



## Research Article

## Comparative analysis of the utilisation of maternal healthcare in rural and urban communities in the Tolon District, Ghana

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### Abstract

There are limited research works on a comparative analysis of the utilization of maternal healthcare in rural and urban communities in Ghana and developing countries. The study makes a comparative analysis of the utilization of maternal healthcare in a district in the deprived northern region of Ghana. It attempts a comparative analysis of the differences in the utilization of maternal healthcare in rural and urban communities in an economically deprived region in Ghana. Using a quantitative cross-sectional design and a sample of 120 drawn using the accidental sampling design, the disparities in the use of maternal healthcare facilities are assessed with the Andersen (1995) behavioural model serving as the theoretical framework. The main findings are that there is a significant difference between rural and urban participants in the utilization of maternal healthcare with the urban utilizing the services more than the rural. Secondly, the socio-economic factors showing significant differences in the use of maternal healthcare are employment, distance and family support. Thirdly, the urban community uses skilled delivery services more than the rural and education and cost of service do not predict the use of maternal healthcare between the two communities. Despite the policy of free maternal healthcare in the district, the urban community utilizes the services more than the rural. There must be policies to improve the provision of maternal healthcare facilities in rural communities and to educate the rural communities to patronise maternal healthcare.

**Keywords:** Maternal healthcare; Comparative analysis; Utilization; Family support; Ghana

### Abbreviations

WHO: World Health Organisation

MMR: Maternal Mortality Ratio

LDC: Less Developed Countries

MDG: Millennium Development Goals

SDG: Sustainable Development Goals

NHIS: National Health Insurance Scheme

ANC: Antenatal Care

CHIP: Community Health Planning and Services

### Introduction

Globally, maternal deaths and Maternal Mortality Ratio (MMR) are still very high and remain key challenges to governments and international organizations and agencies. The World Health Organization (WHO)

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statistics have shown that 295,000 maternal deaths were recorded in the year 2017, representing 211 maternal deaths per 100,000 live births [1]. These deaths represent just a 38% reduction in maternal deaths from 2000 when 342 maternal deaths per 100,000 live births were estimated [1]. This puts the lives of women at a very high risk. The global lifetime risk of maternal deaths for a 15-year-old girl in 2017 was approximately 1 in 190. This shows a reduction of almost half of the level of risk in 2000 which was 1 in 100 (WHO, 2019).

MMR is higher in Less Developed Countries (LDC). MMR in LDCs is 415 maternal deaths for every 100,000 live births. This is more than 40 times higher than that of Europe and North America (10 deaths for every 100,000 live births) (WHO, 2019). According to the WHO, Sub-Saharan Africa contributed to almost 66% of the world's maternal deaths (295,000) in 2017 (WHO, 2019). Sub-Saharan Africa was identified as the only region with a very high MMR in 2017 (542 per 100,000 live births), while the lifetime risk of maternal mortality was 1 in 37, as against 1 in 190 globally and 1 in 6500 in Europe [1].

In most developing countries like Ghana, maternal deaths continue to occur despite several interventions by governments and other non-governmental organizations. According to the Ghana Health Service, the incidence of institutional maternal deaths in Ghana stood at 926 in 2015. This was increased to 955 deaths in 2016 and 948 deaths in 2017 [2].

The MDG 5 laid a foundation for the Sustainable Development Goals (SDGs) to improve maternal health towards ending preventable maternal mortality. SDG 3 Target 1 is aimed to reduce MMR to less than 70 deaths per 100,000 live births globally by 2030 [3]. Specifically, successive governments in Ghana have implemented various policies and interventions to address maternal health challenges. Among these are free maternal health care, Community-based Health Planning and Services (CHPS) and the National Health Insurance Scheme (NHIS).

Notwithstanding, the maternal deaths and maternal mortality ratio in Ghana are still higher than the global average [4]. These deaths are unacceptable and could have been prevented by improving the utilization of maternal healthcare. WHO and UNICEF maintain that the use of maternal healthcare is a significant intervention that can reduce the MMR [5,6].

Factors determining access to maternal healthcare, especially in developing countries in Sub-Saharan Africa are disparity in the distribution of skilled maternal health personnel and other facilities between rural and urban areas [7, 8, 9,10,11], age of the mother [12], and cost of services [13, 14, 15]. Other factors are the education of the mother

[12, 13, 8, 16, 17], geographical location of the facility [8] and socio-cultural beliefs [18] among others.

The utilization of maternal healthcare especially in developing countries is poor.

The situation in Ghana (a developing country) is not different. [12] examined access and utilization of maternal healthcare in a rural district in the forest belt of Ghana. In the study area, [17,19], examined the causes of maternal mortality and factors influencing the decline in skilled delivery in Tolon respectively.

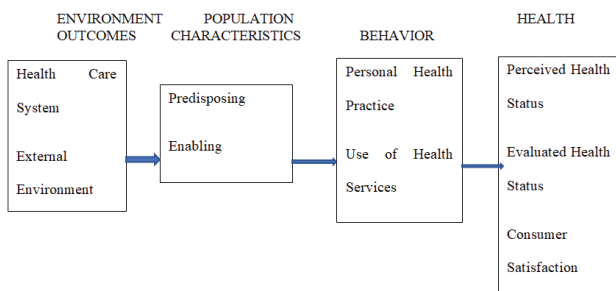
Despite research on socio-economic perspectives on the use of maternal healthcare, research works on comparative analysis of the utilization of maternal healthcare in rural and urban areas in Africa in general and Ghana in particular are limited [20]. Examined a comparative study of urban and rural maternal healthcare facilities in the Kano State, Northwest Nigeria using a comparative cross-sectional study design that utilized mixed methods of data collection. In the study, it was found that in both urban and rural communities, the majority of respondents had 1-3 antenatal care visits with urban respondents visiting more than rural. In a comparative study on antenatal care services utilization among women of reproductive age in urban and rural communities of South East Nigeria by [21] it was observed that more women in urban communities went in for skilled delivery services than those in the rural and cost of service was higher in the urban than the rural. In Ghana, as already discussed, factors determining the utilization of maternal healthcare in rural communities were socioeconomic characteristics such as education, income, and employment. In the foregoing studies, it is apparent that there is not much work done on comparative analysis of the use of healthcare by rural and urban communities. In the few works done, qualitative design dominates and there are very few theoretical underpinnings. Besides, the role of the family in access to and use of maternal healthcare is negligible [22]. In a qualitative study investigated the influence of family support on women's health-seeking behaviour in rural southern Egypt [23] assessed the influence of family members on the utilisation of maternal healthcare among teen and adult pregnant women in Kathmandu, Nepal, in a cross-sectional study. In Ghana, [24] assessed the male involvement in maternal healthcare through Community-based Health Planning and Services in rural Ghana. Among the social factors, the role of the family which is the basic structure of human organisation has not been factored in. This study aims to fill these gaps i.e., the rural-urban comparison, the role of the family, the employment of a theoretical framework, and the use of a quantitative design.

The following research questions engaged the study: To what extent do these socio-economic disparities reflect in the use of maternal healthcare facilities between the urban

and rural communities? Do these disparities reflect in the use of skilled delivery services? What role does the family play in the utilisation of maternal healthcare? How does the [25] (Figure 1) behavioural model reflect the use of maternal healthcare in the study area? This study which is underpinned by the [25] (Figure 1) behavioural model, thus sought to assess the rural-urban disparity in the utilization of maternal health services in the Tolon District [26] (Figure 2) in the Northern Region of Ghana.

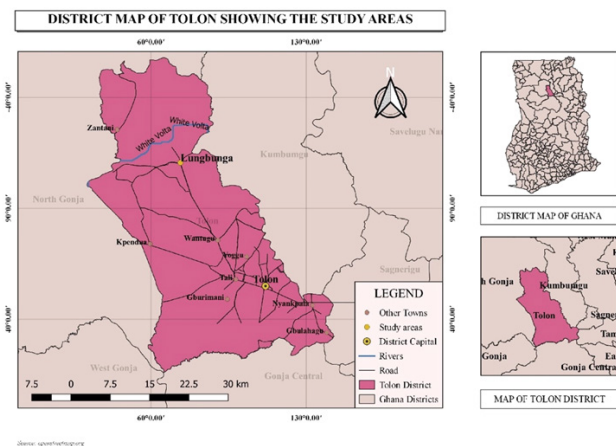
In the model, there is an interaction among environment, population characteristics, health behaviour and health outcomes. The healthcare system (facilities, personnel, infrastructure, etc.) and external environment constitute the environment which affects predisposing, enabling and need characteristics comprising the population characteristics which influence healthcare behaviour.

Two null hypotheses were tested. First, that there is no statistically significant relationship in the utilization of maternal healthcare by level of education; and, second, that there is no statistically significant relationship in the utilization of maternal health services by place of residence (rural-urban).



Source: Andersen (1995)

Figure 1: Anderson Behavioural Model



Source: Geography Map Drawing Room (KNUST), 2020 [27].

Figure 2: Map of Tolon District showing Tolon and Lungbunga communities

## Materials and Methods

### Research Design and Study Population

A cross-sectional research design was adopted for the study which employed the quantitative method for the description and analysis of the rural-urban disparity of utilization of maternal healthcare in the Tolon District. The target population for the study was women with confirmed pregnancies of at least eight weeks because this is the stage at which pregnant women are expected to commence antenatal visits.

### The Variables and Measurements

The variables for the study were derived from the conceptual framework which was a summary of the literature on the theme. The independent variables are age (categorical/ranked), place of residence/location (rural-urban) (categorical), education (categorical/ranked), employment (categorical), cost of service (categorical/ranked), income (categorical/ranked), attitude of health workers (categorical/ranked), family support (yes or no) (categorical) and dependent variable, utilization of health services (categorical/ranked). Utilization of health services is defined as the number of visits a pregnant woman made to receive antenatal services and was coded as follows: 0-1 visits irregularly; 2-3 visits moderately; 4+ visits regularly. This was based on the WHO recommendation that a pregnant woman should make at least four antenatal visits before delivery [28].

### Sources of Data

The study made use of primary and secondary sources of data. Primary data were collected from sampled pregnant women, nursing mothers and health service workers in the study area. It was a quantitative study in which a questionnaire instrument was used to collect data from the pregnant women and nursing mothers whilst semi-structured interview guides were used to collect data using open-ended questions from the health service workers. The questionnaire contained both closed-ended and open-ended questions to enable respondents to choose from options and provide their opinions respectively.

### Sampling

The study employed cluster sampling, purposive sampling and accidental sampling, i.e., multi-phased sampling techniques in the conduct of the research. The clustering was based on the sub-districts system in the district. These clusters included Tolon sub-district, Nyankpala sub-district, Wantugu sub-district, Kpendua sub-district, Kasuliyili sub-district and Lungbunga sub-district. Each sub-district was composed of several health facilities and a purposive sampling technique was used to select Lungbunga sub-district for rural and Tolon sub-district for urban.

Pregnant women and nursing mothers were accidentally selected from Tolon Health Centre and Lungbunga Community-Based Health Planning and Services (CHPS) compound whilst health workers were selected purposively for the study. Any pregnant woman or nursing mother who agreed to respond to the questionnaire was interviewed one after the other until the calculated sample was reached.

### Sample Size and Distribution

The major groups of the sample were pregnant women and nursing mothers in Tolon District. There is no definite number of pregnant women and nursing mothers in the study area therefore, the sample size was calculated using Wright Fisher's formula for calculating the sample size of surveys that have a population of more than 10,000 [29]. The formula is:

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = sample size

z = the standard deviation, (1.96 or 95% Confidence level)

p = the proportion in the target population deemed to have a similar characteristic (estimated at 55%). Therefore,

$$P = 0.55$$

$$q = 1.0 - P$$

$$= 1.0 - 0.55$$

$$= 0.45$$

d = desired accuracy, with 9% margin of error 0.09

$$= 0.09$$

Substituting these into the formula,

$$n = \frac{(1.96)^2(0.55)(0.45)}{(0.09)^2}$$

$$n = \frac{(3.8416) (0.2475)}{0.0081}$$

$$n = \frac{0.950790}{0.0081}$$

$$n = 117.382222$$

$$n = 118$$

Two respondents were added due to fallouts. This means that a total of 120 pregnant women and nursing mothers were sampled for data collection. This number was significant to represent and make an inference on the study population. The sample size was distributed equally among the two communities (Table 1) and the various groups in the study population. A total of sixty (60) pregnant women and sixty

(60) nursing mothers were accidentally selected from the study population: 60 from the urban settlement and 60 from the rural settlement; 30 for nursing mothers and 30 for pregnant women for each community. Since there was no estimated number of pregnant women and nursing mothers, the study assumed an equal number of respondents for each of the communities for comparative analysis. Tolon community was considered an urban area for the study while Lungbunga was considered a rural area. This was based on their populations. Tolon has an estimated population of 5,841 and that of Lungbunga is estimated at 3,920 (GSS, 2012). Besides, Tolon has relatively more socioeconomic infrastructure than Lungbunga which depicted a rural environment.

### Data Collection and Analysis

A questionnaire instrument and semi-structured interview guide, made up of open-ended questions, were used to collect data. The interview guide was used to collect data from maternal health service officials while the questionnaire instrument was used to collect data from the pregnant women and nursing mothers in the study area. The data gathered from the survey was analysed with the aid of Statistical Product for Service Solution (SPSS) software version 20.0 and Microsoft Excel. Descriptive statistics, Chi-square test of independence and t-test were used for data analysis. A significance level (or alpha value) of 0.05 was chosen. The Chi-square test of independence was used to show a significant difference in the use of maternal health services by location, controlling for some socio-demographic variables; whilst the t-test was used to show a significant relationship (bivariate) between the use of maternal health services and education and place of residence (rural and urban). The questionnaire was coded for easy entry and analysis using the software and subsequently cleaned to ensure accuracy. Charts, tables, frequencies and percentages were generated to analyse data on the research objectives. Participants signed consent to participate forms and ethical approval for the study was given by the Humanities and Social Sciences Research Ethics Committee (Reference: HuSSREC/AP/36/Vol.1)[Letter Issued on June 23, 2022]. of the Kwame Nkrumah University of Science and Technology, Kumasi.

## Results

### Demographic and Socioeconomic Characteristics of the Respondents

The demographic and socio-economic characteristics of the respondents are indicated in Table 1.

The respondents are dominated by adults aged above 30 years. The teens below age 18, which is the age of maturity, constitute an insignificant proportion of the respondents. What this implies is that the respondents were mature enough to be concerned about their health conditions during pregnancy.

**Table 1:** Demographic and Socio-economic characteristics of respondents

Variable	Tolon (Urban)		Lungbunga (Rural)		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
<b>Age</b>						
<18	1	1.7	1	1.7	2	1.7
18-29	21	35	15	25	36	30
30-39	24	40	26	43.3	50	41.7
40-45	14	23.3	18	30	32	26.6
<b>Total</b>	<b>60</b>	<b>100</b>	<b>60</b>	<b>100</b>	<b>120</b>	<b>100</b>
<b>Marital Status</b>						
Married	59	98.3	52	86.6	111	92.5
Single	0	0	2	3.3	2	1.7
Divorced	0	0	3	5	3	2.5
Widowed	1	1.7	3	5	4	3.3
<b>Religion</b>						
Christian	5	8.3	13	21.7	18	15
Muslim	55	91.7	46	76.7	101	84.2
Traditionalist	0	0	1	1.7	1	0.8
<b>Education</b>						
Non-Formal Education					79	65.8
Primary	3	5	5	8.3	8	6.7
MSCL/JHS	10	16.7	5	8.3	15	12.5
Secondary	9	15	4	6.7	13	10.8
Tertiary	3	5	2	3.3	5	4.2
<b>Employment</b>						
Farming	4	6.7	1	1.7	5	4.2
Public Servant	21	35	10	16.7	31	25.8
Trading	8	13.3	15	25	23	19.2
Unemployed	18	45	34	56.6	61	23.9
<b>Income per Month (In GhC)</b>						
0-500	56	49.6	57	50	113	94.2
501-1000	2	50	2	50	4	3.3
<b>1001+</b>	2	66.7	1	33.3	3	2.5
<b>Ethnicity</b>						
Dagomba	55	91.7	41	68.3	96	80
Gonja	0	0	8	13.3	8	6.7
Mamprusi	3	5	4	6.7	7	5.8
Akan	2	3.3	7	11.6	9	7.5

Source: Fieldwork, 2020.

The married respondents dominate, implying that they may receive support from their husbands to access health care during pregnancy. On the issue of religion, Muslims dominate whilst for education, respondents with non-formal education constitute a greater proportion. This can influence their use of health services since education is an influencing factor in the use of healthcare. The unemployed also constitute a greater proportion of respondents; and, with most of them earning low incomes, access to health care may be affected.

### Rate of utilization of antenatal (ANC) services

The urban community utilizes antenatal (ANC) services more regularly than the rural. Whereas 86.7% of respondents in the urban communities use health services regularly, 73.3% of those in the rural do similarly (Table 2).

### Factors influencing significant differences in utilization of maternal health services by location

Factors influencing significant differences in the utilization of maternal health services by type of community are indicated in Table 3.

**Table 2:** Utilization of ANC services

How many times did you attend ANC before delivery?	Tolon (Urban)		Lungbunga (Rural)		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
0-1 (Irregularly)	3	5	7	11.7	10	8.3
2-3 (Moderately)	5	8.3	9	15	14	11.7
4+ (Regularly)	52	86.7	44	73.3	96	80
<b>Total</b>	<b>60</b>	<b>100</b>	<b>60</b>	<b>100</b>	<b>120</b>	<b>100</b>

Source: Fieldwork, 2020

Besides, the urban community accesses skilled delivery services more than the rural (71.7 for urban and 66.7 for rural).

**Table 3:** Factors determining significant differences in utilization of maternal health services by type of Community

Variable	Tolon (Urban)	Lungbunga (Rural)	X <sup>2</sup> value	p-value
<b>Distance to Facility</b>				
1km	41(68.3%)	26(43.3)	3.052	0.003
2km	8(13.3%)	5(8.3)		
3km	8(13.3%)	11(18.3)		
4km	3(5.0%)	11(18.3)		
5km+	0(0%)	7(11.7)		
<b>Travel Time (In Minutes)</b>				
0-30	22(36.7)	18(30)	1.289	0.438
31-60	13(21.7)	12(20)		
61-90	20(33.3)	19(31.7)		
91+	5(8.3)	11(18.3)		
<b>Family Support</b>				
Yes	46(76.7)	36(60)	1.978	0.05
No	14(23.3)	24(40)		
<b>Quality of Service</b>				
Poor	1(1.7)	3(5.1)	-1.383	0.192
Average	8(13.3)	7(11.9)		
Good	10(16.7)	18(30.5)		
Very Good	41(68.3)	31(52.5)		
<b>Service Cost (In GhC)</b>				
0-100	39(92.9)	43(97.7)	-1.067	0.264
101+	3(7.1)	1(2.3)		

Missing	18	16		
<b>Attitude of Health Workers</b>				
Very Poor	0(0)	1(1.7)	-1.096	0.797
Poor	5(8.3)	3(5.6)		
Satisfactory	13(21.7)	15(25.0)		
Good	23(38.3)	22(36.7)		
Very GoodT	19(31.9)	19(31.7)		
<b>Education</b>				
No Formal Education	35(58.3)	44(73.3)	2.887	0.256
Primary	3(5.0)	5(8.3)		
MSLC/JHS	10(16.7)	5(8.3)		
Secondary	9(15.0)	4(6.6)		
Tertiary	3(5.0)	2(3.3)		
<b>Employment</b>				
Employed	42(70.0)	28(46.7)	3.125	0.003
Unemployed	18(30.0)	32(53.3)		
<b>Income (In GhC)</b>				
0.5	56(93.3)	57(95.0)	1.356	0.875
501-1000	2(3.3)	2(3.3)		
1001+	2(3.3)	1(1.7)		
<b>Age In Years</b>				
<18	1(1.7)	1(1.7)	0.219	0.111
18-24	21(35)	15(25.0)		
25-30	24(40)	26(43.3)		
31-40	13(21.6)	11(18.3)		
41+	1(1.7)	7(11.7)		

Source: Field Work, 2020.

**Table 4:** T-test for Place of residence and Level of Education

Variable	Unstandardized Coefficients		Standardized Coefficients	t-value	P-value
	B	Std. Error	Beta		
(Constant)	2.887	0.351		8.217	0
Place of Residence	0.661	0.217	0.275	3.048	.003*
Level of Education of the Respondents	-0.136	0.087	-0.141	-1.563	0.121

a. Dependent Variable: Regular Use of Maternal Health Services

Factors for which there are significant differences between rural and urban are employment ( $p < 0.05$ ), distance ( $p < 0.03$ ) and family support ( $p = 0.05$ ). Whereas 68.3% of urban respondents who live 1 kilometre or less to a health facility use health services regularly, 43.3% do the same in rural communities. For employment, 70% of the employed in urban communities use health services regularly whilst 46.7% in the rural do the same in rural communities. Further, whereas 76.7% of urban residents who receive family support use health services regularly, 60% of those in rural communities do the same. By implication, employment status, distance and family support predict regular use of maternal health services.

Based on the evidence in Table 5.8 the null hypothesis ( $H_0$ ) for level of education is accepted as against the alternative hypothesis ( $H_1$ ) (Table 4).

This is because the significance values against the utilization of maternal health services are less than 0.05. The t-test analysis shows a p-value of 0.121 and a t-value of -1.563 between the level of education and the utilization of maternal health services. Therefore, it is statistically evident that at a 5% significant level, there is no significant difference in the utilization of maternal health services by level of education.

However, the null hypothesis ( $H_0$ ) for a place of residence is rejected in favour of the alternative hypothesis ( $H_1$ ). The t-value is -1.563 with a probability value of .121. It, therefore, means that at a 5% confidence level, there is a significant difference in the utilization of maternal health services by place of residence. This suggests that the utilization of maternal health services is not the same at different places of residence.

## Discussion

The study examined a comparative analysis of the utilization of maternal healthcare by rural and urban communities in an economically deprived administrative region in Ghana. The quantitative approach, using a questionnaire instrument, was used to generate data to answer the research questions.

Results show that there is a disparity in the use of maternal healthcare by rural and urban communities, with urban residents using the services more regularly than the rural. The factors showing a significant difference by location are employment, distance and family support. Employment predicts income which is needed to procure health services. Studies by [8, 10] confirm this finding. Cost of service incidentally did not show a difference by location, and by implication, a significant relationship with the utilization of maternal healthcare. This is a deviation from studies such as [14, 15]. This deviation may be explained by the free maternal healthcare implemented under the National Health Insurance Scheme in 2008 [15]. There is some financial relief making services partly accessible by both rural and urban respondents. Distance shows a disparity by location since the major maternal healthcare facilities are located in the urban community of Tolon. The Lungbunga rural community boasts just a CHPS compound which has lower-level facilities. Results further show that family support, which is a predisposing factor [25], exhibits a significant difference in the use of maternal healthcare by rural and urban participants, with urban participants giving greater support than rural residents apparently due to their better level of income. Limited extant literature [22, 23, 24, 30] supports the meaningful role played by the family in the utilisation of maternal healthcare. The null hypothesis that there is no statistically significant relationship between utilization of maternal healthcare by rural and urban communities was rejected. On the contrary, the null hypothesis that there is no statistically significant relationship between the utilization of maternal healthcare and by level of education could not be rejected even though several studies [12, 16, 17] have established a positive association between the two variables. This could be explained by the several programs mounted to educate women on the need to access maternal healthcare and again due to the introduction of free maternal healthcare policy [31].

The conceptual framework has been justified. Some predisposing factors such as employment and family support have been found to influence the use of maternal healthcare whilst distance, an enabling factor, has been found to influence the same. The location of a district hospital with maternal healthcare at Tolon, the urban community, explains the distance factor. The respondents in the urban community live within easy reach of the maternal healthcare facilities. Besides, generally, distance is a factor that predicts the use of healthcare [32,33].

The study had some limitations. Firstly, the use of the mixed method approach would have given a better picture of the use of maternal healthcare. Secondly, the spatial scope was limited. Nonetheless, the relevance of quantitative research which gives greater knowledge and understanding of the social world cannot be gainsaid. The scope did not affect the credibility of the findings since the population is generally homogeneous so it is expected that similar findings would have been established in similar urban and rural communities.

## Conclusions

The study has established that urban participants use maternal healthcare more regularly than rural residents and that employment status, distance and family support show differences between rural and urban communities in the use of maternal health services. The hypothesis that there is no significant relationship between utilization of maternal healthcare by the level of education could not be rejected. The possible explanation is the education programs on the use of maternal healthcare mounted and also the free maternal healthcare policy. The conceptual framework [25] has partially been justified. It is recommended that maternal healthcare facilities be made more accessible to rural residents and that the Community Health Planning Services (CHIP) compound which is more accessible to rural residents be upgraded to the status of a District hospital which will have better maternal healthcare facilities. The WHO should encourage international institutions such as the World Bank and Non-governmental organizations to focus on the rural communities in developing countries in the provision of maternal healthcare facilities. This study has contributed to the ongoing debate on the use of maternal healthcare by rural and urban communities in developing countries and further added family support as a new contribution to the limited literature. There must thus be an education programme on the role of the family in supporting mothers in the use of maternal healthcare.

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## Conflict of Interest

There were no competing interests involved in the preparation of the manuscript.

## Ethics Approval and Consent to Participate

The College of Humanities and Social Sciences Research Ethics Committee of the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi-Ghana gave Ethical Approval for the research to be conducted. The Reference number for the approval was HuSSREC/AP/36/Vol.1. (Letter issued on June 23, 2022) Participants gave their consent to participate in the study.

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## Consent for Publication

The authors give their consent for the manuscript to be published.

## Availability of Data Materials

Data materials will be made available upon request.

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