

Household and Energy Poverty: Review on Concepts and Indicators

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ABSTRACT

Energy poverty is a global issue which necessity for a nation to pay greater attention. Instead of the income poverty, energy poverty should be prioritized as well in order to build a better nation. There are reasons why energy poverty deserves special attention which first are related to the climate change and energy transition, and second depends on the response of energy demand to price changes. Despite the expanding number of publications on the issue, there are still disagreements over the definition and indicators of energy poverty. As a result, this study is a topical review that tries to synthesize research on definitions and indicators of energy poverty from 2012 through 2022. In order to search and filter the articles from two major databases which is Web of Science (WOS) and Scopus, set of inclusion and exclusion criteria was created to searching and screening the articles and 116 eligible articles were counted in this review. Literature shows the differences of the indicators between energy poverty index (EPI), multidimensional energy poverty index (MEPI), household budget survey (HBS), building fuel poverty index (BFP), energy development index (EDI) and household poverty index (HEPI) and Compound energy poverty index (CEPI). Approaches to measure energy poverty show how different attributes of energy supply and aspects of household vulnerability matter for which energy services are utilized.

Keywords: Energy poverty, definition, indicator, accessibility, affordability.

Introduction

Energy poverty is widely recognized in the existed literatures, and it has emerged as a severe issue. Energy carried a big responsible toward the progress of today's society. With the access to affordable electricity, a school or hospital may incorporate modern technology such as computer, can assure the hygiene, water supply and access to clean cooking for household that may affect by indoor pollution. Indoor pollution is an essential issue when International Energy Agency (IEA, 2021) record those premature deaths in India is out of 800, 000 a year which caused by indoor pollution (Mathen & Sadath, 2022). Energy consumption has risen to become the dominant engine of economic growth, allowing millions of people to escape poverty. Energy equips humans with necessary capabilities that allow them to meet their basic wants and live satisfactorily. However, individuals who are unable to access needed energy services for a decent and healthy living are exhibiting signs of energy poverty and people's well-being is negatively affected by energy deprivation (Ssennono et al., 2021). For example, indoor pollution, health risk, lack of educational opportunities and poor environment. The problem of

energy poverty is influenced by a variety of factors, as well as their interactions and configurations in various situations. Demographic group identification is the biggest risk when addressing basic needs with income-based poverty indicators (Lan et al., 2022). Based on the existed literature, the most affected by the energy poverty is in rural and urban areas who struggling for income insufficient (Ullah & Yoon, 2021; Okushima 2019; Mendoza et al., 2019). Energy poverty is a global issue, and the literature on energy poverty has been thoroughly examined, addressing methodological and conceptual issues. The number of studies on the subject is increasing, and as of March 2020, the top five sites producing research on energy poverty included England (308 studies), United States (154), Spain (89), Australia (88) and Scotland (62) (Laldjebaev & Hussain, 2021; Charlier & Legendre, 2021; Dong et al., 2022; Gupta et al., 2020). Despite the expanding number of publications on the issue, there are still disagreements over the definition and indicators of energy poverty. As a result, this study is a topical review that tries to synthesize research on definitions and indicators of energy poverty from 2012 through 2022. Regardless of the increasing number of studies focusing on this issue, the discussion needs to continue to better understand about the energy poverty. Therefore, this paper aims to review the literature on the definition and indicators used for energy poverty from 2012 to 2022. Therefore, study's research questions are stated as (1) What are the concepts that been used in defining energy poverty in the literature from 2012 to 2022? (2) What are the indicators has been used to measure energy poverty?

Methodology

This study starts with the formulation of research question. The research questions provided our work with clarity, coherence, and direction so that we could determine what was pertinent to our issue. The next phases involved gathering, organising, and analysing our sources in accordance with the study questions. In the screening stage, study framed clear inclusion and exclusion criteria to determine which studies will be reviewed. First, studies must possess the keyword(s) of “energy poverty” or “energy justice” or “fuel poverty” in the title. Second, to ensure the quality of the studies, we only considered peer-reviewed journal articles and excluded document types such as conference proceedings, book chapters, etc. Third, the original language of the articles must be English. Fourth, we considered articles published from 2012 to the year of 2022). Last, studies must focus on indicator of energy poverty. We searched literature from two dominant databases, namely the Scopus core collection and Web of Science (WOS). To attain maximum reliability of the data, all authors searched and evaluated literature from both databases separately using the same procedure. The results are highly similar, indicating that our data collection procedure is reliable.

Results and Discussion

The finding shows that there is no universal definition of energy poverty. Nevertheless, the existing tradition to capture domestic energy deprivation in developed countries with the concept of fuel poverty which more related to affordability and that of developing countries with energy poverty which lack of access to modern electricity. These definitions symbolize the domestic energy deprivation with similar consequences for the socio-economic well-being of the society. Literature shows the differences of the indicators between energy poverty index (EPI), multidimensional energy poverty index (MEPI), household budget survey (HBS),

building fuel poverty index (BFP), energy development index (EDI) and household poverty index (HEPI) and Compound energy poverty index (CEPI). Approaches to measure energy poverty show how different attributes of energy supply and aspects of household vulnerability matter for which energy services are utilized. Some indicators have built off theoretical contributions on concepts of human capabilities and justice.

Conclusion

With a focus on indicators of energy poverty and their definitions, this research set out to review the literature on the topic from 2012 to 2022. The complexity of quantifying energy poverty changes with time and region and it based on the individual characteristic, individual behaviour and external condition. The quantitative findings have presented the current research on energy poverty definitions and measurements, which partly reflects the trends in the energy poverty study. Newer conceptualizations emphasize on three critical aspects which first look at access as multidimensional concept that issues of affordability, reliability and quality of energy services. Second, that there is a need to distinguish between energy for cooking, lighting and other household uses. Third, there is also increasing awareness and agreement that energy access should be defined more broadly and go beyond a minimum required to meet basic energy services in the home and extend to energy for productive purposes, energy efficiency and community services or decent living standards. From this review, it can show that developing countries experiences different energy issues regarding to accessibility to energy poverty while developed countries experiences issues regarding affordability of energy. Instead of developing and developed countries, it also can be classified into country's level of income as low income, lower middle income, upper middle income and high income. Instead of 10% measure, EPI and MEPI, new approaches are invented in the recent paper such CEPI, HEPI and BFP. This study faces several limitations that need to be highlighted regarding the current review paper. First there are various definition and indicator are detected and it is not easy to justify. A dedicated study underlying the definition of energy poverty only are needed.

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