budget Survey	House-hold	6	32	Weighted
Berenger et al. [2013]	Egypt, Morocco, Turkey	Acquisition approach, Correspondence analysis	Demographic and Health Surveys	House-hold	NA	10	Weighted
Battiston et al. [2013]	Latin America (Argentina, Brazil, Chile, El Salvador, Mexico, Uruguay)	UBN approach	Socioeconomic Database for Latin America and the Caribbean (SEDLAC)	House-hold	NA	6	Weighted
Yu [2013]	China	The Alkire-Foster method	China Health and Nutrition Survey (CHNS)	House-hold	5	8	Equally weighted

* Not Available

3.2. Findings on systematically analyzed studies

The second section of the findings extensively examines the concept of multidimensional poverty by employing a synthesized set of diverse dimensions and indicators of deprivation sourced from the selected articles. The literature underscores the significance of multiple dimensions in comprehending and assessing poverty beyond the traditional income-based approach. The dimensions explored in the literature include income and occupation, which reflect economic well-being, assets, education, housing conditions, access to basic services, such as water and sanitation, urban infrastructure quality, availability of urban amenities and facilities, environmental issues, food security and nutrition, health status and access to healthcare, as well as social well-being. By considering these dimensions collectively, a more comprehensive and nuanced understanding of poverty and the interplay of various factors contributing to deprivation is achieved. This multidimensional approach enables policymakers and researchers to develop targeted interventions and policies that address the diverse and interrelated challenges faced by individuals and communities experiencing poverty.

In the existing literature, the dimension of income and occupation has emerged as a focal point of research, garnering considerable attention. Among the urban poor, this domain presents a multitude of challenges and deprivations that demand closer examination. These challenges encompass various aspects, such as insufficient income levels, financial limitations, and the consequent restricted affordability. Furthermore, individuals facing urban poverty encounter obstacles related to accessing employment opportunities, including limited availability and competitiveness. Additionally, the urban poor often face hurdles in accessing social security and pension insurance, undermining their financial stability and long-term security. Moreover, debt, credit, and savings become pressing issues, compounding the overall financial struggles experienced by this vulnerable group (Bruder & Ünal, 2017; Yang & Pundarik, 2021). Extensive research in this domain illuminates the critical nature of these deprivations and underscores the need for targeted interventions to address and mitigate them effectively.

Various studies, such as those conducted by Bruder and Ünal (2017) and Mahadevana and Hoangb (2016), consistently suggest that a country's economic condition, wages, and average equalized income significantly influence the levels of poverty and deprivation. Specifically focusing on the income aspect, individuals facing deprivations related to income often experience financial stress or limitations due to inadequate financial resources (Dewilde, 2004). This means that even if households are employed, the income level remains a crucial factor in determining the extent of deprivation. It is worth noting that different income levels can lead to specific forms of deprivation. For instance, households with low income are more prone to food deprivation, while those with middle-income levels might face challenges in accessing quality education. On the other hand, higher-income households may experience deprivation in terms of certain non-essential goods that are less commonly accessible (Golgher, 2015). These findings underline the intricate relationship between income and various dimensions of deprivation, highlighting the need to address income disparities as a vital component in poverty reduction strategies.

Further investigations into multidimensional poverty have challenged the notion that income level alone is the primary indicator of an individual's deprivation or impoverished status. An illuminating study conducted by Ataguba et al. (2013) provides compelling evidence in this regard. The study examined the poverty levels of a sample group and found that 11 percent of individuals living below the threshold of US\$1.25 per day were actually classified as non-poor according to selected measures of multidimensional poverty. Surprisingly, a significant proportion of individuals, amounting to 62 percent, who exceeded the US\$1.25 per day threshold were classified as poor based on the same multidimensional poverty measures. These findings underscore the critical need to move beyond a narrow focus on income and consider a broader range of determinants and indicators of deprivation when evaluating poverty. It becomes evident that poverty status cannot be solely determined by monetary factors alone, as the presence or absence of deprivation hinges on the specific indicators chosen to assess an individual's well-being or that of a household.

Access to employment plays a significant role in determining both income and occupation levels, as discussed by Dewilde (2004). Individuals belonging to households where the reference person is unemployed are more prone to experiencing income poverty and facing multiple deprivations. Unemployment can arise due to various reasons, including retirement, inactivity, disability, or illness preventing individuals from working (Dewilde, 2004). When it comes to mitigating the risk of poverty, having fixed-term employment is generally preferable to being unemployed, particularly when there are stricter employment regulations in place. However, the impact of fixed-term employment on poverty is influenced by economic prosperity. Interestingly, the flexibility associated with fixed-term employment can paradoxically increase the likelihood of experiencing poverty. Nonetheless, overall, being employed, even in a fixed-term position, proves to be more effective in preventing poverty compared to being unemployed (Dewilde, 2008). These findings underscore the importance of employment as a key factor in poverty prevention and highlight the complex dynamics involved in the relationship between employment, poverty, and deprivation.

Additionally, the type of employment not only affects the level of deprivation but also plays a crucial role in determining the overall well-being of households. When the head of the household is employed by a company or organization, there is a higher likelihood of them experiencing less deprivation. This can be attributed to the stability and security that comes with formal employment, including a regular income, access to benefits, and more predictable work conditions. On the other hand, self-employed households face a higher risk of experiencing deprivation due to various factors such as irregular income streams, limited access to social protection, and the potential for business instability. The nature of self-employment often involves inherent uncertainties, making these households more susceptible to economic hardships and the associated deprivation (Hernández & Zuluaga, 2022).

To effectively tackle the impact of income-related factors on poverty, it is imperative to adopt a multifaceted approach encompassing comprehensive poverty relief strategies and the implementation of appropriate policies. One key aspect of this approach involves the integration of social protection programs. These programs play a vital role in mitigating the effects of poverty by providing targeted support to vulnerable individuals and households. Among the various initiatives that can be incorporated into social protection programs are cash transfer programs, which provide direct financial assistance to those in need. Additionally, school feeding programs can address the nutritional needs of underprivileged children, ensuring their access to proper meals and supporting their educational outcomes. The labor market interventions within social protection programs can enhance employment opportunities and foster economic resilience. Furthermore, the provision of social insurance, disability pensions, pension insurance, and unemployment insurance can offer essential safeguards to individuals and families during times of economic instability and vulnerability (Saleem et al., 2019). By integrating these diverse components into poverty relief strategies, policymakers can establish a comprehensive and robust framework that effectively addresses income-related factors, reduces poverty, and promotes social well-being.

According to the UNDP global standard of multidimensional poverty, the assets domain is considered significant in assessing poverty. It follows the income and occupation domain, signifying the importance of material possessions and wealth indicators. These assets encompass a range of items such as land, houses, telephones, computers, refrigerators, radios, televisions, cars, motorcycles, and more (Tedong et al., 2022). In the multidimensional poverty framework, if a household lacks ownership of at least one of these assets, they are classified as deprived in the asset's domain (Alkire et al., 2017; Das et al., 2021). Possessing these assets serves as a protective factor, helping to prevent households from falling into poverty, even if their income levels are low (Tedong et al., 2022). However, when assessing assets, it is crucial to account for potential measurement bias. The evaluation and weighting of each asset should vary based on the assessment's time frame. This consideration is important because the accessibility and prevalence of specific assets may change over time. Relying solely on certain assets may not be adequate to differentiate between poor and wealthy households accurately (Steinert et al., 2016). Therefore, a comprehensive

and dynamic approach to evaluating assets is necessary, considering their changing nature and the context in which they are assessed. This ensures that the assessment accurately captures the multidimensional nature of poverty and provides insights into the diverse circumstances and needs of households.

Another significant domain extensively discussed in deprivation research is education, and its positive impact on poverty and deprivation has been widely studied (Bruder & Ünal, 2017; Dewilde, 2004; Iqbal et al., 2020). It has been revealed that individuals without education often face multiple deprivation domains in many countries, whereas those with higher education levels are significantly less likely to experience poverty and deprivation across various domains (Bikorimana & Sun, 2020). Moreover, households headed by individuals with an educational background tend to experience lower levels of multidimensional deprivation (Bikorimana & Sun, 2020). Education serves as a key pathway to increasing productivity and earnings, thereby enabling individuals to escape poverty. It is considered a basic need that not only contributes to the fulfillment of other basic needs but also enhances the overall quality of life (Ataguba et al., 2013; Bikorimana & Sun, 2020; Khan et al., 2013, 2014). Within the education domain of deprivation, indicators such as school attendance and schooling play crucial roles. Das et al. (2021) explain that households are deemed deprived of school attendance if at least one child aged 4 to 14 does not attend school. Additionally, a household is considered deprived of schooling if no individual aged 10 and above has completed at least 6 years of schooling. Increasing the level of schooling has been shown to reduce both monetary and non-monetary deprivations (Machado et al., 2014).

In the studies, housing is identified as another significant domain of poverty. Challenges in the urban legal housing market are various and multi-dimensional. Very low and irregular income makes it difficult for the poor to save enough money and to have long-term plans for purchasing a house. Most developing countries not only have financial problems but also lack a holistic and comprehensive approach in planning and practice that deals with the pro-poor housing policies (Cihangir Çamur, 2007). Research shows that house ownership has a positive impact on reducing deprivation, with owner-occupiers being less likely to experience multidimensional poverty (Sevinc, 2020). Conversely, households without any ownership of a dwelling house face deprivation in terms of housing (Das et al., 2021). Therefore, one policy approach to alleviate poverty is the provision of social housing for those in need (Djahini-Afawoubo & Couchoro, 2020). Household type is also considered an important indicator of housing deprivation. One-person households are more susceptible to deprivation, and similarly, single-parent households often experience material deprivation (Bruder & Ünal, 2017). Additionally, overcrowding is identified as another indicator of housing deprivation, indicating that larger family sizes are associated with multidimensional deprivation (Bikorimana & Sun, 2020). These findings emphasize the need for comprehensive strategies to address housing-related poverty and improve the living conditions of vulnerable households.

Following is the domain of basic services which is about the provision of basic and essential public and private services including electricity, nutrition, drinking water, cooking fuel, sanitation, sewage system, and garbage collection which reduces the level of deprivation (Correa, et al., 2022; Das et al., 2021; Djahini-Afawoubo & Couchoro, 2020; Yuheng et al., 2022). Firstly, if electricity is not the main source of power for lighting, the household is considered as deprived of electricity. Moreover, households are also considered deprived of cooking fuel if there is no natural gas, liquefied gas, or electricity available to them for cooking (Alkire et al., 2017; Das et al., 2021). Likewise, limited access to sanitation is believed to reduce the quality of life by both increasing the risk of diseases and lowering the quality of healthcare (Correa, et al., 2022). Overall, although a lot of studies have investigated the domain of basic services, the assessment of deprivation in this domain is only based on the access to these basic services and the quality of these services is not included in many studies (Correa, et al., 2022).

Moving on to the next domain which is food and nutrition, it is revealed that compared to housing, food has got the second place in basic needs (Golgher, 2015), since highly deprived households in terms of food spend more money on household rent, taxes, and services. However, the higher level of expenses of a household in regard to food is an indicator of higher levels of deprivation in all dimensions. In other words, households fail in overcoming the other dimensions of deprivation since they have relatively higher food expenditures (Golgher, 2015).

On the other hand, in studies on the relationship between health as another basic need and poverty, it is discussed that countries with insufficient health facilities are associated with higher levels of poverty (Saleem et al., 2019). In addition to that, social well-being has also been studied in relation to poverty in the literature. This domain encompasses the indicators of social relationships which include family, friends and relatives' interactions and the benefit from their support, safety which focuses on perception of safety in the living neighborhood, also going on holiday, spending leisure time etc. (Dirksen, et al., 2022).

Overall, this systematic review of the literature reveals that the majority of the articles related to urban poverty were conducted on the national scale and there are only seven studies focused on urban areas. Although urban planning is fundamental in sustaining the growth of cities and ensuring that citizens have access to basic facilities and amenities equally and stay safe from deprivation on multidimensions, there is a lack of appropriate indicators for evaluating urban deprivation in multidimensional poverty and deprivation studies. Some studies have shed light on some indicators that urban deprivation can be associated with. Among these factors are lack of essential services, resources, and opportunities which lead to socio-economic disadvantages and affects the well-being and quality of life significantly, housing quality, accessibility to public amenities and facilities such as green areas and parks, adequate waste management, urban safety, social inclusion, mobility, and participation in social activities. However, these indicators require in-depth study to assess urban deprivation, effectively.

Table 2. Domains and indicators of deprivation in literature review

Domains	Indicators	References
Income & occupation	Income	(D'Ambrosio & Imanishi, 2008), (Ataguba et al., 2013), (Dewilde, 2004), (Dewilde, 2008), (Khan et al., 2013), (Khan et al., 2014), (Pham et al., 2021), (Saboor et al., 2015), (Saleem et al., 2019), (Correa et al., 2022), (Chan & Wong, 2020), (Abu Bakar et al., 2020), (Chen et al., 2019), (Pham & Pundarik, 2018), (Martínez et al., 2022), (Wu & Qi, 2016), (Battiston et al., 2013), (Yu, 2013)
	Financial affordability	(Ataguba et al., 2013), (Bruder & Ünal, 2017), (D'Ambrosio & Imanishi, 2008), (Dewilde, 2008), (Golgher, 2010), (Pham et al., 2021), (Sevinc, 2020), (Vollmer & Alkire, 2022), (Bialowolska, 2014)
	Employment (Unemployed, informal, child labor)	(Ataguba et al., 2013), (D'Ambrosio & Imanishi, 2008), (Djahini-Afawoubo & Couchoro, 2020), (Machado et al., 2014), (Pinilla-Roncancio et al., 2020), (Steinert et al. 2016), (Edwar & Blanca, 2022), (Iqbal et al., 2020), (Abu Bakar et al., 2020), (Bikorimana & Shengmin, 2020), (Chen et al., 2019), (Salvucci et al., 2012), (Angulo et al., 2016)
	Social security	(Pinilla-Roncancio, et al., 2020), (Yang & Pundarik, 2021)
	Debt/Credit/Savings	(Pham et al., 2021), (Sevinc, 2020), (Bialowolska, 2014), (Pham & Pundarik, 2018), (Salvucci et al., 2012), (Bellido et al. 1998), (Dewilde, 2008), (Pham et al., 2021), (Vollmer & Alkire, 2022)
Assets	House equipment (Refrigerator, radio, television, washing machine, air conditioner, dishwasher, cooking range, sewing machine, clothes)	(Abdelkhalek & Ejjanou, 2012), (Bruder & Ünal, 2017), (Dirksen, et al., 2022), (Djahini-Afawoubo & Couchoro, 2020), (Golgher, 2015), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham & Pundarik 2018), (Pinilla-Roncancio et al., 2020), (Steinert et al. 2016), (Bialowolska, 2014), (Tedong et al., 2022), (Vollmer & Alkire, 2022), (Das et al., 2021), (Chan & Wong, 2020), (Iqbal et al., 2020), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Berenger et al., 2013), (Bellido et al., 1998), (Beccaria et al., 2023), (Berenger, 2017), (Batana, 2013)
	Technological equipment (Computer, mobile phone, internet)	(Abdelkhalek & Ejjanou, 2012), (Bruder & Ünal, 2017), (Steinert et al., 2016), (Bialowolska, 2014), (Tedong et al., 2022), (Vollmer & Alkire, 2022), (Dirksen et al., 2022), (Golgher, 2015), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Chan & Wong, 2020), (Iqbal et al., 2020), (Abu Bakar et al., 2020), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Berenger et al., 2013), (Bellido et al., 1998), (Berenger, 2017), (Batana, 2013)
	Vehicle (Bike, motorbike, car)	(Bruder & Ünal, 2017), (Steinert et al., 2016), (Bialowolska,, 2014), (Tedong et al., 2022), (Vollmer & Alkire, 2022), (Dirksen et al., 2022), (Golgher, 2015), (Yuheng et al., 2022), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Berenger et al., 2013), (Bellido et al., 1998), (Berenger, 2017), (Batana, 2013)

Education	Schooling achievements	(Ataguba et al., 2013), (D'Ambrosio & Imanishi, 2008), (Saleem et al., 2019), (Steinert et al., 2016), (Yang & Pundarik, 2021), (Bialowolska, 2014), (Tedong et al., 2022), (Dirksen et al., 2022), (Golgher, 2015), (Djahini-Afawoubo & Couchoro, 2020), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Khan et al., 2013), (Khan et al., 2014) (Edwar & Blanca, 2022), (Correa et al., 2022), (Das et al., 2021), (Iqbal et al., 2020), (Abu Bakar et al., 2020), (Bikorimana & Shengmin, 2020), (Chen et al., 2019), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Salvucci et al., 2012), (Rahman, 2018), (Berenger, 2017), (Wu & Qi, 2016), (Angulo et al., 2016), (Batana, 2013), (Battiston et al., 2013), (Yu, 2013)
	School attendance	(Steinert et al., 2016), (Tedong et al., 2022), (Dirksen et al., 2022), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Edwar & Blanca, 2022), (Das et al., 2021), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Rahman, 2018), (Berenger, 2017), (Angulo et al., 2016), (Battiston et al., 2013)
	Kindergarten (2-6 ages)	(D'Ambrosio & Imanishi, 2008), (Angulo et al., 2016)
	Schooling gap/lag	(Edwar & Blanca, 2022), (Angulo et al., 2016)
Basic services	Electricity	(Abdelkhalek & Ejjanou, 2012), (Ataguba et al., 2013), (Saleem et al., 2019), (Dirksen et al., 2022), (Golgher, 2015), (Yuheng et al., 2022), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Khan et al., 2013), (Khan et al., 2014), (Saboor et al., 2015), (Steinert et al., 2016), (Tedong et al., 2022), (Correa et al., 2022), (Das et al., 2021), (Iqbal et al., 2020), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Salvucci et al., 2012), (Beccaria et al., 2023), (Rahman, 2018), (Berenger, 2017), (Wu & Qi, 2016), (Batana, 2013), (Yu, 2013)
	Water	(Abdelkhalek & Ejjanou, 2012), (Steinert et al., 2016), (Tedong et al., 2022), (Dirksen et al., 2022), (Golgher, 2015), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Edwar & Blanca, 2022), (Iqbal et al., 2020), (Bikorimana & Shengmin, 2020), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Tanwar & Hooda, 2018), (Rahman, 2018), (Berenger, 2017), (Wu & Qi, 2016), (Angulo et al., 2016), (Batana, 2013), (Battiston et al., 2013), (Yu, 2013)
	Sanitation (Unimproved toilet facility, sewage/ drainage system, garbage collecting facility)	(Abdelkhalek & Ejjanou, 2012), (Ataguba et al., 2013), (Bruder & Ünal, 2017), (Dewilde, 2004), (Saleem et al., 2019), (Steinert et al., 2016), (Bialowolska, 2014), (Tedong et al., 2022), (Vollmer & Alkire, 2022), (Dewilde, 2008), (Dirksen et al., 2022), (Djahini-Afawoubo & Couchoro, 2020), (Golgher, 2015), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Khan et al., 2013), (Khan et al., 2014), (Saboor et al., 2015), (Edwar & Blanca, 2022), (Correa et al., 2022), (Chan & Wong, 2020), (Iqbal et al., 2020), (Abu Bakar et al., 2020), (Nitin et al., 2019), (Pham & Pundarik, 2018), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Berenger et al., 2013), (Bellido et al., 1998), (Rahman, 2018), (Berenger, 2017), (Wu & Qi, 2016), (Angulo et al., 2016), (Batana, 2013), (Battiston et al., 2013), (Yu, 2013), (Golgher, 2015), (Djahini-Afawoubo & Couchoro, 2020)
	Cooking fuel	(Tedong et al., 2022), (Dirksen et al., 2022), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Steinert et al., 2016), (Das et al., 2021), (Iqbal et al., 2020), (Bikorimana & Shengmin, 2020), (Alkire et al., 2017), (Salvucci et al., 2012), (Berenger et al., 2013), (Rahman, 2018), (Wu & Qi, 2016)

Housing	Housing material/quality/condition (Roof, floor and wall materials)	(Abdelkhalek & Ejjanoui, 2012), (Ataguba et al., 2013), (Bruder & Ünal, 2017), (D'Ambrosio & Imanishi, 2008), (Dewilde, 2004), (Steinert et al., 2016), (Sevinc, 2020), (Bialowolska, 2014), (Tedong et al., 2022), (Dirksen et al., 2022), (Dewilde, 2008), (Djahini-Afawoubo & Couchoro, 2020), (Golgher, 2015), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Edwar & Blanca, 2022), (Iqbal et al., 2020), (Bikorimana & Shengmin, 2020), (Nitin et al., 2019), (Pham & Pundarik, 2018), (Alkire et al., 2017), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Rahman, 2018), (Berenger, 2017), (Angulo et al., 2016), (Batana, 2013), (Battiston et al., 2013)
	Type of dwelling	(Abdelkhalek & Ejjanoui, 2012), (Dewilde, 2004), (Steinert et al., 2016)
	Overcrowding	(D'Ambrosio & Imanishi, 2008), (Dewilde, 2004), (Bialowolska, 2014), (Vollmer & Alkire, 2022), (Dewilde, 2008), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Edwar & Blanca, 2022), (Correa et al., 2022), (Abu Bakar et al., 2020), (Salvucci et al., 2012), (Wu & Qi, 2016), (Angulo et al., 2016)
	Housing tenure	(Mohanty & Vasishtha, 2021), (Pham & Pundarik, 2018)
	House ownership	(Saleem et al., 2019), (Khan et al., 2013), (Khan et al., 2014), (Saboor et al., 2015), (Das et al., 2021), (Bellido et al., 1998)
Urban infrastructure	Transportation	(Djahini-Afawoubo & Couchoro, 2020), (Pinilla-Roncancio et al., 2020), (Bialowolska, 2014)
	Street pavement	(Golgher, 2015), (D'Ambrosio & Imanishi, 2008)
	Street lighting	(Golgher, 2015)
Urban amenities & facilities	Distance / Access to urban facilities	(Bialowolska, 2014), (Djahini-Afawoubo & Couchoro, 2020), (Pinilla-Roncancio et al., 2020), (Abu Bakar et al., 2020), (Chen et al., 2019), (Angulo et al., 2016)
Environmental problems	Air pollution / Air quality (PM 2.5)	(Dewilde, 2004), (Sevinc, 2020), (Dewilde, 2008), (Golgher, 2015), (Iqbal et al., 2020), (Chen et al., 2019), (Golgher, 2015), (D'Ambrosio & Imanishi, 2008)
	Noise	(Bialowolska, 2014), (Golgher, 2015), (D'Ambrosio & Imanishi, 2008)
Food & nutrition	Access to food (Food adequacy)	(Bruder & Ünal, 2017), (Dewilde, 2004), (Steinert et al., 2016), (Sevinc, 2020), (Bialowolska, 2014), (Dewilde, 2008), (Das et al., 2021), (Chan & Wong, 2020), (Pham & Pundarik, 2018), (Mahadevana & Hoangb, 2016), (Salvucci et al., 2012), (Beccaria et al., 2023)
	Nutrition	(Tedong et al., 2022), (Golgher, 2015), (Yuheng et al., 2022), (Mohanty & Vasishtha, 2021), (Das et al., 2021), (Bikorimana & Shengmin, 2020), (Alkire et al., 2017), (Salvucci et al., 2012), (Rahman, 2018), (Berenger, 2017), (Wu & Qi, 2016), (Batana, 2013), (Yu, 2013)
Health condition & care	Child mortality	(Tedong et al., 2022), (Yuheng et al., 2022), (Machado et al., 2014), (Mohanty & Vasishtha, 2021), (Bikorimana & Shengmin, 2020), (Alkire et al., 2017), (Rahman, 2018), (Berenger, 2017)
	Health affordability	(Bialowolska, 2014), (Sevinc, 2020), (Saboor et al., 2015), (Pinilla-Roncancio et al., 2020), (Pham et al., 2021), (Pinilla-Roncancio et al., 2020), (Djahini-Afawoubo & Couchoro, 2020), (Roncancio & Silva, 2018)
	Health services	(Chan & Wong, 2020), (Pham & Pundarik, 2018)
	Health insurance	(Yang & Pundarik, 2021), (Vollmer & Alkire, 2022), (Mohanty & Vasishtha, 2021), (Pham et al., 2021), (Edwar & Blanca, 2022), (Pham & Pundarik, 2018), (Angulo et al., 2016), (Yu, 2013)
	Health condition/disease	(Ataguba et al., 2013), (Yang & Pundarik, 2021), (Bialowolska, 2014), (Machado et al., 2014), (Abu Bakar et al., 2020), (Chen et al., 2019), (Tanwar et al., 2018), (Salvucci et al., 2012), (Wu & Qi, 2016)
	Disability	(Abu Bakar et al., 2020)

Social well-being	Social relationships	(Dewilde, 2004), (Dewilde, 2008), (Chan & Wong, 2020), (Beccaria et al., 2023), (Batana, 2013), (Pinilla-Roncancio et al., 2020)
	Safety	(Dewilde, 2004), (Golgher, 2015), (Sevinc, 2020), (Bialowolska, 2014)
	Social support	(Chan & Wong, 2020)
	Holiday	(Bruder & Ünal, 2017), (Dewilde, 2004), (Sevinc, 2020), (Bialowolska, 2014), (Dewilde, 2008), (Beccaria et al., 2023)

Source: Authors

3.3. Findings on the frequency of dimensions and indicators

This part follows the domains and indicators number and the numeric percentage of each variable in the literature review. Using numerical values assigned to each element by counting the number of cited articles in Table 2, radar visualizations have been used to depict their relative importance in four main domains of Socio-Economic Status (SES), Physical Environment, Health Status, and Social Network and Well-being. By exploring potential links and interactions between the variables, this section hopes to provide insight into whether any of the indicators are more noticed in the literature or not.

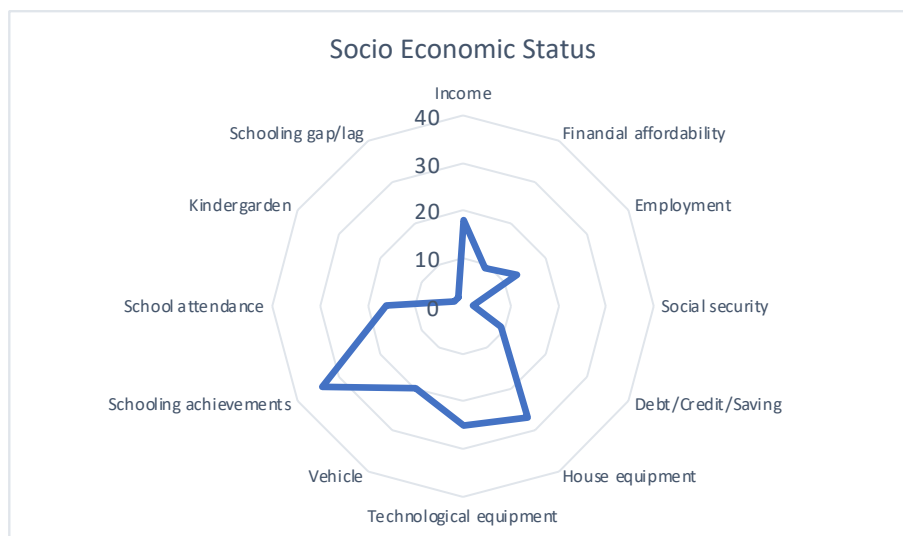


Figure 2. Distribution of multidimensional poverty and deprivation indicators in “socio economic status”

Source: Authors

Figure 2. provides a visual representation of the relative performance indicators in the selected articles. At first blush, school achievements draw attention. As previously talked about education has a great importance on poverty and deprivation level. On the other hand, poverty and education are a part of the vicious cycle; if people are poor, they fail to get a proper education. Due to a lack of education, household members are incapable of improving themselves and earning on their own. Thus, they are stuck in the vicious cycle of poverty. Additionally, education is considered to be one of the most effective ways to combat poverty. It has been proven that education has the power to transform people’s lives and create opportunities for personal and economic growth. Education can also provide people with the skills and knowledge they need to secure employment and become financially independent.

Owning assets are multifaceted and interconnected. Assets can play a crucial role in alleviating poverty and improving overall well-being. For example, owning and accumulating assets, such as land, property, savings, or livestock, can act as a buffer against poverty. These assets can provide income-generating opportunities, act as collateral for loans, and serve as a safety net during financial hardships. Following access to productive assets, such as tools, equipment, or capital, can empower individuals and communities to engage in income-generating activities and lift themselves out of poverty. Assets can enable entrepreneurship, skill development, and the creation of sustainable livelihoods. Intergenerational Impact of assets can have long-term effects on poverty. Inheritable assets, such as education, property, or business enterprises, can help break the cycle of poverty by providing opportunities and resources for future generations. Overall, asset poverty refers to the lack of ownership or access to essential assets required for a decent standard of living. Individuals or households without access to assets may face limited opportunities,

reduced resilience to shocks, and a higher risk of falling into or remaining in poverty. Moreover, the distribution of assets across society can contribute to income inequality and perpetuate poverty. Concentration of assets in the hands of a few individuals or groups can lead to disparities in wealth, opportunities, and access to resources, exacerbating poverty among marginalized populations. On the other hand, lack of assets can increase vulnerability to economic shocks, natural disasters, or health crises. Having assets, such as savings or insurance, can provide a cushion against unexpected events, enabling individuals to recover faster and mitigate the impact of such shocks on their livelihoods.

It is important to note that the relationship between poverty and assets is complex and context specific. The type and value of assets, as well as the distribution and access to assets within societies, can vary significantly across regions and countries. Policies and interventions aimed at reducing poverty often address asset inequality, promote asset accumulation, and ensure equitable access to productive resources, contributing to sustainable poverty reduction and inclusive development.

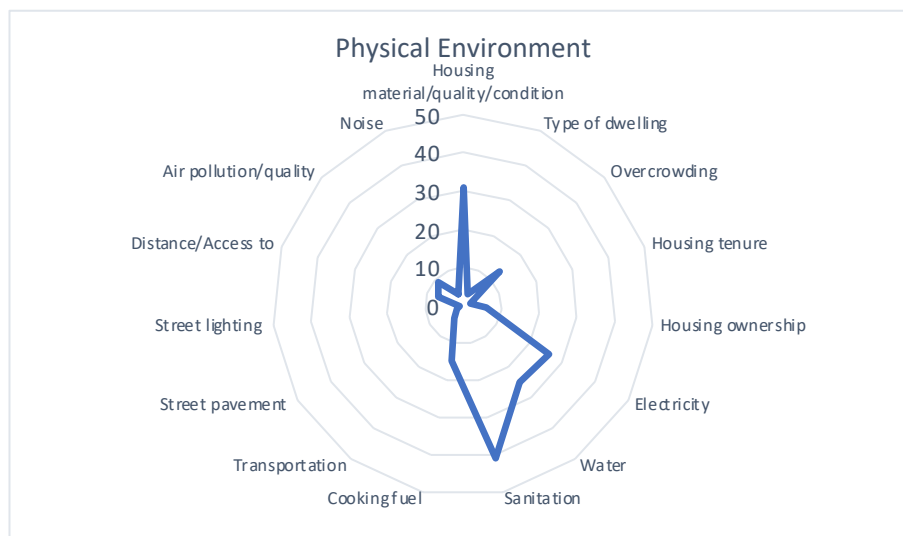


Figure 3. Distribution of multidimensional poverty and deprivation indicators in “physical environment”
Source: Authors

Figure 3. represents the importance of basic needs such as electricity, water, and sanitation and on the other side housing material and its effective on deprivation level. Sanitation is crucial for public health, the environment, and sustainable development. It prevents the spread of diseases, improves public health outcomes, and promotes child health and education. Drinkable water and adequate sanitation protect the environment, promote gender equality, and contribute to economic development. It is a key component of the Sustainable Development Goals, specifically Goal 6¹. Access to clean water and safe sanitation facilities is a fundamental human right, essential for a healthy, dignified, and sustainable future. Along with electricity is of utmost importance in modern society. It drives economic development by powering industries, businesses, and infrastructure. Access to electricity is vital for education, healthcare, and quality of life. It enhances household living standards, enabling lighting, heating, and powering essential appliances. Sustainable and equitable access to electricity promotes social empowerment and supports the achievement of sustainable development goals. Overall, electricity plays a critical role in driving progress, improving quality of life, and fostering inclusive and sustainable societies.

¹ Sustainable Development Goal 6 is about “clean water and sanitation for all”. It is one of 17 Sustainable Development Goals established by the United Nations General Assembly in 2015, the official wording is: “Ensure availability and sustainable management of water and sanitation for all.”

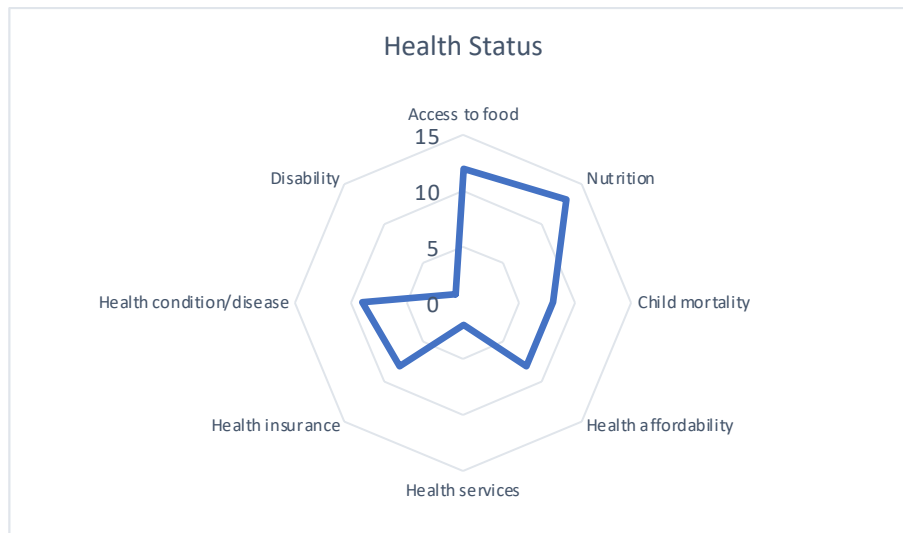


Figure 4. Distribution of multidimensional poverty and deprivation indicators in “health status”
Source: Authors

Figure 4. shows that the majority of the articles focus on access to food and nutrition as their main topic of interest. Limited access to food and inadequate nutrition contribute to malnutrition and its consequences. Furthermore, child mortality rates are higher in impoverished communities due to restricted resources and insufficient healthcare access. Affordability of healthcare and lack of insurance coverage pose barriers to necessary medical services. Poor health conditions and limited access to quality healthcare further compound the challenges faced by those in poverty. By addressing these interconnected factors, households can strive for a more inclusive and healthier life. While health insurance represents the number of people who have health insurance as financial security in healthcare treatments, health affordability measures the cost and financial accessibility of healthcare services. Most of the articles imply that poor people have poorer access to health-related facilities.

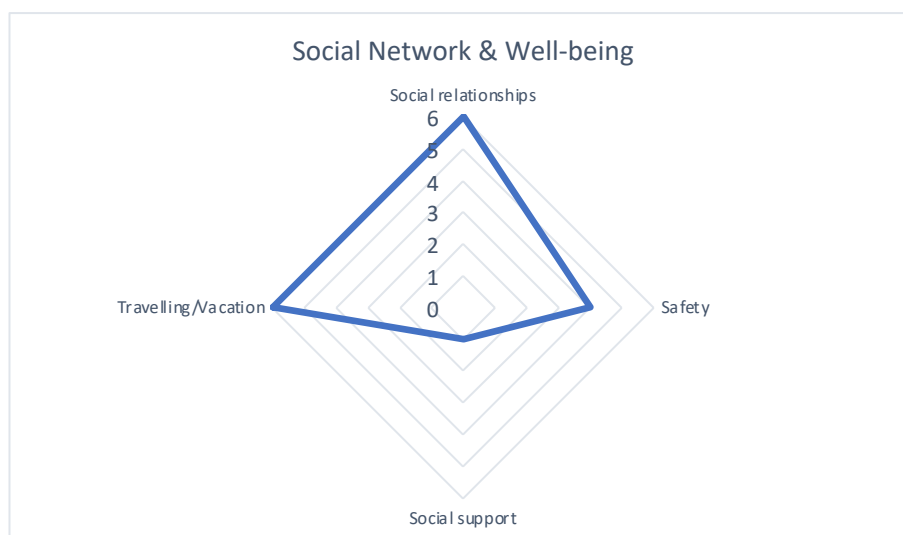


Figure 5. Distribution of multidimensional poverty and deprivation indicators in “social network and well-being”
Source: Authors

Figure 5. indicates that social relationships play a vital role in mitigating the impacts of poverty and deprivation. Strong social connections provide emotional support, a sense of belonging, and opportunities for mutual assistance. In times of financial hardship, having a supportive network can help individuals access resources, share information about job opportunities, and receive assistance during challenging times. Social relationships also contribute to mental well-being, reducing the negative effects of poverty-related stress and isolation. While travel and holidays may seem like luxuries, they hold significance for individuals experiencing poverty and deprivation. Taking a break from daily hardships through travel or having holidays can provide much-needed respite and a chance to rejuvenate. It can also foster personal growth, broaden perspectives, and provide opportunities for cultural exchange. Safety is a crucial aspect when considering poverty and deprivation. Living in poverty often exposes individuals to unsafe living conditions, crime-prone areas, and limited access to essential services. Addressing safety concerns is essential

in alleviating poverty and deprivation. Safe neighborhoods and communities provide a conducive environment for individuals to thrive, pursue education and employment opportunities, and engage in social activities without fear. Safety measures also contribute to mental and emotional well-being, allowing individuals to focus on personal and economic development without constant concerns for their security.

Overall, the indicators of urban poverty deprivation regarding urban planning and the methods for measuring them do not take an adequate place in the literature and there is a gap in this field. Therefore, there is a need for fertile ground for scientific discussions on urban deprivation. Urban infrastructure, urban services and amenities, and environmental problems are highlighted in the literature as urban deprivation-related dimensions, however, there is a need for a set of more indicators to measure multidimensional urban poverty and urban deprivation.

4. Concluding Remarks

This systematic review provides a comprehensive analysis of the scientific literature on multidimensional poverty and deprivation. This study aims to enhance our understanding of poverty in urban context by recognizing the various dimensions of deprivation and the subjective nature of indicators. Moreover, it emphasizes the importance of exploring domains and indicators that have received less attention in the field of urban planning. By shedding light on these previously overlooked aspects, the research seeks to broaden our understanding of poverty and contribute to more comprehensive strategies for addressing poverty in urban contexts. In addition, there have been a few gaps identified in the scientific literature regarding urban deprivations and a better consideration of accurate measurement with a scale in terms of location and time. These need to be revealed in further studies and proper policies, and urban planning interventions need to be integrated into policies to address urban deprivation.

Some studies have discussed the relationship between urban amenities or facilities (such as provision and distance/access to urban facilities) with urban poverty (Abu Bakar et al., 2020; Angulo et al., 2016; Bialowolska, 2014; Chen et al., 2019; Djahini-Afawoubo & Couchoro, 2020; Pinilla-Roncancio, et al., 2020). It is suggested that in order to provide a sustained set of amenities and facilities and also help enhance the social integration in an area, it is better to locate these services at the intersection points of the transportation roads taking into consideration the accessibility and physical distance and also an adequate number of these facilities to be distributed accordingly to alleviate the level of deprivation on urban amenities and facilities.

Moreover, discussing the importance of urban infrastructure on poverty, some related indicators are transportation, street pavement, and street lighting (Bialowolska 2014; Djahini-Afawoubo & Couchoro 2020; Pinilla-Roncancio, et al., 2020). Generally, the dense flow of vehicular traffic is not preferred by pedestrians in urban life since it affects the feeling of safety negatively and hence reduces the presence of pedestrians and their physical activity. However, it is suggested to integrate pedestrian and vehicular paths together (but still keep the pedestrians dominant) to provide a sustained transportation system encompassing different activities at once.

Among the other factors are the pavement and lighting. Different zones and key locations can be demarked by different pavements and therefore afford different urban activities accordingly. Likewise, lighting plays an important role in urban poverty since it is vital for the visibility of different zones especially on the streets. Moreover, it ensures safety in the dark by reducing the risk of accidents on the roads, and also reducing the opportunities for crime. Dark zones would be vulnerable, and this makes individuals deprived from some urban activities.

Some other research topics have shed light on some environmental issues including air quality and pollution, in relation to urban poverty (Chen et al., 2019; D'Ambrosio & Imanishi, 2008; Dewilde, 2004; Dewilde, 2008; Golgher, 2015; Iqbal et al., 2020; Sevinc, 2020). To tackle the problem of air pollution, policies need to be integrated to control the population density of an area, as well as provide the standard square meters of green area per person. The importance of the provision of green areas in reducing air pollution can be discussed by a few examples. According to estimates, air pollution causes 7 million premature deaths annually (UNEP, 2021), making it the biggest environmental danger to public health in the world. Due to the fact that most significant pollutants originate from the same sources as greenhouse gases and have an effect on the climate, air pollution and climate change are intimately related. Health, development, and the environment will all benefit from better air quality.

The existing literature on urban poverty lacks a comprehensive identification of indicators that capture the multifaceted nature of deprivation in urban contexts. This represents a significant gap in understanding the challenges faced by urban populations. To address this limitation, this study proposes the inclusion of additional indicators to

accurately assess urban poverty and deprivation. These proposed indicators encompass various aspects of urban life that contribute to deprivation. For instance, accessibility to public amenities and facilities, such as green areas and parks, can enhance the quality of life for urban poor. The quality of work and the workplace environment are also crucial factors to consider, as they directly impact individuals' economic well-being and overall satisfaction.

Urban safety and freedom from violence are important dimensions of urban deprivation, as they influence individuals' sense of security and well-being (Cihangir Çamur et al., 2017). Social inclusion and connectedness, along with the freedom from exclusion and feelings of humiliation or shame, are essential for individuals to fully participate in urban life and have a sense of belonging. Psychological well-being and life satisfaction are additional indicators that shed light on the overall quality of life experienced by urban residents. Finally, considering the effectiveness of urban governance is crucial, as it plays a significant role in shaping the urban environment, providing services, and ensuring equitable opportunities for all.

By incorporating these additional indicators, a more comprehensive assessment of urban poverty can be achieved addressing urban life quality. This expanded framework recognizes the multidimensional nature of urban deprivation and allows for a more accurate understanding of the challenges faced by urban populations. It also provides valuable insights for policymakers and urban planners to develop targeted interventions and strategies those address the specific needs of urban communities and promote inclusive and sustainable urban development.

Further studies on poverty should consider examining the issue at different scales, such as urban or neighborhood level. This is important because the identification of deprivation can vary among populations based on their unique cultural contexts, ways of living, and specific needs. By focusing on specific indicators within local contexts, researchers can gain a more nuanced understanding of poverty and tailor interventions accordingly. Taking a micro-level approach can reveal insights into the diverse experiences and specific challenges faced by different communities, enabling more targeted and effective poverty alleviation strategies. Moreover, any studies, policies, or interventions in this field must utilize and benefit from community engagement and participation.

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