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Understanding electricity nightmare and health implications among slum dwellers in Ghana

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Abstract

Purpose – The purpose of the study was to examine the electricity challenges confronting slums in order to understand the health implications thereof.
Design/methodology/approach – The study utilized purposive sampling techniques supported by the convenience sampling method within the context of qualitative research to select 30 interviewees of varying demographics for in-depth interviews.
Findings – The findings revealed that slums faced various forms of challenges that are attributable to lack of government support, stringent procedures and financial hardship, among others. The study also found that a lack of health education in the slums has resulted in health problems, such as skin diseases, stomach aches, cholera, typhoid and childbirth complications.
Research limitations/implications – The outcome of this study cannot be generalized to represent the whole population of slums within context due to the qualitative approach.
Practical implications – The study advanced the frontiers of slum literature to understand contextual issues that are important to policymakers and practitioners.
Originality/value – This study revealed a country-specific understanding of the challenges confronting slum dwellers in accessing electricity through the perspective of the two-factor theory of motivation.

Keywords Slums, Informal settlements, Health, Electricity, Ghana, Old Fadama

Paper type Research paper

Introduction

Many governments appear to be facing a difficult problem in providing universal access to inexpensive and dependable energy services for all people. Electricity demand among inhabitants worldwide, including slums and informal settlements (both terms used interchangeably in this study), continues to rise. According to the 2015 World Energy Outlook, power consumption will grow at a 2.1% annual rate by 2040, which is twice the rate of available energy. The International Energy Agency (IEA, 2015) indicates that more than 1.3 billion people do not have access to electricity, and another 2.7 billion do not have access to cooking facilities. While it is critical that governments take appropriate steps to achieve the Sustainable Development Goal (SDG-7), slums must not be overlooked in the efforts to implement energy policies. Residents of slums, particularly children, may be at risk for health problems that disproportionately affect them, due to a lack of affordable and reliable

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electricity. This is so because the structures in the slums and the density of people in the settlements create conditions that tend to cause a lot of heat. The heat, as well as a lack of electricity to run fans or air conditioners, can cause body rashes and other skin disorders, particularly at night and during sunny seasons. The phenomenon, coupled with the lack of sanitation in slums, could further incubate malaria caused by plasmodium parasite and spread through mosquito bites. Mosquitoes mostly live in stagnant waters, slow-moving water bodies and insanitary areas, among others. They become quite a nuisance when the weather starts to warm up. The study's goal was to examine the difficulties slum dwellers in Ghana face in accessing power, and how this affects their health.

According to the literature (Mukeku, 2018; Sandoval and Sarmiento, 2020), slums have become an unavoidable reality in many places around the world, particularly in emerging countries. Per the global slum population figures, more than one billion people live in slums and are expected to increase to two billion by 2030 and three billion by 2050 if present growth trends continue (UN Habitat, 2010). Slums house 61.7% of Africa's population or more than half of the total population (UN-Habitat, 2013). Ghana is ranked 57th on the global slum index, with 5.349 million people living in slums and a 1.83% annual growth rate (Almanac, 2015). Over the years, efforts to improve the living conditions of slum dwellers have posed a challenge not only to national governments but also to international organizations, such as the World Bank (WB), the United Nations (UN) Habitat, IEA and philanthropic organizations (Brown-Luthango *et al.*, 2017). Electricity is one of the many challenges in slums that requires immediate attention.

Studies have shown that the lack of electricity in slums has a negative impact on dwellers' health, education, quality of life and well-being (Butera *et al.*, 2016; Parikh *et al.*, 2012). Discourse concerning slums and electricity has surged and produced a plethora of research (Devkar *et al.*, 2019; De Bercegol and Monstadt, 2018; Debnath *et al.*, 2020; Butera *et al.*, 2019; Smit *et al.*, 2019). Of the abundance of research and its importance in the field, the empirical focus appears to have led the discussion away from understanding the health implications of a lack of power, as well as a limited public appreciation of the problems slum inhabitants experience in gaining access to electricity. Significantly, the undiscovered phenomena have created an issue gap in the slum literature that if not addressed, may have ramifications for the domain's future research agenda. The study addresses this gap through interrelated questions: What are the challenges slums face in gaining access to electricity? What are the uses of electricity in slum settlements? To what extent does lack of electricity affect health in slums?

In the following ways, the study is noteworthy and significant to the literature: First, considering that achieving SDG-7 requires access to and affordability of electricity, a study of this nature can make a substantial contribution to energy policy. Second, because the growth of slums is unpredictable, this study sheds light on the black box for policy considerations. Third, the study's findings are intended to aid in the development of energy policy with a focus on slum settlements. The remainder of this article is structured with an overview of the literature, followed by the methodology employed for data gathering. Then, the results of the study are presented, followed by a discussion of the findings. The final section presents the study's conclusion, and the implications for policy and practice.

Literature review

Challenges of electricity in slum settlements

Electricity challenges confronting slum settlements have been ongoing (Das, 2017; UN-Habitat, 2017). Studies have pointed to a seeming ineptitude of formal institutions to provide basic human needs, such as electricity and housing within the formal market (Jones, 2017). Although it has been established that global access to energy has improved, the number of

people lacking access to electricity has increased (Smit, Musango and Brent, 019). The IEA, 2015 report projected that 700 million people in rural Sub-Saharan Africa (SSA) will live without electricity by 2040. Further studies have highlighted a wide range of issues regarding slums' access to energy in developing countries (Butera *et al.*, 2016; Coelho and Goldemberg, 2013; Puzzolo *et al.*, 2016; Rahut *et al.*, 2016). In particular, difficulties associated with estimating energy demand (Gaunt *et al.*, 2012; Madlener and Sunak, 2011); expansion of the grid in low-density areas (Department of Energy, 2011; Africa Sustainable Energy, 2014); and recovering electricity revenues from informal settlement dwellers (Borchers *et al.*, 2018). This, undoubtedly, makes access to energy in the Global South worrisome and often overlooked as part of urban problems (Westphal *et al.*, 2017).

Other strands of the scholarships have studied the causes of electricity thefts in slum communities and the advancement of sub-standard services by the service providers as a major cause (Mimmi and Ecer, 2010; Scott *et al.*, 2003). While energy theft may be common in slum communities, the drivers and causes of it may contextually differ. For instance, in Nigeria and India, energy theft has largely revolved around politics (Golden and Min, 2012). Similarly, in Brazil, it has been linked to the perception of residents being discriminated against by the service providers (Mimmi and Ecer, 2010). In Greater Accra, the capital of Ghana, Silver (2014) maintains that most of the thefts are largely attributed to poverty. The above review signifies that providing affordable, reliable and clean electricity to all manner of people does not only lead to the achievement of SDG-7 but might also reduce the incidence of electricity thefts. Examining the use of electricity in the slums is very significant. A survey conducted by the Ghana Statistical Service (GSS, 2006) indicates that a whopping majority of 79% of Ghanaians use electricity for lighting. Also, 54% use wood fuel for cooking, 49% use kerosene and electricity and charcoal, 31%. It further notes that in urban areas alone, 53% of households use charcoal for cooking. In this regard, 34.5% of households use gas, as compared to other areas of the country in Greater Accra (GSS, 2006). As vital as these data may be, it underscores how little statistics do in terms of disaggregating the importance of electricity to the social and economic lives of the slums. Furthermore, it has been established that the percentage of the urban poor having access to electricity outweighs the high-income quintile of the population who have access to electricity (GSS, 2006).

While admitting the challenges slum dwellers face in accessing electricity, understanding its implications for the lives of the dwellers is critical. Revealing the importance of electricity, Parikh *et al.* (2012) add that electricity enhances the productivity of slum dwellers by shifting their aspirations upwards. Similarly, other bodies of studies found that electricity influences education and productive income generation in the slums (Butera *et al.*, 2016). In the same vein, earlier scholars have proven that electricity positively affects health, education, quality of life and well-being (IEA, 2015; Parikh *et al.*, 2012). Indeed, the IEA, 2015 notes that even though poverty is an unpleasant fact for millions of people, energy poverty is both a cause and a consequence. Dube (2003) argues that access to electricity improves the functioning of individuals, while, at the same time, removing barriers to income generation (Dube, 2003). The review above indicates that easing access for the slums to have power does not only ensure the achievement of SDGs but also improves both social, economic, health and academics of slum dwellers.

Health implications of electricity at the slums

Electricity and its health implications in slum communities appear to have received scant attention. According to Laverack (2007), addressing health issues in the slums should involve individuals, groups and communities in order to enable target people to improve on the factors that affect their health. Evidence for the above fact is not far-fetched, as studies have claimed that the health of people living in slums is a function not only of poverty but also of physical and

social environmental conditions (Lilford *et al.*, 2017). It is significant to indicate that densely populated slum neighborhoods tend to promote the spread of diseases. Critically, one of the factors that appears unnoticed that leads to health-related issues in the slums is the absence of electricity. Unfortunately, the dwellers' awareness in terms of education regarding how to mitigate the effect of electricity on health appears minimal. Inasmuch as health education in the slums may be low in some jurisdictions, studies have advised that any health intervention program or education in the slums should be based on context-specific variables. In this regard, health practitioners are encouraged to be proactive in health protection in the slums, in the areas of immunization and surveillance for childhood malnutrition (Lilford *et al.*, 2017).

Inevitably, the nature of slums' set up may create more and diverse health-related issues, which may tend to occasion health service inequalities. This has caused many health outcomes in the slums to be worse in the Global South than in neighboring urban areas or even rural areas (Ezeh *et al.*, 2017; Harpham, 2009). Existing studies have clarified why those living in slums and those living in poverty can produce different health outcomes (Ezeh *et al.*, 2017). In the first instance, the slum dwellers share environmental risks, leading to neighborhood effects and possibly benefiting collectively from interventions. In particular, social and health improvement interventions in nonslum localities might not be transferable to slum areas. The World Health Organization (WHO) has evidenced that people living in slum settlements are challenged with complicated health conditions, such as injuries, infectious diseases and noncommunicable conditions, like diabetes and heart diseases (WHO and UN-Habitat, 2018). Lack of health education, lack of electricity, poor environmental conditions, lack of access to safe water, sanitation, exclusion from quality healthcare and education and other factors have been attributed to the enumerated health issues (Corburn and Riley, 2016). Consequently, whereas it is believed that living in the city can be healthy for most residents, studies have shown that the location, in terms of where the individual lives, plays a critical role in determining well-being and health accessibility (Dye, 2008; Ezeh *et al.*, 2017). From the above review, poor health situations in the slums cannot be attributed to the behaviors or lifestyles of the dwellers but rather to a multi-dimensional factor. While tackling health issues in the slums is critical, intensifying health education in the dwellings is equally important to mitigate the impact of the factors giving rise to health issues. Doing so will ensure that appropriate health education policies are developed.

Methodology

The setting of the study

The research was conducted at Old Fadama, one of the oldest slum communities in Accra, Ghana. Old Fadama, popularly referred to as Sodom and Gomorrah, became known as a destination for externally generated automobile and electronic scrap collected mostly from the Western world. Most of the area around Old Fadama is located along the Odaw River and the Korle Lagoon. Most of the area has been reclaimed from the river and lagoon by filling up the waterlogged area with sawdust (Afenah, 2010). The settlement is the center of an illegal exportation network for the environmental dumping of electronic waste (e-waste) from industrialized nations. Dating back to the early 1980s, the settlement witnessed an increase in population caused by ethnic conflict, forcing many people to migrate for fear of death. According to Amnesty International (2011) report, the population of Old Fadama is roughly between 55,000 and 79,000. The community is one of Accra's biggest markets, and a center for bulk breaking activities, where foodstuffs from around the country are sold in smaller quantities. It attracts many people who earn their living from the informal sector.

In terms of their makeup, the majority of the households are migrants from the northern region of Ghana (Afenah, 2010), who are engaged in menial jobs. The community was formed with the relocation of squatters from the Osu area to pave way for the construction of the Non-

Aligned Movement (NAM) conference in Ghana in 1990. The nickname "Sodom and Gomorrah" is due to the rampant fires that gut the settlement, coupled with the deplorable living conditions under which residents live. However, the settlement continues to be a hub for a large number of migrants from around the country, with the young majority from the northern parts of the country. The area is also home to several nationals from neighboring countries in the West African region. Old Fadama has become very attractive to young adults in search of greener pastures, particularly young females from the northern regions of the country. A considerable number of residents are engaged in small food markets, selling items such as yams, onions, tomatoes and many more. Others are also engaged in diverse activities, such as hairdressing, food production and dressmaking (COHRE, 2008).

Research design

The study adopted exploratory qualitative method that focused on unearthing the electricity challenges confronting dwellers at the settlements. Exploratory qualitative method is a design that seeks to illuminate how a phenomenon is manifested and especially useful in uncovering a full nature of a little-understood phenomenon (Polit and Beck, 2010). The choice of the design is two-fold: First, the study aimed to explore deeper meanings of behavior rather than quantifying and generalizing results (Creswell, 2011; Walsh, 2002). Second, the study was interested in uncovering important issues, at the same time understanding the health-related implications connected to electricity in slums. The study was not interested in any other factors that have implications on health apart from the absence of electricity. In view of that, respondents who are connected to electricity in the slums were purposively identified as participants for the study. Purposive sampling refers to an intentional selection of informants based on their ability to elucidate a specific theme, concept or phenomenon (Saunders *et al.*, 2009). The main disadvantage of the purposive sampling method is that it cannot be considered a statistical representation of the target population (Saunders *et al.*, 2018); thus, the results of this study do not represent the entire population of Old Fadama dwellers with similar characteristics.

In-depth interviews and focus group discussions (FGDs) were the main sources of data collected for the study among key respondents, who experienced the phenomenon being investigated. At the same time, the use of the FGD afforded the investigators the opportunity to elicit common ideas, thoughts and experiences about the subject matter. In all, 30 interviews were conducted, comprising 25 one-on-one interviews and a FGD made up of five respondents, who were between 40s and mid-40s. Studies have evidenced that a sample size of between 10 and 15 is considered appropriate for a homogenous population (Boddy, 2016; Creswell, 2011). As a result, after the 25th interviewee, no new information was generated by the participants, indicating saturation point in accordance with the recommendation (Guest *et al.*, 2006). In this regard, the sample size used is adequate for a qualitative study as recommended by O' reilly and Parker (2013) and Walker (2012). The biodata information about the participants includes gender, age and occupation. In particular, petty traders, repairers, electricians, yam sellers, fruit sellers, beauticians, hairdressers, food vendors, scrap dealers, vegetable sellers and welders constitute the occupations of respondents.

In line with COVID-19 protocols, social distancing of at least 2 meters apart, use of a facemask, avoidance of handshakes, handwashing and use of hand sanitizers as recommended by the World Health Organization (WHO, 2021) were maintained during the entire period of the field research. To ensure that every interviewee adheres to the in-country COVID-19 etiquette, the investigators provided facemasks and hand sanitizers to those respondents who did not have one. To enhance the high response rate, the researchers preinformed the respondents about the essence of the interview. The procedure allowed respondents to have adequate information about the field exercise and schedule their time for the actual interview.

The interviews, which were mainly conducted in English, were open-ended questions guided by an interview protocol. Conducting the interview in English was necessary because Old

Fadama is regarded as a cosmopolitan slum community with varied dialects. Therefore, researchers used the English language to ascertain fairness in the data collection. The interviews, which lasted between 35 and 45 min on average, were audio-tapped and thematically analyzed, with the emerged themes becoming the products of discussion (Braun and Clarke, 2006). The analysis commenced with a thorough examination of the data to find repeated patterns (Braun and Clarke, 2006). This was done by getting familiar with the data, coding the data, searching for themes, recognizing relationships and refining themes (Saunders *et al.*, 2018).

For the data coding, the investigators read the transcripts, highlighted and annotated the relevant portions. Next were the cluster descriptive codes, where the researchers interpreted the meaning of clusters relative to research questions and applied the interpretive codes to the dataset. There were instances where the participants were contacted via phone calls to crosscheck or confirm some of the transcriptions, particularly relating to quotes. The measures undertaken enabled the enquirers to ensure that the responses by the interviewees were credible, reliable and devoid of bias.

Findings

Challenges confronting slums in accessing electricity

The section presents findings relating to the first research question, aimed at establishing the challenges confronting slums in accessing electricity. The study shows that although some of the dwellers have electricity, challenging issues such as lack of government support, stringent procedures, lack of information clarity, financial hardship and perception were identified. These challenges have become a stumbling block for most of the dwellers trying to access power in the slums and tend to affect them in diverse ways. Discussed below are the quotes underlining respondents' answers to the first objective.

> As you can see, this community generates so much revenue for the assembly, but neither the government nor the assembly is concerned about the wellbeing of the dwellers in this community in terms of electricity. (Repairer, male, 41)

> There is no electricity company of Ghana (ECG) office in this community, where one can go and seek information. This is evidence that the government does not care about us because going to the main office to apply for a prepaid meter is too difficult. (Fruit seller, 37)

> I once went to the ECG office to apply for a prepaid meter and was asked to provide a permanent house number, a digital address, and other requirements before the process could commence. My question is, how many Ghanaians have permanent home addresses? (Beautician, Female, 38)

> I have applied for a single-phase meter for more than a year now, and have still not been given one. Each time I visited the office, I was told that a single-phase prepaid meter was unavailable. I know people who have been supplied with single-phase prepaid meters after my application. (Electrician, Male, 45)

> I had to pay one thousand Ghana cedis 1,000 equivalent to (171 USD) just to facilitate the process, and yet, I have not been given the meter. If I had used this money for business, I could have had a profit. The agent whom I paid the money to kept telling me stories every day. Only God knows when I will be given the meter. (Hairdresser, Female, 46)

> My question is, does all the money we pay for the processing of electricity go to the company? I think ECG is taking undue advantage of our desperation for power and is cheating us. (Petty Trader, Female, 51)

Uses of electricity in slum settlements

The second research question regarding the use of electricity in slums has been presented. The evidence gathered from the field reveals that the dwellers utilize electricity in diverse

means. In particular, activities bordering on economic, social and commercial tend to positively influence their livelihoods. Below are the results that indicate the various uses of electricity in the slums in context.

> Due to the absence of electricity, my children do not iron their uniforms before going to school. Sometimes they tell me their colleagues in school laugh at them. This can easily affect their psyche and the academic performance of children. (Food vendor, Female, 52)

> Some of the trained teachers have refused postings to this community due to the absence of electricity. This is because they perceived the community as being very deprived of social services such as electricity. (Welder, Male, 46)

> In my case, I have noticed that some of the customers do not buy fresh fish or meat from us. This is because they are unsure how we are able to store our fresh products. (Coldstore operator seller, Female, 34)

> I have been going to buy ice blocks from a far place just to enable me to cool my water before selling. Sometimes, getting ice blocks to buy is difficult because demand for it is high than the supply especially during the sunny period. (Ice water seller, Female, 33)

Electricity's impact on health in slums

The findings for the third research question regarding health-related implications associated with a lack of electricity have been reported. In particular, it was aimed at understanding the ways in which the dwellers are able to mitigate health issues at the settlements. The field data indicate that lack of electricity at the dwellings has affected not only the dwellers economically but it also has implications for social and economic implications. The statements below depict the findings.

> Those of us who do not have electricity in our homes suffer from heat. In the process, our rooms become very hot, mostly at night, making it difficult and uncomfortable to sleep. In the process, we develop heat rashes and other skin diseases. (Petty trader, Female, 51)

> Food prepared for the household must all be eaten on the same day or else it will go bad, because there is no electricity for storage. Sometimes, we try to uncover the food partly to prevent it from going bad. At times, when the food is consumed the following day, the children, in particular, develop a running stomach. (Hairdresser, Female, 46)

> Malaria, particularly among children, is common in this community because of the lack of electricity. Although the government has provided us with free mosquito nets, we are unable to use them because the rooms are very hot at night, leaving us at the mercy of the mosquitoes. (Electrician, Male, 45)

> People do bad things in the dark because they know nobody will see them. In this community, people defecate in black polythene bags, and throw them in open gutters. Some also leave garbage indiscriminately along the roads at night, causing cholera and typhoid among both children and the elderly. (Repairer, Male, 41)

> Electricity can increase access to health information through electronic media. I heard of a health education programme on television concerning how to prevent getting COVID-19. However, those of us in this settlement cannot benefit from the programme because we do not have electricity. (Petty trader, Female, 51)

> Women can go into labor at any time. Can you imagine a woman going into labor at night when there is no electricity? Last year a mechanic almost lost his son at birth because the local attendant unknowingly, overcut the baby's umbilical cord because the place was dark. (Food vendor, Female, 52)

Discussion and conclusion

The study sought to understand the implications of electricity in slum settlements within the Ghanaian context. Specifically, the interrelated research questions to which answers were sought from field research have been analyzed. In line with the first question, issues such as lack of government support, stringent procedures, lack of information clarity, financial hardship and perception were identified. It is important to note that challenges confronting respondents' inability to access electricity are not limited to single problems, but border on a gamut of issues. For instance, the interviewees claimed that the government appeared unconcerned with the provision or absence of electricity in the slums. Furthermore, most of the respondents maintained that accessing the ECG office to seek clarification on information has been difficult. The situation had created many intermediaries along the chain of electricity acquisition, leading to huge financial demands. This implies that the higher the bidder, the smoother the process.

The following responses represent the second research question: ironing of uniforms, teaching and learning, and commercial and economic activities. Respondents indicated that the absence of electricity at the dwellings tends to affect the psyche of pupils in the slum community in the following ways: First, it was found that teachers were unwilling to accept postings to teach in the slums due to the absence of electricity. Second, the pupils from the slums often do not iron their school uniforms, a situation that makes their friends look down on them. Third, economically, the lack of electricity has slowed down their businesses, as most customers tend to refuse to buy fresh and frozen produce from the slums.

The findings backed up previous research that showed public institutions are hesitant to give essential amenities to slums, such as power (Jones, 2017). Existing literature consistently shows that access to electricity in the Global South is problematic and frequently disregarded by governments, as part of urban concerns (Westphal *et al.*, 2017). Similarly, Silver (2014) finds that bureaucracies connected with obtaining energy contribute to electricity theft. This is because evidence points to the fact that access to electricity improves productivity, health, education, quality of life and well-being, allowing slum residents to achieve their goals (Butera *et al.*, 2019; Parikh *et al.*, 2012).

Additionally, the health implications of living in a settlement without power have been analyzed. According to accounts from the field, health-related difficulties caused by the lack of electricity include a lack of health education, skin illnesses, stomach aches, cholera, typhoid and complications during childbirth. The interviewees remarked that there is a lack of health education in the slums. This is because most health educational programs were broadcast on television and radio, of which they were unable to access owing to a lack of electricity. Furthermore, the inability to power their fans at night caused sleeplessness, as well as heat rashes. They acknowledged that mosquito nets had been provided but that they were unable to use them at night due to the intense heat in their quarters. The study noted that indiscriminate littering and the dumping of human waste in open gutters were prevalent in slums. Respondents attributed this to a lack of health education, which they say contributes to cholera, typhoid and dysentery in the slums.

The findings of the research add to the growing body of evidence indicating that slum dwellers' health is a factor of poverty, as well as physical and environmental conditions (Ezeh *et al.*, 2017; Lilford *et al.*, 2017). The nature of the slums' composition, in terms of shelters, surroundings and the congestion that characterizes the houses, supports this argument. Furthermore, research has found that slum inhabitants experience complicated health circumstances (injuries, infectious diseases and noncommunicable diseases), which is consistent with the literature. Studies have pointed to the fact that slum inhabitants suffer from a variety of health problems (injuries, infectious diseases and noncommunicable diseases such as diabetes and heart diseases), which is consistent with the literature (WHO and UN-Habitat, 2018). The findings imply that there is a complete lack of health education in the slums, which has tended to influence slum dwellers' health.

As a result, the evidence from the study indicates that the lack of electricity has repercussions for health-related concerns in slum settlements. This indicates that providing electricity will result in slum residents receiving a better education and living in a better social and economic environment. Importantly, achieving SDG-7 necessitates countries reorienting their energy policies to accommodate all people, especially those living in slums. Although electricity is only one of many difficulties confronting slum settlements, it may serve as a barrier to escaping poverty and living a healthy life (IEA, 2015; Kumi, 2017). Finally, the purpose of this article was to look into the difficulties involved in obtaining electricity among slum dwellers and its health implications. The results of the investigation have been presented objectively in three ways.

One, it demonstrates that the slums' difficulties in obtaining electricity are attributed to a lack of government support, strict procedures, lack of information clarity, financial hardship and perception. Two, the study established that the dwellers in the slums use electricity to iron clothes, for teaching and learning and for other economic enterprises. Three, regarding the effects of electricity on health education, the study identified issues such as lack of health education, skin diseases and stomach aches, cholera, typhoid and complications in children's birth. Significantly, the outcome of the study provides a country-specific understanding of the problems slum inhabitants face in gaining access to power. It reveals the diverse usage of electricity in the slums and its health repercussions. Therefore, the research has pushed the boundaries of the domain's literature and indicated pointers for policy consideration. Finally, if SDG-7 is any indication, the study's result justifies the need for slum-specific energy regulations.

Implication and recommendations

The study's findings have managerial and policy consequences. To begin with, the findings suggest managerial lessons for stakeholders, such as the Energy Ministry and the ECG, to consider when expanding energy provision to slums. It is the recommendation of the study that alternate power supplies, such as solar and natural gas, be explored for the slums. This will minimize the health-related issues associated with the lack of electricity in slums. The following recommendations are made from a policy standpoint.

First, a policy of sub-letting the slum electrification project to third parties will ensure that electrification difficulties are successfully addressed. Second, the study recommends that the power offices be decentralized so that residents can easily have access without having to rely on agents. This will lower the expenses associated with enlisting third parties, while providing residents with real-time information. Three, the study suggests enacting a policy that assures that each slum family receives a credit-based prepaid meter. That way, when a meter owner buys power, deduction is made to cover the cost of the meter. This is important, since achieving SDG 7 requires that all people have access to affordable, dependable and modern energy services. Fourth, the study recommends that since health education is primarily limited to print or electronic media, slums without electricity may be disadvantaged. Therefore, while attempts are made to supply power to all slums, other methods, such as community durbars, use of loudspeakers and vans equipped with loudhailers, could be deployed to give health education in the slums.

Limitations and future studies

The research has the inherent limitations of a qualitative study that deter the findings from generalization. This is because the interviewees were not randomly selected and, statistically, not representative of the whole slum population in context. Furthermore, this study did not aim to compare demographics in terms of the challenges, uses and health implications associated with electricity in the slums. The study design was descriptive and

did not quantify participants' responses to the phenomenon being investigated. Although the above limitations did not affect the robustness and quality of the study, future research should explore the highlighted limitations in terms of demographics using quantitative research techniques.

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