Journal of
Water, Sanitation & Hygiene for Development

 Journal of Water, Sanitation and Hygiene for Development Vol 13 No 2, 127 doi: 10.2166/washdev.2023.197

**Research Paper**

# Availability and accessibility of toilet facilities among low-income households in selected settlements of Cape Coast Metropolis, Ghana

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## ABSTRACT

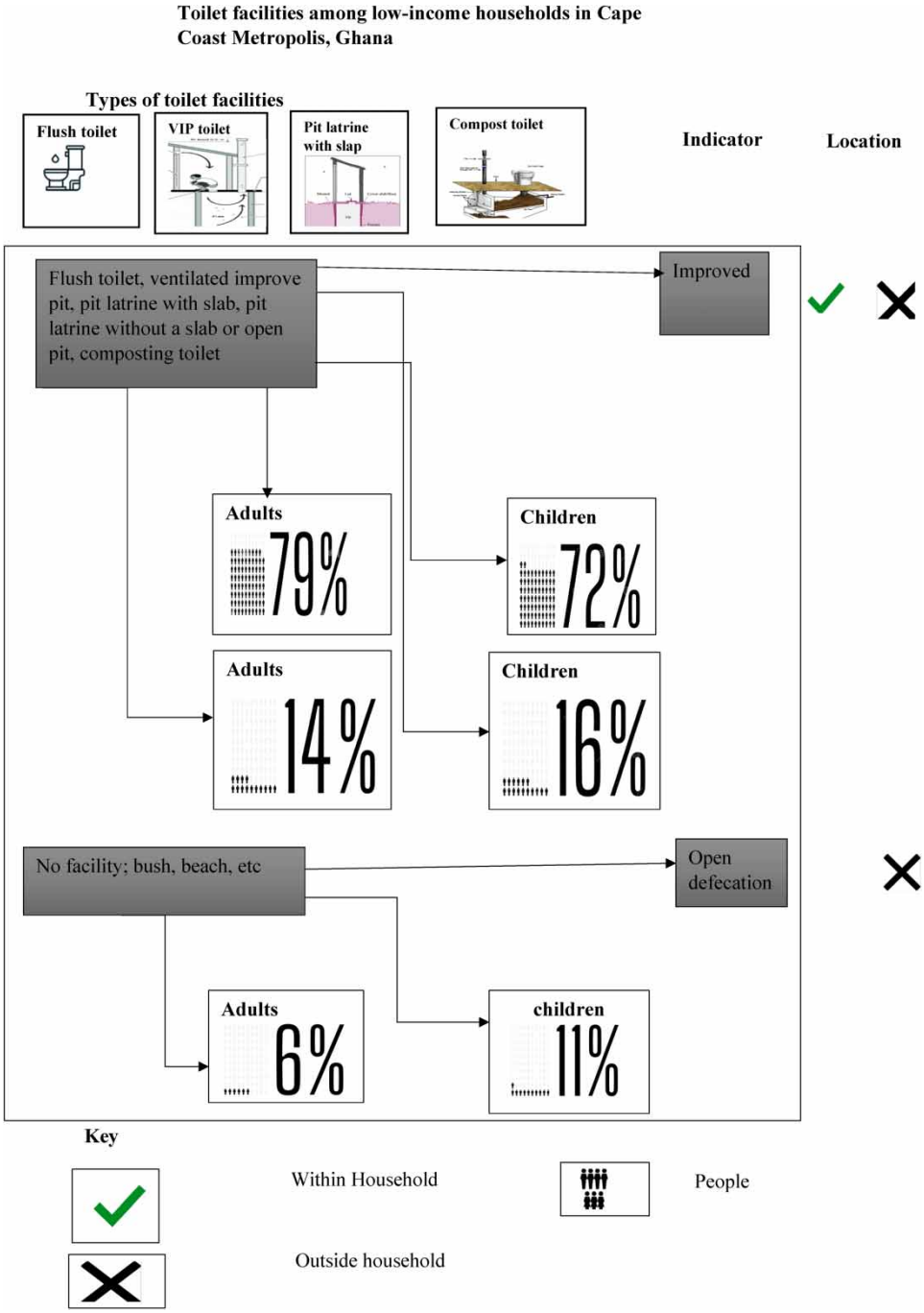
Cape Coast Metropolis faces a serious lack of adequate toilet facilities among the low-income households, leading to poor sanitation, health, and environmental degradation. The research explored and provided valuable data on the availability and accessibility of toilet facilities among low-income households. Using a simple random sampling technique,100 closed-ended questionnaires were equally administered to respondents in four Cape Coast Metropolis communities. Descriptive statistics were used to assess the types of toilet facilities available, identify the accessibility of toilet facilities, and ascertain challenges in providing toilet facilities. Spearman's correlation coefficient was used to explore the relationship between income source and toilet facilities in the households. All statistical analysis was done using SPSS version 21. The findings were presented in form of tables and figures. The results reveal a significant lack of toilet facilities among the residents. Regarding the level of accessibility, most adults (79%) and children (72%) used household toilet facilities for defecation, while 14% of adults and 16% of children in the household were using toilet facilities outside the household. Open defecation near the house was more prevalent among the children (11%) than adults (6%) which shows unwillingness by most families to invest in improve toilet facilities.

**Key words:** Cape Coast Metropolis, households, low-income household, toilet facilities, urban

## HIGHLIGHT

- The research seeks to illustrate inequality in the accessibility and availability of toilet facilities among low-income households in Ghana. Thus, providing useful data which helps in understanding Ghana's set targets in achieving its Millennium Development Goals (MDGs) for sanitation to its citizens.

## GRAPHICAL ABSTRACT




## INTRODUCTION

Numerous concepts of the term sanitation define it as a simple and secure way of disposing waste (Starovoytova 2018). Considering that the secure disposal of waste influences human health significantly and substantially, the need to improve sanitation is scrutinized from a comprehensive perspective. The provision of ample sanitation entails giving facilities that can reduce human risk with waste that can potentially contaminate food and water. These include good personal hygiene, secure disposal of human excreta, rubbish, wastewater, and animal droppings. Safe disposal of human waste comprises of aptly improved pit latrine, designed with ventilators to curb odor and flies (Degraf 2017).

The global sharing of toilets and pit latrines in several urban environments is making it impossible to fulfill a toilet's fundamental health objective of safeguarding the disposal of human excreta. The aim is to prevent contamination through hands, clothing, water, or food and inaccessibility to flies and other disease vectors (Osumanu *et al.* 2019). In an urban center with communities that are having the largest number of households with low income, patronization of the toilet by scores of people is not common. In Africa and Asia, only toilets with poor communal maintenance can be accessed by tens of millions found in low household settlements (Lwasi 2018).

The WHO/UNICEF (2008) Report as cited by Roche *et al.* (2017) and Powell (2018) identified the proportional size of the people using improved toilet facilities in the entire Africa and this only accounts for 38% of the total population in the continent as of 2006. The condition is even dire in Sub-Saharan Africa (SSA) on access to improved sanitation facilities with only 30% of the population having access.

Ghana did not meet the set targets in its MDG for sanitation which was set to fulfill 54% of the coverage by providing improved sanitation to its citizen but the country only achieved a modest 15% (Osumanu *et al.* 2019). There was a marginal increase of 7% of the total coverage, which was attained from 13% in 1990 to 20% in 2015. According to Kosoe & Osumanu (2018) shared toilet facilities are considered to be unimproved and at the moment they are major sanitation facilities being used by households in Ghana.

Based on Okurut *et al.* (2015) it is estimated that 20% of the residents in urban areas are using individual improved facilities. Practice of open defecation by urban residents accounts for only 7%. The majority of the toilet facilities which include individual toilets are onsite technologies. Almost 7% of the urban dwellers are relying on 'bucket latrine' or plastic bags which are disposed to the surrounding environment in Ghana.

For two key reasons, toilets are important features in Ghanaian urban life. First, in low-income, heavily populated, or informal settlement areas, they have become the primary facility for many individuals. Second, the toilets serve more significant public health needs and without them, people will be forced to defecate in the 'bush or beach' in low-income densely populated areas, which is likely to exacerbate environmental health threats in a world that is already vulnerable to diseases such as malaria, diarrhea, dysentery, cholera, and bilharzia (Robb *et al.* 2017).

A vital aspect of urban sanitation and a fundamental requirement of disease prevention is hygienic excrete disposal. Proper means of running and maintaining toilets are an efficient way to manage environmental pollution by excreta, according to public toilet guidelines by de la Salud (2018). The unscrupulous means adopted by most landlords, by which their domestic toilets and bathrooms have been converted into rental accommodation, have forced many people to rely on public toilets to meet their domestic needs in Ghana (de la Salud 2018).

About half of Ghana's population (59%), the highest in the world, relies on shared toilet facilities, including public toilets (Nambo 2018). Almost 8% of Ghanaians rely on different types of unimproved sanitation facilities such as bucket latrines which is common among low-income households. There is a lack of sanitation promotion facilities, which is demonstrated by how most households are using either bucket latrines and dispose their waste in open spaces or in public dumping sites. There is a small number of water closet (WC) households and very few households with pit latrines as well, while many households are still without any sort of decent toilet facilities (Munamati *et al.* 2016).

An average of 4.8 million people in Ghana have no latrines and defecate in open spaces, while an additional 16 million use unsanitary toilets (Cobbinah *et al.* 2020). The challenge of open defecation simply leads to about 10% of Ghana's sanitation-related problems. As of 2006, about 10% of Ghana's entire households used open defecation, reflecting a serious shortage of toilet facilities in many of Ghana's residential areas (Degraf 2017).

Due to the lack of toilets in different households, poor sanitation, and crowded areas, Cape Coast Metropolis, the capital of the Central Region of Ghana, also faces such challenges, especially in low-income settlements (Obeng *et al.* 2019). The Metropolitan Planning Committee's annual composite report on CCMA in 2014 revealed that the Metropolis has issues with inadequate toilet facilities that have orchestrated excessive disposal of waste and poor sanitation. Inadequate awareness of human excrement's proper disposal has contributed to open defecation in open areas and places along the roads or lakes, lagoons, and beaches for individuals in low-income households (Okurut *et al.* 2015). However, information on the availability and accessibility of toilet facilities in households in low-income households has not been well reported and documented.

## Aim of the study

This research was aimed at exploring and providing valuable data on the availability and accessibility of toilet facilities among low-income households in Cape Coast Metropolis.

The specific objectives were to:

1. assess the type of toilet facilities available among the urban low-income households
2. identify the accessibility of toilet facilities in urban low-income dwellers
3. ascertain challenges in providing improved toilet facilities among urban low-income households
4. to find out the relationship between the source of income and the availability of toilet facilities.

## METHOD

### Method of measurement

#### Dependent/outcome variables

The response/dependent or outcome variable considered for this study was the availability and accessibility of toilet facilities. The toilet facilities and means of disposal of human excreta are categorized into improved and unimproved toilet facilities. Improved toilet facilities consist of a ventilated improved pit latrine (VIP) and flush toilet. In contrast, unimproved toilet facilities are made up of shared pit latrines, owning pit latrines, and open defecation in the bush or the use of the bucket.

#### Independent/exposure variables

The independent variables were toilet facilities and the provision of toilet facilities. They were generated from demographic information, including gender, education level, occupation, marital status, household size, and income source for households. The process was done using selected data available, a literature review, the significance of practicality, and parsimony. These independent variables were chosen because they can influence the toilet facilities being used in the household.

### Study area

Cape Coast, as shown in Figure 1, is located at longitude 1°1′ to 1.41′ west of the Greenwich Meridian and latitude 5° 10′ north. Cape Coast Metropolis is sharing common boundary with Twifo Heman Lower Denkyira district to the north. On the southern part is the Gulf of Guinea. On the western side, it shares borders with Komedo Edina Eguafo Abrem Municipality and borders the eastern side with Abura Asebu Kwamenkese district. The total area for Cape Coast Metropolis is estimated to be 111 square kilometres (Ghana Statistical Service 2013).

In general, the landscape formation is a rising and fall pattern having features of batholiths. The main rock type that exists is Birimain formation, and it consists of pegmatite, granites, and schist. Soils that are mostly present are sandy and clay mixed with silt and are usually available within the hills' vicinity. In contrast, gravel that is clayey and has lateritic soils is commonly found in the valleys (Ghana Statistical Service 2013).

Temperatures are comparatively high in the entire period of the year, with February and March being considered the hottest, whereas June, July, and August are the coldest months. There are two main types of annual rainfall in the Cape Coast, and it is between 750 mm and 1,000 mm on average. Cape Coast is a humid place with average relative humidity falling within 85–95% during the morning hours. In the afternoon, there is variation in the humidity from 50% in the dry months to about 80% when it is wet, more so during May and June (Ghana Statistical Service 2013).

According to the population census conducted in the year 2010, Cape Coast Metropolis had about 169,894 people, representing 7.7% of the region's entire population. Females had a higher population of 51.3%, while males were 48.7%. Furthermore, the population mostly consists of youths within the age group of 20–24 years. There are 40,386 households within the entire population of 140,405. There are about 3–4 people per household, with the largest proportion of the household structure being children, representing 37.1% of the Metropolis. Metropolis's urban population is 76.6%, while the rural population is 13.3% (Ghana Statistical Service 2013).

Public toilets are most popularly used in the Metropolis and there is no contrast between urban and rural dwellers. Two out of five households are possibly using the WC toilet and it is not popular among low-income households in urban. Pit latrines and ventilated improved pit latrines are more common. Open defecation is still common, with about 7 out of 100 households having no toilet facilities, therefore opting to use the bush, open space, or beach for defecation (Ghana Statistical Service 2013; Mansour & Esseku 2017).

Cape Coast Metropolis is large in size that is why a transection of the low-income household population was selected in the four communities. Furthermore, there is high disparity in the number of households with toilet facilities among some regions in Ghana in which the Central Region is part of them. Hence, the selection of Cape Coast Metropolis will bring out a clear

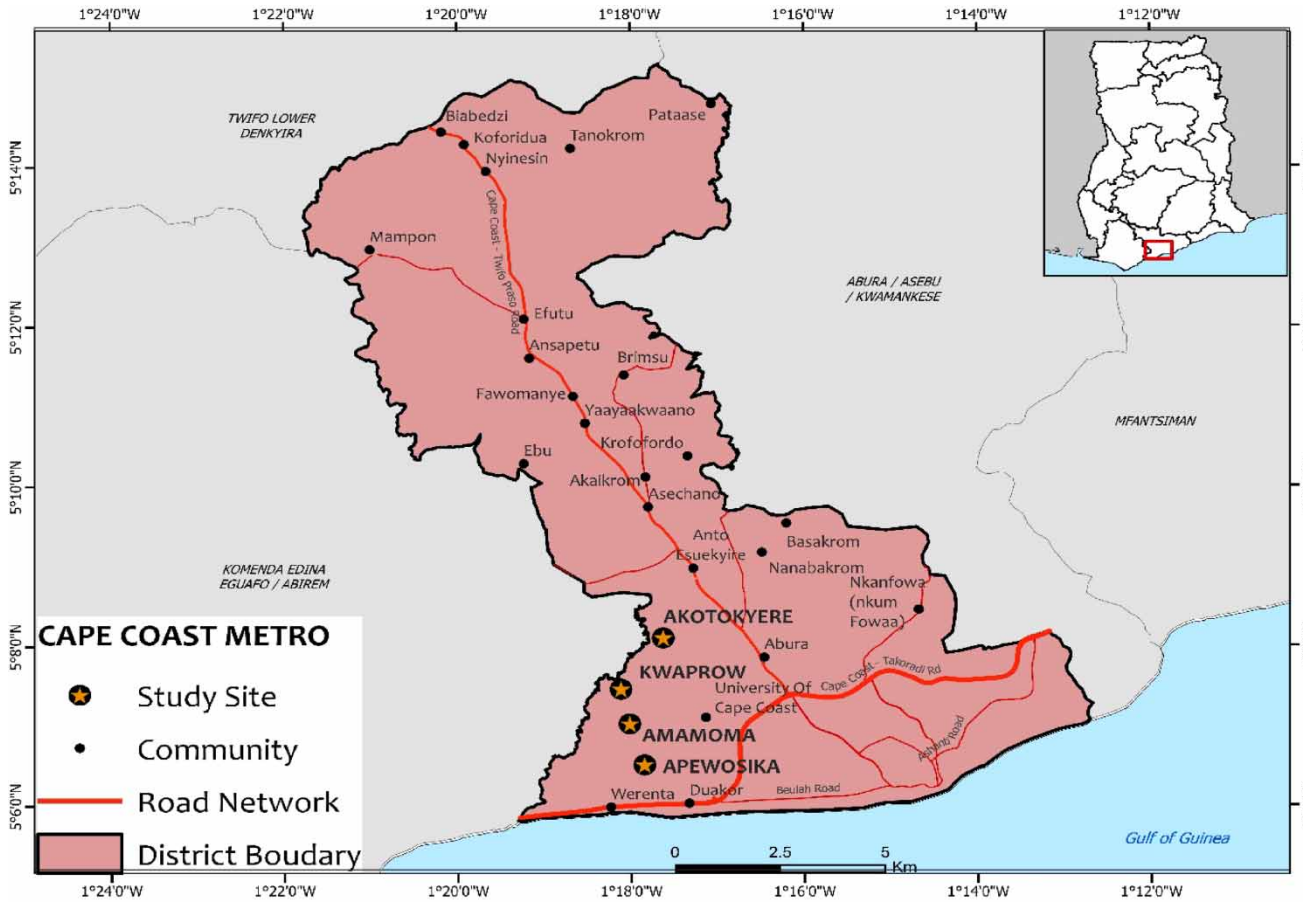



**Figure 1** | A map of Cape Coast Metropolitan Area. *Source*: Author's construct, 2021.

picture of the problem. The research focused on households that have lived not less than a year in the Metropolis. During the 2010 population and housing census, the cut-off of households having lived in the Metropolis for no less than a year was based on classification by the Ghana Statistical Service on the definition of who a resident is. This consisted of different households selected within the populations, comprising of male and female adult household heads and household members who could provide a vivid overview of their sanitation circumstances, including that of their children (Ghana Statistical Service 2013).

### Research design

A descriptive survey research design was adopted for the study. The choice of the design was informed by quantitative data collected and the design was useful in accurate data analysis and interpretation using descriptive and inferential statistics.

### Tools

Questionnaires were used to collect the primary data. The questionnaire consisted of biodata and 14 questions. It was content validated and the reliability coefficient was found to be 0.705 using Cronbach's Alpha.

### Data source

Data were obtained from the primary source by using closed-ended questionnaires. Data were collected from primary data sources which gave detailed information on toilet facilities since it provides both the researcher and the respondent with an opportunity to engage one another. It helped save time for the respondent while avoiding any influence or intervention from the researcher when answering questions. The questionnaires were administered in four selected communities' settlements in Cape Coast Metropolis and among household heads, members, and landlords in low-income households, in the

following communities represented as follows: Akotokyere (AK), Kwaprow (KP), Amamoma (AM), and Apewosika (AP). The questionnaire was designed in a manner that all the critical issues regarding toilet facilities were captured to depict the real picture in terms of accessibility and availability of toilet facilities among low-income households. It was divided into three major sections, with each part having a different number of questions. Section one consisted of the item relating to the respondents' biodata information and was divided into five parts. Section two was on the availability of toilet facilities and was made up of nine questions. Section three was on challenges in the provision of improved toilet facilities and consisted of five items. There were 14 questions in total with a varying number of answers per question.

The questionnaires were administered to respondents from the age of 20 to 70 years and who have lived in the area for not less than one year. And this was to ensure the reliability of the responses. If the respondents could not read and write or understand the questions, the researcher assisted them in filling, and all the questionnaires were collected on the same day it was administered.

## Sampling procedure and size

There were 40,386 households, out of these a sample size of 100 households was chosen using the mathematical formula provided by Nassiuma (2000). A simple random sampling technique was used to select the sample size in this study. This technique was used to allow all the households to be selected without any bias.

$$n = NC_V^2/(C_V^2 + (N-1)e^2)$$

where $n$ is the sample size; $N$ is the population; $C_v$ is the coefficient of variation (take 0.5); $e$ is the acceptable sampling error (5% or $95/100 = 0.05$)

Equation (1) describes the calculation of sample size.

Therefore, from Equation (1), the sample size is

$$\frac{40,386 \times 0.5^2}{(0.5^2 + (40,386-1)(0.05^2)} = 99.76 \simeq 100 \quad (1)$$

100 households

## Data analysis

The data were extracted and cleaned up by locating all missing values and checking for the answers' internal accuracy. By using the hard copies of the completed questionnaires, any irregularities in the data were corrected. Where appropriate, variables were recorded. Descriptive statistics by means of frequencies were used to assess the types of toilet facilities available, identify the level of accessibility of toilet facilities, and ascertain challenges in the provision of toilet facilities. Spearman's correlation was used to explore the relationship between income source and the availability of toilet facilities in the household. All statistical analysis was done using SPSS version 21. The findings were presented in the form of tables and graphs.

## Ethical consideration

During the data collection point to the analysis, the researcher considered many ethical concerns. The researcher observed ethical policies and procedures by shielding respondents from physical and psychological damage and ensured that their rights were not violated. The right to free and informed consent was guaranteed. Respondents were not coaxed to engage in the research project in any way and they participated willingly in the research process. Also, adequate information was provided to participants to make informed decisions about their involvement or non-participation. For ethical issues, pseudo-names were used for the communities (AM, AP, KP, and AK). During the writing of the research, confidentiality and privacy concerns were not affected. The data that were collected were strictly utilized only for academic purposes.

**Table 1** | Socio-demographic data of the households

| Respondents | Frequency | Percent |
|---|---|---|
| Gender | | |
| Male | 46 | 46.0 |
| Female | 54 | 54.0 |
| Marital status | | |
| Single | 28 | 18.0 |
| Married | 72 | 71.0 |
| Education level | | |
| No formal education | 20 | 10.0 |
| Primary | 9 | 9.0 |
| JHS | 41 | 41.0 |
| SHS | 17 | 17.0 |
| Tertiary | 13 | 13.0 |
| Household size | | |
| 1–5 | 51 | 51.0 |
| 6–10 | 38 | 38.0 |
| 11–15 | 11 | 11.0 |
| Source of income | | |
| Traders | 74 | 74.0 |
| Artisans | 11 | 11.0 |
| Civil servants | 13 | 13.0 |
| Students | 2 | 2.0 |

*Source*: Field survey, 2021.

## RESULTS AND DISCUSSION

### Results

#### Socio-demographic data of the households

The demographic data that were obtained from the filled questionnaires are presented in Table 1. There were 46 males (46%) and 54 females (54%) in a sample of 100 respondents from the output in the table. The education level reveals that the respondents with no formal education were 10 (10%), those with primary education were 9 (9%), those with junior high school accounted for 41 (41%), which was considered the highest, and those with senior high school and tertiary education accounted for 17 (17%) and 13 (13%), respectively. In regard to the household size, there were 51 (51%) respondents within the household size of 1–5, 38 (38%) respondents in the 6–10 household size, and 11 (11%) respondents in 11–15 household size.

Most of the households' income sources were obtained through trading activities and these were represented by 74 (74%) of the respondents, and it was the majority group and was distantly followed by those who were in formal employment. The group in formal employment were mainly the civil servants representing 13 (13%) of the total respondents and then closely followed by the group of respondents who were under the category of artisan which was represented by 11 (11%). The least of the respondents were students who obtained their income possibly from their pocket money and this was represented by 2 (2%).

#### Types of toilet facilities available among the communities

The descriptive statistic was used in assessing the types of toilet facilities available in the AM, AP, KP, and AK communities. The results are presented in Figure 2 and Supplementary Material. The availability of the different types of toilet facilities varied from one community to another. Pit latrines were available in all the communities and distributed differently in

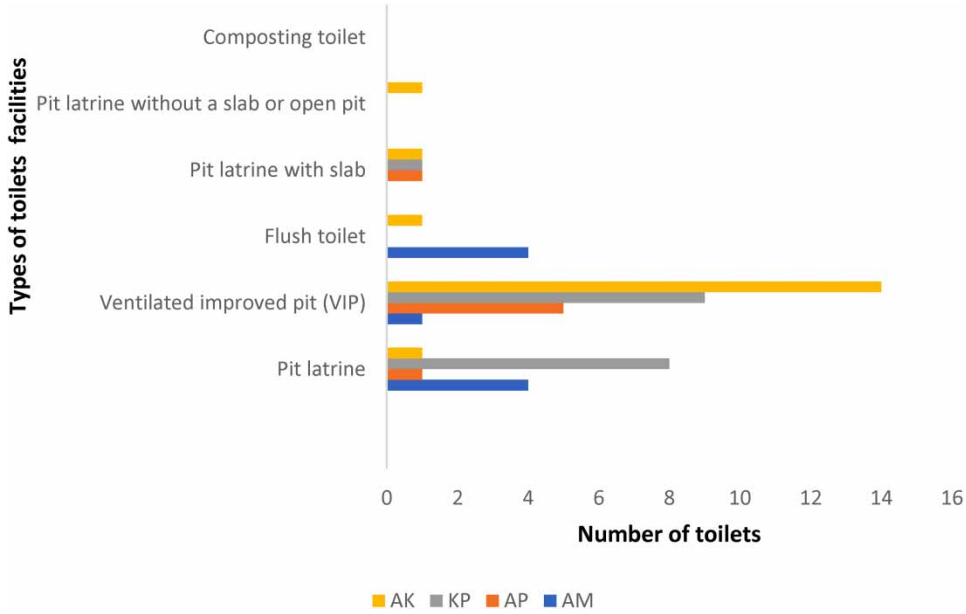



**Figure 2** | Types of toilet facilities available among the communities. *Source*: Field survey, 2021.

frequencies and percentages. The available pit latrines are as follows: AM was 4 (16.0%), AP was 1 (4.0%), KP was 8 (31.0%), and in AK it was 1 (4.0%). Ventilated improved pit latrines were also present in all the communities and their distributions were as follows: AM was 1 (8.0%), AP was 5 (10.0%), KP was 9 (36.0%), and AK was 14 (56.0%). Flush toilet facilities were only available in AM and were 4 (16.0%) and in AK were 1(8.0%). Pit latrines with slab were available in three communities in equal frequencies and percentages, and the distributions were as follows: AP at 1 (8.0%), KP at 1 (8.0%), and AK at 1 (8.0%), respectively. Pit latrines without a slab or open pit were only present in AK at 1 (8.0%). However, composting toilet facilities were not present in any of the four communities at all.

### Level of accessibility of toilet facilities

From the output presented in Figure 3, the level of accessibility of the toilet facilities in the communities was determined through the considerations of the following: adult means of defecation; children's mean of defecation; means of disposing of babies' feces; and preferred toilet facility.

The number of adults who could access the household toilet facility was equivalent to 79 (79%) of the respondents. Fourteen (14%) of the household had access to other toilet facilities. In contrast, some households could only access the open defecation near the house or open defecation in the field or the bush. Open defecation near the home accounted for 6 (6%) and open defecation in the field accounted for 1 (1%).

Children's means of defecation were depicted by 72 (72%) of the households, where children can access household toilet facilities and those who access the other toilet facilities were 16 (16%). Furthermore, households where children could access open defecation near the house were 11 (11%) families. At the same time, those who could access defecation near the field were 1 (1%) households.

Accessibility of toilet facilities as a means of disposing of babies' feces was determined by looking at the households which disposed babies' feces into the latrine, which accounted for 21 (21%). Those who disposed it into a drain or a ditch were represented by 24 (24%), while households that disposed babies' feces in an open area near the house were at 47 (47%). A small percentage of 2 (2%) households disposed babies' feces by leaving them in open space while 4 (4%) of the households did not have babies and 2 (2%) use other means which were not among the group listed.

Regarding the toilet facility's preference, shared pit latrines accounted for 11 (11%) households, while 18 (18%) households had their own pit latrines. Households that use shared improve pit latrines was 7 (7%) compared to the households who own improved pit latrine which was 9 (9%) households. Seventeen per cent of the households preferred a shared flush toilet, while most households preferred owning a flush toilet and these were 38 (38%).

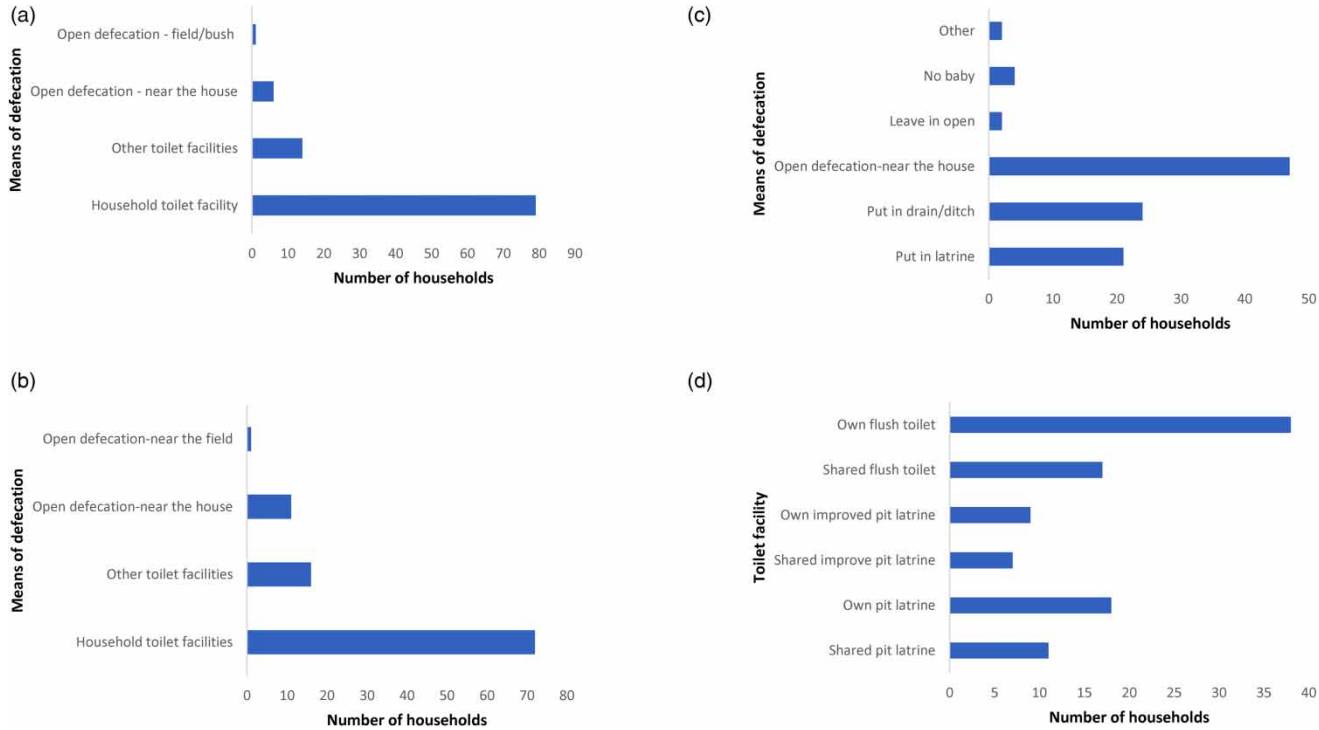



**Figure 3** | Level of accessibility of toilet facilities. (a) Adult means of defecation. (b) Children means of defecation. (c) Means of disposing babies' feces. (d) Preferred toilet facility. *Source*: Field survey, 2021.

### Challenges in the provision of toilet facilities

Figure 4 presents the results of challenges in the provision of toilet facilities and the analyses were done through descriptive statistics by assessing the disadvantage of owning a household toilet facility and the quantity of water used per day in the household to flush the toilet.

Based on the disadvantages of households owning a toilet facility, 17 (17%) of the households attributed the bad smell to be the disadvantage of owning the toilet facility. According to 10 (10%) of households, owning a toilet facility could attract flies. Furthermore, according to the majority of the households, which was were 59 (59%), it is costly to maintain the toilet while according to 10 (10%) of the respondents, it is a huge task to maintain individual household toilet and 4 (10%) of the households, interviewed mentioned maintenance cost, encroachment, and usage by other people as the major challenge to owning a toilet facility. The amount of water used every day in the households to flush the toilets varied in households that use or own flush toilets. The highest amount of water used was between 15 and 16 litres as mentioned by 6 (6%) of the respondents. About 6–14 litres were used by 11 (11%) households in flushing the toilets. The least amount of water used was 5 litres and below which accounted for 2 (2%) of the households. Seventy-seven per cent of the respondents were not using any water to flush toilets since they did not have flush toilets in their respective households.

### The relationship between the source of income and availability of toilet facility

The relationship between the source of income and toilet facilities availability was investigated using Spearman's correlation coefficient. Preliminary analyses were done to ensure no violation of assumptions of normality, linearity, and homoscedasticity. There was a weak, negative correlation between the two variables, $rho = 0.080$, $n = 100$, $p < 0.216$, with high levels of income associated with the low level of toilet facility owned by the household (Table 2).

## DISCUSSION

Past researches have depicted that toilet facilities have a very crucial role in society. Therefore, the availability and accessibility of toilet facilities in the communities should be a necessity. Despite several efforts carried out by the government and other partners to improve the availability and accessibility of toilet facilities, Ghana, as a nation, is still facing shortages in the

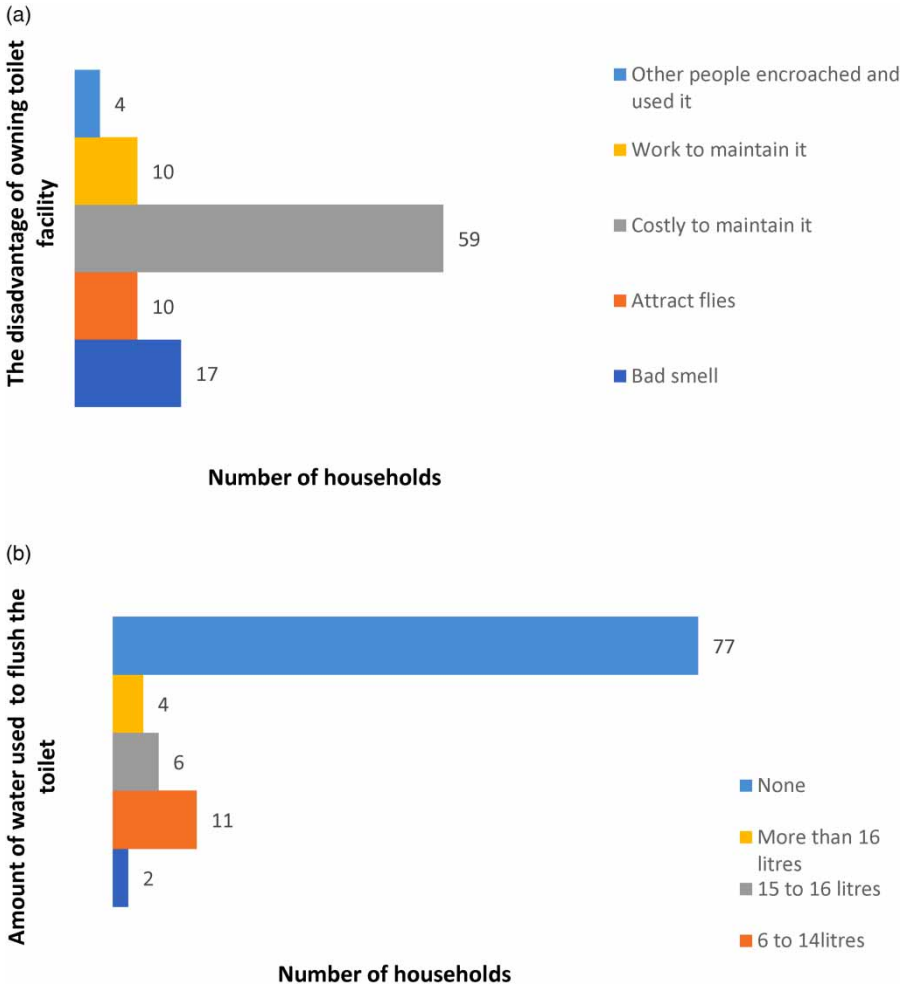



**Figure 4** | Challenges in the provision of toilet facilities. (a) Disadvantages of owning a toilet facility. (b) Amount of water used per day in the household to flush the toilet. *Source*: Field survey, 2021.

number and types of toilet facilities among its various communities and especially in the urban areas among the low-income households. Consequently, in this research, Cape Coast Municipality, the headquarters of the Central Region of Ghana, faces a serious problem of a lack of toilets among low-income households.

The majority of the respondents (54%) were females, which implies that females are usually at home most of the time to maintain cleanliness in the household, including toilet facility and handling of household sanitation, for example, disposing of children's feces. The majority of the respondents (72%) were married.

**Table 2** | Relationship between the source of income and availability of toilet facilities

**Correlations**

| | | | Source of income | Kind of toilet facility owned |
|---|---|---|---|---|
| Spearman's rho | Source of income | Correlation Coefficient | 1.000 | −0.080 |
| | | Sig. (1-tailed) | 0 | 0.216 |
| | | *N* | 100 | 100 |
| | Kind of toilet facility owned | Correlation Coefficient | −0.080 | 1.000 |
| | | Sig. (1-tailed) | 0.216 | 0 |
| | | *N* | 100 | 100 |

*Source*: Field survey, 2021.

Using descriptive statistics, the available types of toilet facilities in the four communities of Cape Coast Municipality were assessed. This research reveals that there is a significant lack of some toilet facilities among the residents. Pit latrines were available in all four communities because it is cheap to construct, maintain, and use. And this is in line with the study by Nakagiri *et al.* (2016) that asserted that pit latrines are used by more than half of the people in the urban areas in SSA and mostly with low-income households. Furthermore, 36 million households in urban centers in SSA have embraced the pit latrine since 2007. VIP was also common in all four communities of the study.

Furthermore, this is supported by the research done by Obeng *et al.* (2016), which asserted that though pit latrines are popular, mostly in their basic form, they have a nuisance of intense smell and flies. And this usually resulted in creating a barrier to consistency in usage, which necessitated the creation of VIP. Appropriate construction of VIP latrine can prevent odor and nuisance of flies and provide those who use it a majority of health benefits. Flush toilets were less popular among low-income households in the four communities of the study area and were only present in one community. And this could be attributed to the high cost of acquiring and using the flush toilet by low-income households. And was supported by the literature by Okurut *et al.* (2015) who cited a study conducted in Ghana by Monney *et al.* (2015) to assess the household demand for flush toilet facility and identified high cost of the construction and maintenance as the major impediment to low-income households to own a flush toilet. Composting toilets were not available in any of the four communities and pit latrines without a slab or open pit that were only present in one community, AK. This is in line with the research by Wilbur (2014). He claimed that composting toilets have a real limitation that usually influences the users' socio-cultural and economic sustainability in developing nations. For instance, the compost toilet's infrastructure is perceived to be of high cost, compared to the pit latrine, VIP, and flush toilet. Moreover, it requires a high maintenance level and in depth knowledge on how to use, which can evoke negative perceptions by the users about handling composted human excreta.

The accessibility of toilet facilities was determined using descriptive statistics by considering the following variables: adult means of defecation, children's mean of defecation, means of disposing of babies' feces, and preferred toilet facility. The majority of the adults (79%) and children (72%) use household toilet facility for defecation, while 14% of the adult households' members use other toilet facilities as compared to 16% used by the children which are not within the household reach. More children are not using household toilet facilities than adults because, most of the time, children are in school except during weekends and holidays, and young children, especially among low-income households, can use other means such as open defecation. Open defecation near the house is more prevalent among children (11%) than adults (6%). Open defecation near the open field is low and similar for adults (1%) and children (1%). This could be attributed to the fact that kids, especially five years and below, defecate near their homes and in a few open fields which are available due to congestion.

The type of household toilet facility used by most adults and children is unimproved toilet facilities while few could be using improved toilet facilities. These revelations coincide with studies conducted by Akpakli *et al.* (2018), who found that 86% of Ghana's population has no access to an improved toilet facility. The situation is even dire among low-income households in peri-urban areas as compared to residents in rural places. Moreover, open defecation has become a critical health challenge, affecting about 1 billion people globally, and a significant number of people dying per year is approximately 841,000 due to diseases related to poor sanitation exacerbated by open defecation. Several urban and peri-urban places of Sub-Saharan countries in Africa have been hit hard by this problem, as highlighted by Osumanu *et al.* (2019).

The majority of the households in the four study areas dispose babies' feces in open places near the houses (47%) which exacerbates the challenge of open defecation already mentioned above. The situation is worsened because 24% of the households dispose babies' feces through drains or ditches while only 21% use pit latrines. This explained the reason for high diarrhea cases among babies in SSA as put forward in Kosoe & Osumanu (2018). The rest of the means of disposal of babies' feces include ways such as leaving in the open (1%), households with no baby (4%), and other means of disposal (1%), which had no substantial impact.

Using the descriptive statistics to assess the toilet facility's preference, it was discovered that the majority of the households preferred owning the flush toilet (38%). And this was followed by the households who wished to have a shared flush toilet (17). This is ascribed to the fact it is prestigious to use the flush toilet and easy to clean and maintain; however, it requires a constant water source and is more costly to install in the household, as mentioned by Zaied (2018).

Some households preferred using shared pit latrines (11%) and others owned pit latrines (18). Seven per cent preferred using shared improved pit latrine compared to 9% who preferred owning improved pit latrine. Possibly this could be due to the less expense in constructing a pit latrine, which does not require water for flushing. This is substantiated by research by Nakagiri *et al.* (2016), which argued that pit latrines and improved pit latrines are the primarily forms of toilet available among low-income households in urban areas of SSA. The study proposed methods for ensuring their proper usage and sustainability.

Challenges in the provision of toilet facilities were identified through analysis of the two variables using descriptive statistics. The variables were the disadvantage of owning a toilet facility by the household and the amount of water used per day to flush the household's toilet. The major disadvantages of owning a toilet facility were due to the following factors: the cost of maintenance (59%), which was the most common factor as compared to other factors such as the foul smell (17%), the attraction of flies (10%), and maintenance work (10%) which were moderately low. The encroachment by non-household members (4%) was the least factor among the four communities' residents. The research supports these findings carried out by Mariwah *et al.* (2017) and Osumanu *et al.* (2019), who found that the cost of maintenance of the toilet facility is affected by the wealth of the household and therefore low-income households are limited from owning improved toilet facility such as flush toilets in Ghana. The influence is noticed strongly at the pinnacle of wealth quantile among the wealthiest households. Several households were not using flush toilets (77%) as compared to the rest of the few households that use flush toilets and with varying amounts of water used per day to flush the feces. Many of the households were not using flush toilets due to the nature of their household wealth, as further explained by the works done by Addo (2016).

Using Spearman's correlation coefficient, the relationship between the sources of income and toilet facility availability was explored for the sample size ($N$) of 100 households. Rho was −0.080, indicating a very weak negative correlation between income sources and the type of toilet facility owned by the households. As income level decreases for the majority of the households it leads to almost no likeliness to upgrade the type of toilet facility owned by the household. Source of income helps explain only 0.0064% of the household of variance scores on the kind of toilet facility owned. This is a very minimal amount of variance explained. The $P$-value (sig. value) is 0.216, which is more than 0.05. Therefore, there is no statistically significant relationship between income sources and the kind of toilet facility owned by the household. The research reinforces these findings by Awunyo-Akaba *et al.* (2016) and Mansour & Esseku (2017) and who alluded that Ghana has a minimal investment in the kind of toilet facilities used in the households among the peri-urban and urban residents.

## CONCLUSION

The availability and accessibility of toilet facilities among low-income households in Ghana are inadequate. Despite this, the household members are supposed to use the toilet facilities daily. Lack of enough toilet facilities jeopardizes human health, increases child mortality, and degrades the esthetic value of the environment through means such as open defecation. The study on the availability and accessibility of toilet facilities in low-income households of the Cape Coast Metropolis has shown the households do not have enough toilet facilities. The available ones are used by many people beyond the capacity and hence not everyone can access them.

Additionally, most of these toilet facilities are pit latrines or ventilated pit latrines, which become full and at one point pose a great danger of the spread of diseases such as cholera and thus should be emptied. Due to their financial status and the meager source of the household's income, the owners of this facility cannot afford to empty it or acquire improved toilet facilities such as flush toilets or water closets. This has necessitated the residents from low-income household in the Metropolis to continue using this pit latrine or open spaces, which has resulted in the degradation of environmental sanitation and human health. Therefore, with all these challenges hindering accessibility of toilet facilities, the study suggests that the Metropolis should provide the low-income household members with toilet facilities by increasing the number of public toilets, to augment the shortage of household toilets and in addition enforcing strict rules on defecation on open spaces to curb the possible spread of sanitary-related diseases.

## DATA AVAILABILITY STATEMENT

All relevant data are included in the paper or its Supplementary Information.

## CONFLICT OF INTEREST

The authors declare there is no conflict.

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First received 16 September 2022; accepted in revised form 28 December 2022. Available online 13 January 2023