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The Relationship between Poor Sanitation and Socio-economic Status of Residents in Tamale, Ghana

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Abstract:
The purpose of the study was to assess the relationship between poor sanitation and the socio-economic factors of residents in Tamale. The study used both qualitative and quantitative sampling techniques to achieve the objectives of the study. Tamale was stratified into three zones. Each zone was then grouped into low, middle, and high-income groups, and one community was randomly selected from each income bracket of each zone. All nine (9) communities were selected for the study. In each zone, 128 households were systematically selected for the survey. In total, 384 households took part in the survey. Stakeholders in sanitation were purposefully selected for in-depth interviews. Three focus groups (nine persons in each group) were held to confirm the findings from the surveys and the interviews. Observations were employed in areas such as gutters, forests, and open spaces to have firsthand information on the state of sanitation in Tamale. The data gathered were subjected to both qualitative and quantitative analysis. The study revealed that 105 respondents, representing 27.4% of the respondents, had household toilets, and 150 respondents, representing 39.1% of the respondents, either shared toilets with neighbours or used public toilets. 129 respondents, representing about 33.5% of the respondents, practised open defecation. 100 respondents (26.0%) practised open defecation because the toilets were smelling, and 74 respondents (19.4%) said the ventilation in the toilets was poor. However, 180 respondents (46.9%) were aware that open defecation spreads diseases. The analysis of variants showed that ownership of household toilets was significantly dependent on income, education, and household size at p=0.000. The study concludes that ignorance and poverty were the causes of poor sanitation in Tamale. The study recommends that education, economic empowerment, and sensitization were necessary to improve the sanitation situation in Tamale.

Keywords: *Income, household, poverty, barriers, urban*

1. Background to the Study

Sanitation is the maintenance of hygienic conditions and creating physically closer facilities to offer less waiting time and safer disposal of human excreta (WHO, 2012). The proportion of people across nations without household latrines and excreta disposal systems has decreased (UN-HABITAT, 2009) but continues to be a global concern (WHO, 2012). Improving access to safe water, adequate sanitation, and proper hygiene are at the forefront of curbing sanitation-related diseases and their associated effects worldwide.

The Sustainable Development Goal (SDG) 6 seeks to ensure safe drinking water and sanitation for all by 2030. SDG6 prioritizes clean water and sanitation as an inevitable component of development (UNICEF, 2017). Globally, 2.2 billion people around the world lack safe drinking water, over half of the global population, or 4.2 billion people, lack safe sanitation, 673 million people still practise open defecation, and 3 billion people around the world lack basic hand washing facilities at home (WHO/UNICEF, 2019). Globally, 207 million people, mostly from developing countries, spend over 30 minutes per round trip to collect water from an improved source (WHO/UNICEF 2019)

Major challenges facing developing countries are rapid urbanization, poor sanitation, and waste management (Songsore & Stephens, 2008). This situation has been compounded by weak local government structures (Haller *et al*., 2007). In urban communities, overflowing garbage containers, indiscriminate waste disposal, overcrowded toilet facilities, and choked drains are commonly seen (UNICEF, 2015). The human development report by UNDP explains that deprivation from basic sanitation destroys more lives than any war or terrorist act. From the perspective of human rights, social justice, or economic aspects, sanitation deprivation inflicts damage that cannot be defended (UNDP, 2006).

The Tamale Metropolitan Area, under which this study is focused, is among the least-ranking districts in sanitation delivery in the Northern Region of Ghana (UNICEF, 2017). According to UNICEF, seven out of ten residents in the Tamale Metropolis practise open defecation (UNICEF, 2017), mostly in drains, parks, and forest reserves. According to

Acheampong (2010), many people who do not have access to decent toilets in their homes have no choice but to practise open defecation.

Payment for the use of the toilet, poor ventilation and hygiene, and poor lighting are motivators for the practice of open defecation (Arku, 2010). Ignorance and lack of education are the main causes of poor sanitation in most developing nations (Owusu-Sekyere et al., 2016). Open defecation pollutes drinking water sources and causes diarrheal diseases, which have far-reaching effects on those who drink, bathe, and cook with it. The government of Ghana has committed itself to improve sanitation in urban communities (Acheampong, 2010). The relationship between poor sanitation and socio-economic characteristics must be investigated to achieve this. This is why this study sought to investigate the relationship between poor sanitation and socio-economic characteristics in Tamale.

2. Study Area and Methodology

The Tamale Metropolitan Assembly (TAMA) was established under Legislative Instrument (LI) 2068 of 2012. Tamale is rated as the fastest-growing city in Ghana (GSS, 2018). A key challenge facing the city of Tamale is sanitation and waste management. The city is characterized by choked drains, indiscriminate waste disposal, and uncollected refuse in central waste containers. Tamale is the capital of the Tamale Metropolis and the administrative capital of the Northern Region. The Tamale Metropolis is located within latitudes 9°16′N and 9°34′N and longitudes 0°34′W and 0°57′W (Figure 1).

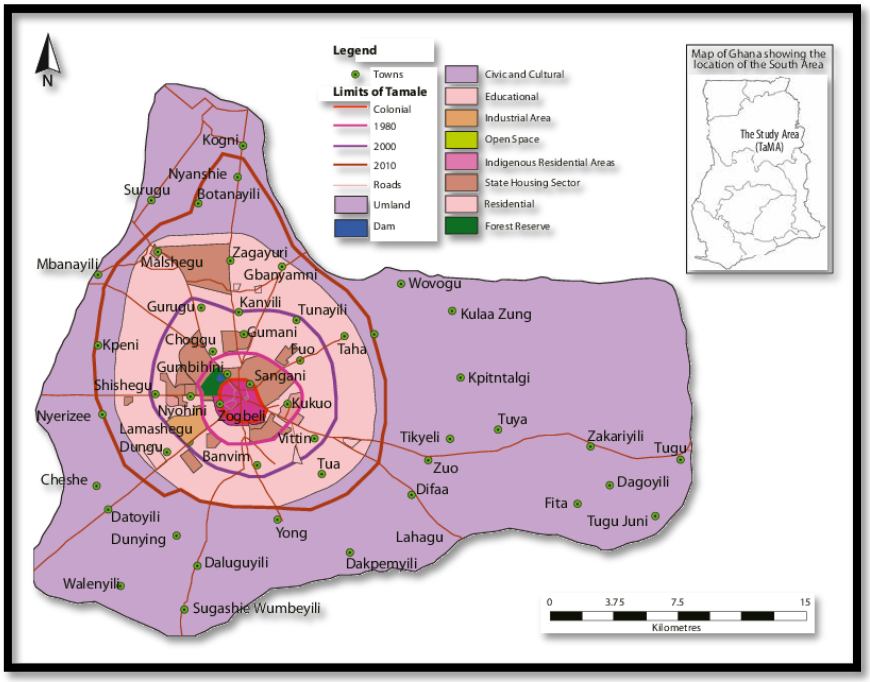

Figure 1: Map of Tamale Metropolis
Adopted from: Http:www.researchgate.net

The Metropolis covers a total area of 922 km² (Tamale Metropolitan Assembly, 2010). Regarding its relative location, the metropolis is bordered to the north by Sagnarigu Municipality, to the east by Mion District, to the south by North-East Gonja District, and to the west by Tolon District and the Central Gonja District. Regarding settlement structure, the Tamale Metropolis is composed of 17 peri-urban communities and 115 rural communities (Fuseini & Kemp, 2016). The Tamale Metropolis has the Tamale Central Constituency and the Tamale South Constituency as legislative districts. The two constituencies are each represented by a Member of Parliament. According to the World population review, the population of Tamale is 374,744 at a growth rate of 4.37% (GSS, 2020).

The Tamale Metropolis exists to enhance the quality of life of the people of the Metropolis by facilitating the maintenance of law and order and mobilizing the physical and financial resources to provide quality socio-economic services, especially in education, health, agriculture, water, and sanitation in collaboration with other development partners and in conformity with broad national policies (TAMA, 2011).

3. Theoretical Frame Work

One of the central arguments of this study is that there are socio-cultural feelings about defecation practices and favorites of any group of people. Therefore, it is essential to understand the view of any group of people in relation to such matters and be able to adequately explain the admiration and continuation of certain defecation practices and preferences. This process may best be accounted for by an amalgamation of theories that, on the one hand, stimulate the social relations people have with their shit or faeces and, on the other hand, the political and social instruction in which their lives are built. Douglas & Wildavsky's (1983) concept of dirt as matter out of place perspective of habitus is well-positioned and will allow the pulling together of these two elements fixed in people's defecation practices.

3.1. Sample and Sampling Techniques

Stratified random sampling, simple random, and convenient sampling methods were used to select respondents for the study.

Firstly, a stratified random sampling was employed to divide Tamale into three zones called strata. Stratification brings about a more precise estimate of the characteristics of the population.

Secondly, communities in each zone were grouped into low, middle, and high-income groups based on the findings of the population and housing census of 2020 (GSS, 2021).

Thirdly, one community in each income bracket from each zone was randomly selected for the study. Also, households in each chosen community were systematically selected for a survey. A purposeful sampling was used to choose communities closer to forest reserves, open spaces, and open drains for observation.

Lastly, key informant interviews were conducted not only with opinion leaders in the communities but also with organizations in water and sanitation in Tamale. The list of the organizations was obtained from the Metropolitan Environmental Health and Sanitation Department of the Tamale Metropolitan Assembly. The organizations are:

- Waste Management Department (WMD) of the Tamale Metropolitan Assembly,
- Environmental Health and Sanitation Department (EHSD) of the Tamale Metropolitan Assembly,
- Environmental Protection Agency (EPA),
- Ghana Water Company Limited,
- Catholic Relief Services,
- UNICEF,
- Afram Plains Development Organization, and
- Zoomlion Ghana Ltd.

Kvale and Brinkmann (2009) indicate that the elites are used to being asked about their opinions and what they think about a subject area. This has the advantage of the interviewer having reliable information about the subject area but has the disadvantage of the interviewee imposing their knowledge on the interviewer. The interview was either recorded or written on a notepad based on the preference of the interviewee.

A survey was conducted by administering questionnaires' to household heads or their representatives who were available and willing to respond to the questionnaire at the time of the survey. For those who could not read, the questionnaire was interpreted in their local dialects to enable them to give appropriate responses to the questions asked. The survey questions were tried at Gumani in the Sagnarigu Municipality to make any corrections before the actual interview.

The data collection tools were a semi-structured questionnaire, a structured questionnaire, and an observation checklist. Two field officers were trained by the researchers to assist in administering the questionnaire. The researchers used three weeks (Monday, 2 May to Friday, 20 May 2022) for the data collection. Pre-coded structured instruments were administered in the local language to gather data on the demography, which included age, sex, educational level, income level, and marital status. Data on barriers to access to quality water, good sanitation, and hygiene were obtained from respondents who were ready to respond to the instruments.

Two main types of data were used. They are: primary data and secondary data. The primary sources of data included:

- Information that was gathered from the questions administered to the respondents,
- Direct interaction with respondents and observation

The benefit of using primary data was that they are more reliable since they come from the original sources. The Secondary data were acquired from past theses, research articles, journals, web pages, and books concerning sanitation.

3.2. Sample Size

The term sampling denotes the selection of a part from a whole and then drawing some conclusions/inferences about the population. This involves selecting a representative number of respondents from a given population whose total number is often known. The sample size for the study was determined in accordance with Krejcie and Morgan (1970) in the article 'Small Sample Techniques'. The formula:

$$S = {X^2\ NP\ (1-\ P)}\Big/{d^2(N-1) + X^2P(1-\ P)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eqn\ (1)$$

3.2.1. Variables

The respective variables have been given. Their explanations are below:

$S = required\ sample\ size$

$X^2 = table\ value\ of\ Chi - square\ for\ 1\ degree\ of\ freedom\ (df)\ at\ desired\ confidence\ level\ (3.841)$

$N = The\ population\ size = 374744$ (GSS, 2021)

$P = The\ population\ proportion\ (Assumed\ to\ be\ 0.5\ since\ this\ would\ provide\ the\ maximum\ sample\ size)$

$d = the\ degree\ of\ accuracy\ expressed\ as\ a\ proportion\ (0.05)$

From the information above:

$$= {3.841(374744)(0.5)(1-0.5)}\Big/{(0.05)^2(374744-1) + (3.841)(0.5)(1-\ 0.5)}$$

$$= {359847.926}\Big/{935.89725}$$

= 384.495
= 384

According to Krejcie and Morgan (1970), as the population increases, the sample size increases at a diminishing rate and remains relatively constant at 384 for population sizes of 250,000 and above.

The zones for the study were: the east zone, the west zone, and the southern zone. A sample of 128 was assigned to each zone since the zones had a relatively equal number of households (Table 1).

Zone	Community	Income Bracket	Number of Respondents	Percent
East	Nanton Zoo	Low	33	25.8
	Sangani	Middle	50	39.0
	Kukuo	High	45	35.2
	Sub Total		128	100.0
West	Nyerizee	Low	30	23.5
	Gumbihini	Middle	50	39..0
	Nyohini	High	48	37.5
	Sub Total		128	100.0
South	Cheshe	Low	33	25.8
	Dungu	Middle	40	31.2
	Lamashegu	High	55	43.0
	Sub Total		128	100.0
Grand total			384	100.0

Table 1: Distribution of Respondents in Study Communities
Source: (GSS, 2021)

Cluster sampling was used to divide the entire population into sections or zones. Clusters are identified and included in a sample based on demographic parameters like age, sex, location, etc. This makes it very easy for the researcher to derive effective inferences from the feedback of respondents (Neuman, 2014).

3.3. Data Analysis

Qualitative analysis was used to analyse the interviews and focus group discussions, while quantitative analysis was used to analyse the survey questions. Data were analyzed by transcribing all recorded interviews. A summary of the views of respondents, both recorded and written, was then made. These views were supported by relevant literature, theories, and personal observation from the field. The data were organized into subthemes (Saunders & Thornhill, 2009).

The data obtained from the respondents were cleaned, coded, and subjected to descriptive statistical analysis and presented in tables and graphs using Microsoft Excel. The primary ways of analysing data are quantitative and qualitative data analysis. Data collected were subjected to statistical analysis of variance (ANOVA) using the Statistical Package for Social Sciences (SPSS), IBM Version 20, and Micro Soft Excel for data entry. The data were put into tables and charts for easy interpretation.

3.4. Ethical Considerations

Respondents were assured of anonymity and that any information they provided was for academic purposes only. The interviewees were first informed of the intended interview. After agreeing to grant the interview, an appointment was booked with them. A day before the interview, they were called to remind them of the appointment. Some cancelled the meeting and rescheduled, while others were ready on the day initially agreed on. Before starting with the interview, they were assured that the purpose was purely academic, and their confidentiality was assured. After that, permission was sought to be allowed to record or write on a notepad with the assurance of anonymity. This is very vital because some informants are uncomfortable when they know what they are saying is being recorded and might not even provide the necessary information. Permission was sought from top management officials of waste collectors to be allowed to interview waste collectors within and outside the waste companies.

4. Results and Discussion

4.1. Demographic and Socio-economic Characteristics of Respondents

This section displays the demographic and socio-economic characteristics of respondents. The composition of demographic and socio-economic characteristics presented here are; age, marital status, gender, educational background, income, livelihoods, the religion of respondents, etc. (Table 2).

Variable	Frequency	Percentage
Sex of Respondents	**Frequency**	**Percentage**
Male	270	70.3
Female	114	29.7

Total	**384**	**100.0**
Age group	**Frequency**	**Percentage**
18-25 years	35	9.1
26-33 years	48	12.5
34-41 years	90	23.4
42-49 years	85	22.2
50-57 years	65	16.9
58-60 years	61	15.9
Total	**384**	**100.0**
Educational Level of Respondents	**Frequency**	**Percentage**
No formal education	177	46.1
Primary/JHS	138	35.9
SHS	50	13.1
HND/Diploma	19	4.9
Total	**384**	**100.0**
Marital status	**Frequency**	**Percentage**
Married	219	57.0
Cohabitation	20	5.2
Never married	70	18.2
Divorced	35	9.1
Widow/widower	40	10.5
Total	**384**	**100.0**
Family Size	**Frequency**	**Percentage**
0-5	120	31.3
6-10	112	29.2
11-15	45	11.7
16-20	54	14.1
21-25	38	9.9
Above 25	15	3.8
Total	**384**	**100.0**
Occupation of respondents	**Frequency**	**Percentage**
Civil/public servants	90	23.4
Artisans	105	27.3
Trading	94	24.5
Farming	65	17.0
Student	10	2.6
Unemployed	20	5.2
Total	**384**	**100.0**
Income per annum (GHC) (US$1.00=7.87GHS; Minimum wage=13.53)	**Frequency**	**Percentage**
0-5000 (Extreme poverty; Below US$ 2.15 per day)	110	28.6
5001-10000	56	14.6
10001-15000	60	15.6
15001-20000	80	20.9
20001-25000	30	7.8
25001-30000	43	11.2
Above 30000	5	1.3
Total	**384**	**100.0**
Religion of Respondents	**Frequency**	**Percentage**
Muslim	290	75.5
Christian	94	24.5
Total	**384**	**100.0**

Table 2: Demographic and Socio-economic Characteristics of Respondents

The age of respondents for the study was categorized into 21-25 years, 26-30 years, 31-35 years, 36-40 years, etc. (Table 2). The majority of the respondents (23.4%) were between 34-41 years. The next group was those within 42-49 years, representing (22.2%). The results indicate that the construction and ownership of household latrines largely depend on the household heads. The respondents were male-dominated (70.3%). In homes where women were present to respond to the questionnaire, they sought permission from their husbands before attending to the researcher because the male is considered the head of the household.

Table 2 shows that the majority (28.6%) of respondents were extremely poor and depended on less than $2 per day. The study indicates that 219 respondents (57%) were married. The rest of the respondents (5.2%) were cohabiting, and the others (37.8%) were single, divorced, or widowed. Concerning their religious background, 290 respondents (75.5%) were Muslims, and the remaining respondents (24.5%) were Christians. The dominance of Muslims in the study communities is in line with the results of the 2020 Population and Housing Census (PHC), which reports that Muslims form the majority of the population in the Tamale Metropolis (GSS, 2021). Since the holy books preach that cleanliness is next to godliness and given the fact that Tamale is a religious community, it is expected that sanitation in Tamale should be good and acceptable, but this is not so as the league table on sanitation always places the metropolis at the bottom every year.

From the table, 46.1% of the respondents had no basic education, and 4.9% had tertiary education. Cumulatively, those who had basic to tertiary education stood at 53.1% and showed that illiteracy was still high in the Tamale Metropolis among household heads.

From table 2, 23.4% of the respondents were civil or public servants, 68.8% were in the informal sector, and 7.8% were either students or unemployed. The results suggest that those who were engaged in the informal sector constituted the majority of the household heads, and at least 28.6% of the respondents were extremely poor. A study by Fuseini and Kemp (2016) reported that out of a proportion of 53% of the employed population in Tamale, about 42% is engaged in agriculture, while the remaining 58% is engaged in sales, services, transport, and manufacturing. Their findings agree with the findings of the current study that about 8.0% of the respondents are either students or unemployed and are not able to bear the cost of sanitation. Economically, most males were gainfully employed compared to the female class (GSS, 2021). This suggests that males must champion the course of sanitation if SDG6 is to be achieved in the city of Tamale. Surprisingly, the females cleaned and disposed of waste in their households in the study. WHO/UNICEF (2012) reported that environmental conditions in various communities differ from each other. For example, sanitation in high-income communities is much better than those in low-income communities. Therefore, Kukuo, Nyohini and Lamashegu were much cleaner than Nanton Zoo, Cheshe, and Nyerizee.

The study showed that those who engaged in open defecation were poor. This is because they had little education and were not gainfully employed. Therefore, they receive little or no income for most parts of the year. Household size is also a product of low education or no education. People who are poor cannot afford to pay for basic needs for their children in school. The children become school dropouts and struggle to live in low-paid jobs in society. As a result of poverty, households cannot buy soap and pay utility bills. Therefore, hygiene practices which heavily depend on water and soap are low in Tamale. This agrees with Singh (2017), which states that poverty is the reason for poor sanitation in developing countries.

4.2. Ownership of Household Toilet

In the Metropolis, residents defecate either in their own toilets, shared toilets with neighbours, public toilets, dig and bury, in the bush or forest, in gutters, or in uncompleted houses. Table 3 shows the distribution of the places of the convenience of respondents in the Tamale Metropolis.

Places of Convenient	Frequency	Percentage
Household toilet	105	27.4
Shared latrine with neighbours	80	20.9
Public toilet	70	18.2
Nearby bush or forest	50	13.0
In gutters	35	9.1
Dig and bury	14	3.6
Uncompleted houses	20	5.2
Other (Plastic bags, open places)	10	2.6
Total	384	100.0

Table 3: Places of Convenience in Tamale Metropolis

From table 3, the majority (27.4%) of the respondents had household latrines, and another 20.9% had no household toilets but shared toilets with their neighbours. Those who defecated at public toilets were 18.2% of the respondents. Altogether, 66.5% of the respondents do not practise OD in Tamale Metropolis. Those who practised OD were 33.5% of the respondents.

Besides poverty, other reasons could have accounted for residents not having toilets in their homes. For example, it was observed that some residents drove cars and motorbikes to the Nyohini forest in Tamale to defecate. When they were asked, they indicated that the smelly nature of the toilets and the inconvenience of waiting in queues because of large household sizes at the public toilets drive them to open defecation. Those residents who were not defecating in the forests and or drains but practised OD did so at night or in the early hours of the day before sunrise. This is because people who practice OD know that it is wrong, but they are not ready to stop the practice. An official of the Environmental Health Unit of the Tamale Metropolitan Assembly lamented that:

> *'We are confused as we have done a lot to reverse the trend but to no avail'. According to officer, the unit has graduated from education to prosecutions and working with security agencies to arrest people who engage in OD* (MEHO, Tamale).

The unavailability of household toilets and places of convenience automatically provides the inhabitants the opportunity to ease themselves in the bush, in drains, or even into polythene bags and litter the environment with them, which are the most widely used alternatives as found in the study. This situation affirms the argument in literature that environmental sanitation in developing countries is accorded low priority by city authorities (Zombo, 2010).

It is evident from the study results that social factors, economic factors, and physical factors were the push factors responsible for poor sanitation in Tamale. The respondents agreed that physical factors compelled them to defecate in the bush and other open fields. The physical factors include the non-availability of toilet facilities, stench, and poor hygienic conditions of the toilets. Aside from this, poverty and socio-cultural beliefs negatively affected sanitation and agreed with Zombo (2010) that socio-cultural beliefs influence the practice of open defecation. Ignorance and retrogressive local and traditional beliefs can be corrected by intensive campaigns, education, and information on the prospects of good sanitation and the avoidance of open defecation.

Poor sanitation in one community affects the nearby communities. This is because wind, runoff, and vector organisms are carriers of diseases. An intervention or activity in one area to address issues of sanitation can therefore enhance the living conditions of people living far away. For example, a town that uses a river as its water source may suffer if the water is contaminated by a community located upstream who have poor control of waste collection and disposal systems. The effect of poor sanitation in one place can have an effect on another location, even if it is a distance away.

4.3. Relationship between Socio-economic Factors and Poor Sanitation in Tamale

Analysis of variance indicated that ownership of household toilets is significantly dependent on income, education, and household size at p=0.000 (Table 4).

		Sum of Squares	df	Mean Square	F	Sig.
Income level	Between Groups	1031.888	7	147.413	424.169	0.000
	Within Groups	130.672	376	.348		
	Total	1162.560	383			
Educational level	Between Groups	215.039	7	30.720	171.545	0.000
	Within Groups	67.333	376	.179		
	Total	282.372	383			
Household size	Between Groups	767.085	7	109.584	488.601	0.000
	Within Groups	84.329	376	.224		
	Total	851.414	383			

Table 4: Relationship between Household Toilets and Socio-economic Factors

Poor sanitation is influenced by socio-economic factors. Household heads who are poor cannot buy soap for hand washing after the use of the toilet. The analysis shows that poor people have larger household sizes and low or no formal education. A respondent reported:

'*Soap is used when we are bathing*. *Even when we are coming to eat, we just wash with ordinary water and may use soap or not after eating. Also, our pipes are normally disconnected by the GWCL because we are not able to pay our bills*' (Respondents, Nanton Zoo).

Poverty is not having enough money or access to resources to enjoy a decent standard of living, such as access to healthcare, education or water, sanitation facilities, etc. These people in the low-income bracket can neither afford to construct household toilets nor use public toilets nor resort to open defecation. Poverty is absolute when household income is below a certain level, making it impossible for the person or family to meet basic life needs, including food, shelter, safe drinking water, education, healthcare, etc. Poverty is a form of social exclusion that comes when an individual or family fails to meet an established threshold (United Nations, 1995).

Illiteracy among household heads was high, and this could affect their perceptions of development issues. Bain *et al.* (2014a) recommended that people who have different perceptions or knowledge about the causes of sanitation-related diseases, such as typhoid fever, worm infections, and cholera, must be given intensive hygiene education for all classes of people within a society. Many authors attribute the prevalence of parasites, tetanus, malaria, hookworm, cholera, and diarrhoea in many African countries to unsanitary conditions caused by poor sanitation (Bain *et al.*, 2014a).

Poor sanitation is also a contributing factor to malnutrition and further contributes to childhood mortality. This is because when there is flooding, farmlands are destroyed, and households do not get enough food to feed their families. The flooding also causes the spread of diseases such as cholera and the breeding of mosquitoes. This finding agrees with Stoler (2013) that poor sanitation is a major cause of child mortality in Ghana.

4.4. Barriers to the Ownership of Household Toilets in Tamale

Factors contributing to the practice of open defecation are classified as socio-cultural, physical, and economic. Stench, heat, poor lighting, poor ventilation, and maintenance of toilet facilities are some physical barriers to the usage of toilet facilities (Table 5).

Barriers to Ownership of Household Toilet		Frequency	Percent
	Inadequate land	20	5.2
	High household size	30	7.8

Physical	Absence of local building materials	25	6.5
	Loose nature of land	41	10.7
Economic	High cost of labour	60	15.6
	High cost of using public toilets	45	11.8
	High cost of building materials	80	20.8
Socio-cultural	Excreta must be removed from the house due to bad smell	55	14.3
	May be possessed by demons	10	2.6
	Loss of magical powers	18	4.7
	Total	384	100.0

Table 5: Barriers to the Ownership of Household Toilets in Tamale

The Tamale Metropolitan Assembly is responsible for environmental sanitation and the maintenance of public toilets. They also ensure that the health and hygiene of residents are enhanced. As a result, there are laws and regulations to guide the maintenance of sanitation and open defecation in particular, but these are poorly enforced. The weak enforcement of sanitation by-laws and poor public education are accountable for the persistent poor sanitation in Tamale. The study showed that residents were unaware of any laws that prohibit them from engaging in open defecation and indiscriminate waste dumping. To achieve open defecation-free status, laws on sanitation must be enforced to the letter. The Tamale Metropolitan Assembly relies on the Department of Urban Roads, the Town and Country Planning, the Environmental Protection Agency (EPA), and the various security agencies to implement their programmes on sanitation and open defecation, but there is no coordination between them and their efforts are often duplicated. According to the UN (2019), institutional inefficiencies lead to duplication of functions, gaps in service delivery, and waste of scarce resources. Lack of political will is a cause of open defecation in the Metropolis. The Tamale Metropolitan Assembly seems to lack the political will to ensure the construction of household toilets as stipulated in building permits. Sanitation management is ranked low in the priority lists of local authorities in Ghana because of budgeting constraints, inadequate logistics, and staffing. The lack of space in households is also a reason why household toilets were not built by residents of Tamale, because of high household sizes and the quest for money from rentals. A respondent reported that:

'Most landlords have used all available lands to build rooms, and so there is no more space for toilet construction' (MEHO, Tamale).

Some landlords did not plan for household toilets because they did not acquire building plans and permits. Even though there is some level of awareness of the effects of open defecation and poor sanitation, such as the spread of diarrheal diseases, rape, and dehumanization, little can be done at the household level. The government has also abolished the construction of public toilets in Ghana, putting pressure on the few existing ones. At the public toilets, long queues are made daily, especially during the early hours of the day. The delays in freeing themselves before taking their baths make workers get to their workplaces late. There are instances when disagreements ensue because someone is alleged to jump the long queue when others have been waiting for several minutes. Those who have running tummies sometimes end up soiling themselves because those who were there earlier before them would not give them a chance.

Psychologically, the memory and the trauma of soiling one's clothing before others remain forever in the minds of those who have experienced it. They assume they are laughed at or mocked when they come in contact with those who were present. Children are often the victims of such ordeal because their friends may make them a subject of mockery in school. The money collected at the public toilets by the caretakers is used for repairs and maintenance of the toilets and also to pay those who ensure that they are kept clean. The doors are normally locked at night by the caretakers, and people cannot use the toilets.

Those who cannot afford toilet fees defecate in the surrounding forest during the day or around the public toilets during the night because the doors are locked. Residents who are poor normally focus their attention on daily survivors of food, water, and shelter at the expense of using the money on the toilet. This agrees with Songsore and Stephens (2008), who state that poverty was responsible for the practice of open defecation.

Most residents can construct household latrines, but there is no space in their houses for toilet construction. This is because all available space in the house is used for accommodation because there are no building plans before constructing their houses. The laws of Ghana require the acquisition of building plans and permits, and these laws must be enforced. The Metro Assembly has by-laws that say that there should be no open defecation or indiscriminate dumping and disposal of waste. These laws were put in place by the assembly members, but they were not enforced. This is partly because chiefs and opinion leaders in the communities are not involved in the promulgation of the by-laws. The security agencies are sometimes used to arrest people who practise open defecation in the forest reserves, but enforcement is not done within the communities.

The social costs of open defecation are loss of dignity and privacy or risk of physical attack and sexual violence. The costs of open defecation are inequitably distributed, with the highest economic burden falling disproportionately on the poorest. The average cost associated with poor sanitation constitutes a much greater proportion of a poor person's income than that of a wealthier person. Poverty is a double-edged sword for the poorest in society because they are affected more by poor sanitation and pay more for its negative effects (World Bank, 2016).

Improved sanitation promotes tourism and boosts income, employment, and foreign exchange. Multiple factors, including sanitation, contribute to travel and tourism competitiveness. Poor sanitation in Tamale affects the tourism

potential of the Metropolis. The study, therefore, agrees with the World Bank (2016) that poor sanitation in Ghana could lead to a decrease in travel and tourism.

5. Conclusions and Recommendations

The study concludes that sanitation knowledge and information were necessary to improve sanitation and sustainability to achieve SDG6 by 2030. Education and information on sanitation were popular with those who have radios, as there are several radio stations in Tamale.

The motivating or push factors for open defecation are the lack of household toilets, the collapse of household toilets, or the inability to pay for the use of public toilets.

The study recommends that since the residents of Tamale are either Moslems or Christians, the religious leaders should join the campaign against open defecation in their respective Mosques and Churches. Also, the government should make sanitation and hygiene education an integral part of the educational curriculum.

Through the Ministry of Sanitation and Water Resources, the government must provide public toilets, especially in poor urban communities, and re-construct broken-down public toilets in all communities.

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