

GEOGRAPHICAL ANALYSIS OF MATERNAL MORTALITY IN BAUCHI TOWN

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ABSTRACT

The study aimed to Analyze Spatio-Temporal Pattern of Maternal Mortality in Bauchi Town, which was achieved through knowing the maternal mortality frequency from Jan 2018 to June 2019 in Bauchi Town, identifying the causes of maternal mortality in the region through hospital records, knowing spatial distribution of maternal mortality in the study area and identify the socio-cultural and demographic characteristic of maternal death among women of reproductive age in the study area. Both quantitative and qualitative data were collected from specialist hospital records in Bauchi Town. Descriptive statistics was used which involves the use of frequency distribution tables, pie chart and the use of percentages in analyzing the data obtained from the field. The findings of the study show that maternal death occurred most in May in 2018 (16.7%) while in 2019 maternal mortality occurred most in March (27.8%). Further results show that the major cause of maternal death in the study area is Postpartum Hemorrhage (PPH) in both 2018 and 2019 with 32.2% and 25% respectively. Zango emerged the area with the highest maternal mortality in Bauchi Town with some other areas like Ilela and Yelwa. Further results show that women between the ages of 20 – 24 are the most vulnerable of experiencing maternal mortalities which are mostly Hausa by tribe and most of them are Muslim with little or no formal education. It is recommended that the government should embark on enlightenment programs on the importance of antenatal and postnatal care to women of reproductive ages, through the use of medical personnel, traditional leaders, religious leaders, teachers, media, etc. Women of reproductive age need to have formal education.

Key Words: *Spatio-Temporal, Maternal Mortality, Socio-cultural and Demographic.*

INTRODUCTION

Maternal Mortality is one of the problems bedeviling women especially in developing or low-income countries; though the percentage is gradually reducing due to improve healthcare facilities and services as well as awareness in most developing countries the situation is far from over. According to the World Health Organization, (2019), said maternal death dropped by about 38% worldwide from 2000 - 2017. However, developed countries experience a very low level of maternal death and this is due to their improved healthcare facilities and services such as excellent hospitals and equipment, well trained medical personnel (doctors, pharmacist, nurses, medical lab technicians, etc) and they also attended high level of United Nations standard of living of literacy, income and life expectancy. Another factor could be the result of their low level of giving birth, for example, no country in Europe has fertility rates of more than 2.0 children per woman (World Population Review, 2019). Maternal Mortality difference between developed and less developed countries is extremely high with an estimated ratio of 1 in 5400 for the former and 1 in 45 for the later, (World Health Organization, 2019).

According to the World Health Organization, (2019) stated that “Sub-Saharan Africa and Southern Asia accounted for approximately 86% (254 000) of the estimated global maternal deaths in 2017. Sub-Saharan Africa alone accounted for roughly two-thirds (196 000) of maternal deaths, while Southern Asia accounted for nearly one-fifth (58 000). At the same time, between 2000 and 2017, Southern Asia achieved the greatest overall reduction in Maternal Mortality Rate (MMR): a decline of nearly 60% (from MMR of 384 down to 157). Despite its

very high MMR in 2017, sub-Saharan Africa as a sub-region also achieved a substantial reduction in MMR of nearly 40% since 2000”.

According to World Health Organization, (2019) “Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes”. Maternal death is caused by several factors which are mostly preventable, World Health Organization, (2019) enumerates some of the five major causes of maternal mortality which accounted for about 75% of all maternal death these include: severe bleeding, mostly bleeding after childbirth which leads to loss of 500ml or 1000ml of blood within 24 hours after birth (Postpartum Hemorrhage PPH), high blood pressure during pregnancy (pre-eclampsia and eclampsia) complications from delivery and unsafe abortion. While other causes are as the result of infection (usually after childbirth) such as malaria, cardiac diseases or diabetes.

Nigeria is the most populous country in Africa and 7th most populous country in the world (Worldometers, 2019). The country experiences incessant maternal mortality of which almost 20% of the maternal death in the world occurred in Nigeria and in between 2005 and 2015 the country experienced 600,000 maternal mortality. The country in 2015 experienced 58,000 maternal deaths with 800 deaths per 100,000 live births, (World Health Organization, 2019).

STATEMENT OF THE RESEARCH PROBLEM

The north-Eastern part of Nigeria has the highest maternal mortality rate (MMR) in Nigeria with 1,549 maternal death per 100,000 live births (Abimbola, et al. 2012) and Bauchi State is one of the states located in North-Eastern part of the country which clearly shows the problem of

maternal mortality in the region and this could be as a result of the low social status of women of reproductive age group (15 – 49) in the region. Statistics show 63.4% of women of reproductive age (15 – 49) in Bauchi State do not have western education, only 2.7% of women of reproductive age attended higher education, only 11.1% of women between the ages 15 – 49 can read a whole sentence, while only 12.6% can read part of a sentence, while 73.6% cannot read at all (Nigerian Demographic and Health Survey, 2018, p53 and p55). Women exposure to mass media is also very low in Bauchi State, Nigerian Demographic and Health Survey, 2018, shows that only 1.1% of women of reproductive age have access to newspaper, television, and radios at least once a week, similarly, 67.8% of them do not have access to any of the three mass media above in a week, (Nigerian Demographic and Health Survey, 2018, p58). It is also evident that only 2.1% engage in professional, technical and managerial jobs among women between the ages 15 – 49, (Nigerian Demographic and Health Survey, 2018, p70). Hence this exposes women of reproductive age to the danger of high maternal mortality because women's social status is associated with many factors that have a significant impact on health-seeking behaviors and reproductive behaviors.

Lack of information needed to prevent women access to conventional health care facilities in Bauchi State, particularly emergency obstetric services. “Another factor underlying maternal deaths in Bauchi State is the early age at sexual debut (15.3 years) and teenage pregnancy rate of 51.3% “(UNFPA, 2003). According to Abegunde, et al. (2015). “The quality of maternal and newborn care services in health facilities of Bauchi state, northeast Nigeria is below standard, while Maternal Mortality Rate (MMR) and Neonatal Mortality Rate (NMR) in Bauchi are among the highest in the country”.

Several pieces of research were conducted on this topic nationally and internationally among which are: Say, et al. (2014) conducted a research on the global causes of maternal death, which shows the major causes of world maternal mortality are: hemorrhage, hypertensive disorders, and sepsis. Other studies conducted in the developed world at various times indicated that in U.S.A cardiovascular diseases, thromboembolic diseases, hemorrhage, hypertension, heart conditions, infections, blood clots, and stroke, are the major causes of maternal death, while in Spain the major cause of maternal death is hemorrhage, (Robeznieks, 2015, Lang & King, 2007) and (Atanasova, et al. 2018) respectively. Sloan, et al. (2001), studied the etiology of maternal mortality in developing countries which shows that the major causes of maternal death are hemorrhage and pregnancy-induced hypertension. Other studies conducted in Nigeria show that hemorrhage, eclampsia and pre-eclampsia, and sepsis are the major causes of maternal death in Nigeria, (Sageer, et al. 2019 & Olopade & Lawoyin, 2008).

However, none of the above studies were conducted in Bauchi Town, and even those that were conducted in Bauchi like that of Kabo, Otolorin, Williams, and Orobato, (2016) and Mairiga and Sale (2009) did not examine the distribution of maternal death in the study area and none of the above researches examines monthly occurrences of maternal death in Bauchi Town. Hence this research seeks to study maternal mortality in Bauchi Town by asking the following questions:

- What are the monthly frequencies of maternal mortality in Bauchi Town from Jan 2018 to June 2019?
- What are the causes of maternal death in the study area?
- What is the spatial distribution of maternal mortality in Bauchi Town?

- What are the cultural and demographic characteristics of maternal death in the study area?

This research, therefore, aimed at analyzing maternal mortality in Bauchi Town which was achieved through the following objectives:

- To know the maternal mortality rate from Jan 2018 to June 2019 in Bauchi Town,
- To identify the causes of maternal mortality in Bauchi through hospital records,
- To know the spatial distribution of maternal mortality in the study area.
- To identify the cultural and demographic characteristics of maternal death among women of reproductive age in the study area.

METHODOLOGY

The first step in the data gathering exercise in this study is the reconnaissance survey. At the time of carrying out this surveying; hospitals expected to have maternal mortality were visited, these hospitals include women and children hospital railway, Kofar Ran Health clinic, Tashan Babiye hospital, Umar Isah Yuguda hospital, Bauchi Teaching hospital and specialist hospital. But only information from the specialist hospital was available and used at the end of this research, because all the other hospitals excluding Bauchi Teaching Hospital do not receive complicated maternal cases rather they refer it to either specialist or teaching hospital, hence no record of maternal mortality in these hospitals. While information from Bauchi Teaching Hospital could not be obtained because of the strict bureaucratic nature of the hospital.

Both qualitative and quantitative information of the deceased were collected from the specialist hospital records from January 2018 to June 2019. To achieve the stated objectives of the study,

the descriptive statistic was used which involves the use of frequency distribution tables, percentages, bar graph and the use of pie-chart.

STUDY AREA

Bauchi Town is in Bauchi State located in North-Eastern Nigeria and serves as the state capital. The study area covers an area of 3,687km², and located by latitudes 10° 19' 55"N and 10° 20' 58" N and longitudes 9° 50' 50"E and 9° 51' 29" E, (Shuibu et al. 2016). The town is boarded with Ganjuwa by the North, Kirfi by the North East, Toro by the North West, Alkalari by the South East and Tafawa Balewa by the South West. According to population and census data (2006), the town had 493,810 people; however, the recent population of Bauchi Town based on population projection 2020 at 3.39% growth rate is 794,837 people. The State, in general, has 55 tribal groups with Hausa, Fulani, Gerawa, Sayawa, Jarawa, Bolewa, Karekare, Kanuri, Fa'awa, Butawa, Warjawa, Zulawa and Badawa as the main tribes, (Bauchi State Government Official Website, 2019).

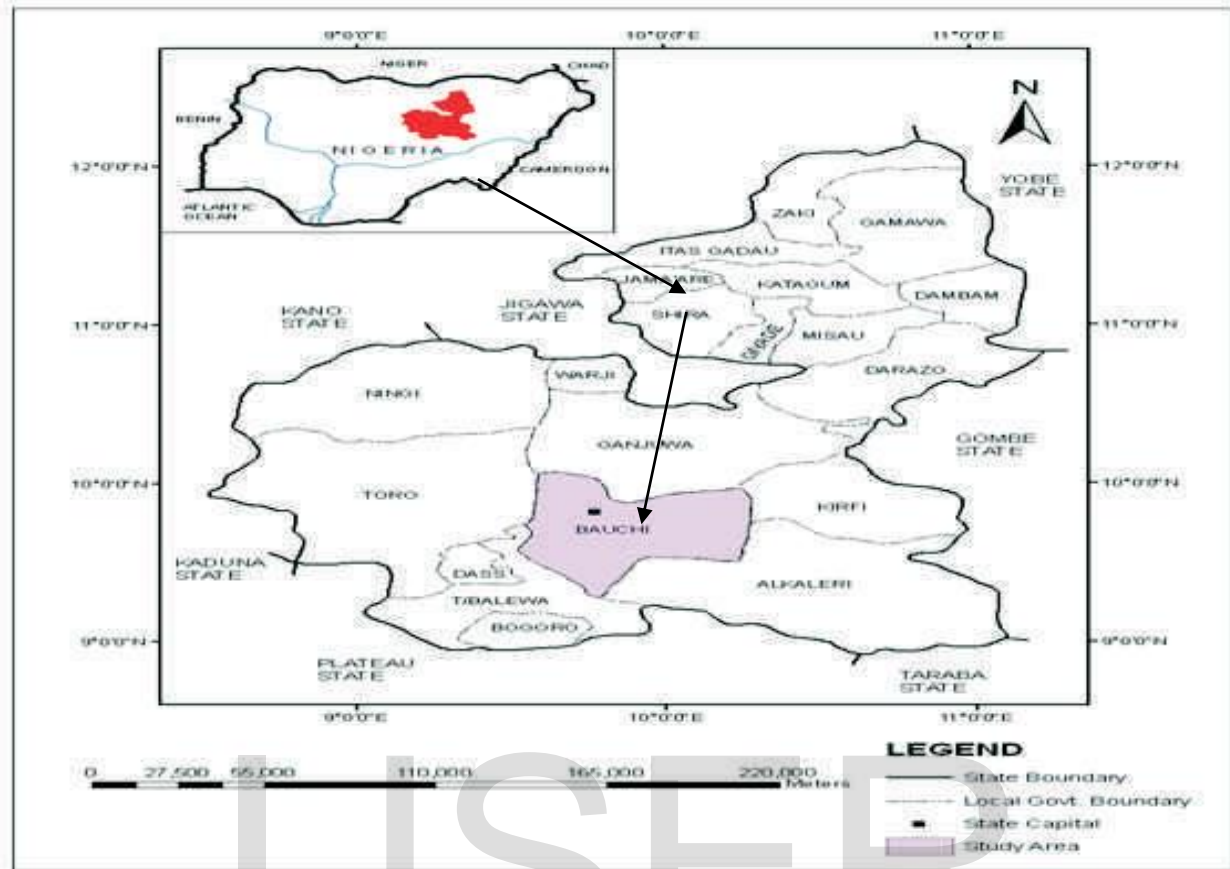


Figure 1: Map of Bauchi Town.

Source: Bauchi State Ministry of Lands and Housing, (2013) in Shuibu et al. (2016) Adopted and Modify.

RESULTS AND DISCUSSION

Introduction

This section is devoted to analyzing data collected from the field using descriptive statistical techniques that include; frequency distribution tables, percentages, and graphs.

Monthly Frequencies of Maternal Mortality in Bauchi Town from Jan 2018 to June 2019.

Maternal death occurred at a different levels in Bauchi Town during this period, below are tables showing the inventory of death of women as a result of pregnancy before, during or after birth.

Table 1 Monthly Frequencies of Maternal Mortality in Bauchi Town in 2018

Months	Frequency	(%)
January	4	13.3
February	4	13.3
March	2	6.7
April	3	10
May	5	16.7
June	4	13.3
July	1	3.3
August	1	3.3
September	0	0
October	3	10
November	3	10
December	0	0
Total	30	100

Source: Specialist Hospital Bauchi, 2019.

Table 1 shows the majority of maternal mortality occurred in May in 2018 in Bauchi Town, other months that recoded high maternal mortality are: January, February, October, and November, while September and December recorded the lowest of maternal death in the study area.

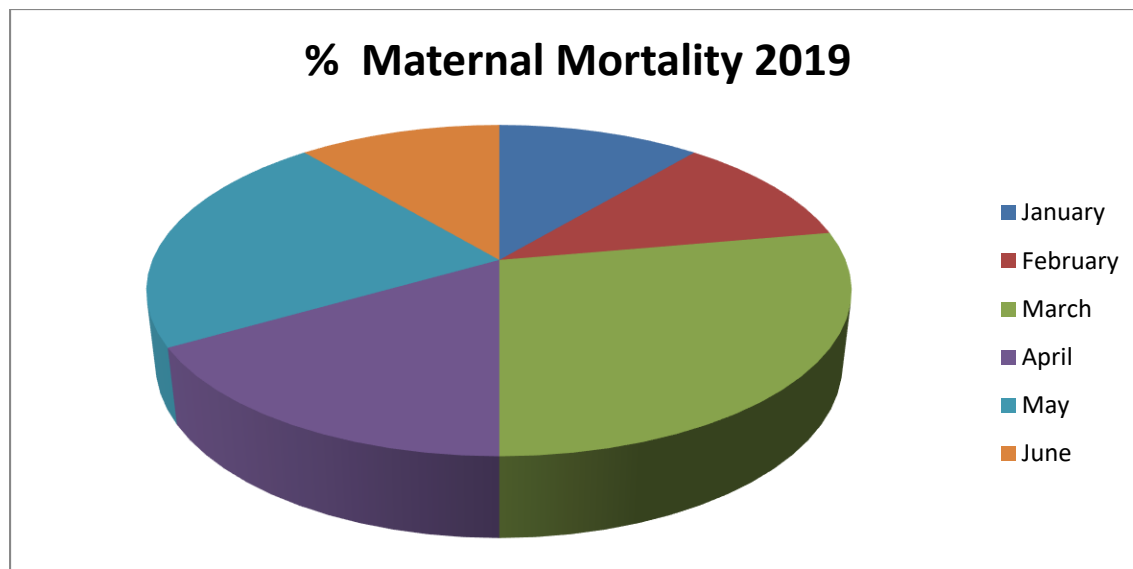


Fig. 2 Monthly Percentage of Maternal Mortality in Bauchi Town from Jan to June 2019
Source: Specialist Hospital Bauchi, 2019

Figure 2 inferred that March recorded the highest maternal mortality rate in 2019 in Bauchi Town with more than one-fourth of maternal death, followed by May and then April, while the other months also recorded the significant proportion of maternal death. Personal discussion with staff Specialist Hospital Bauchi proved that whenever there is free maternal care by the government or nongovernmental donors the rate of maternal mortality tends to decrease compared to the times of non-free maternal care which normally resulted in high maternal mortality within the town. This could attest to the poverty level of people in this region because many cannot afford maternal care. In both 2018 and 2019, it is clear to say in May many women of reproductive age lost their lives as a result of pregnancy, termination or after birth, this call for serious concern on this specific month in the years.

Causes of Maternal Mortality in Bauchi Town from Jan 2018 to June, December 2019

Maternal mortality among women of reproductive age is caused as a result of so many reasons which were collected and analyzed within Bauchi Town. Below is the inventory of the causes of maternal death in the study area.

Table 2 Causes of Maternal Mortality from January-December, 2018 in Bauchi Town

MONTH	PPH	APH	ECLAMPSIA	SEPSIS	OBSTRUCTED LABOUR	UNSAFE ABORTION	ANEMIA	TOTAL
January	2	1			1			4
February	2	1					1	4
March					1	1		2
April	1		1		1			3
May	2	1	1				1	5
June		1	1		2			4
July					1			1
August				1		1		2
September								0
October	1		1			1		3
November	2		1					3
December								0
Total	10	4	5	1	6	3	2	31
%	32.2%	12.9%	16.1%	3.2%	19.4%	9.7%	6.5%	100%

Source: Specialist Hospital Bauchi, 2019

Note: PPH (Post-partum hemorrhage), APH (Ante-Partum Hemorrhage)

Table 2 shows the majority of maternal mortality in 2018 in Bauchi Town was caused by PPH, which accounted for almost one-third of maternal death in the study area. Other high causes of maternal death are obstructed labor, APH, and Eclampsia, which causes serious maternal death in the region. However, Anemia is the least among the causes of maternal death in Bauchi Town in 2018.

Table 3 Causes of Maternal Mortality from January-June, 2019 in Bauchi Town

MONTH	PPH	APH	ECLAM PSIA	OBSTRUCTED LABOUR	UNSAFE ABORTION	ANEMIA	TOTAL
January					1	1	2
February	2	1				1	4
March				1	1		2
April	1		1	1			3
May	2	1	1			1	5
June		1	1	2			4
TOTAL	5	3	3	4	2	3	20
%	25%	15%	15%	20%	10%	15%	100%

Source: Bauchi State Specialist Hospital, 2019

In 2019 from January to June table 3 indicates high maternal mortality as a result of PPH which accounted for one fourth (1/4) of maternal death in the study area. Obstructed labor is another cause of maternal mortality in the region which resulted in one fifth (1/5) of maternal death in Bauchi Town. Other serious causes are APH, Eclampsia, and Anemia which accounted for 15% each of maternal death. However, unsafe abortion in Bauchi town from January – June 2019 emerged the lowest cause of maternal death. Hence, in both 2018 and 2019, it is obvious that PPH is the leading cause of maternal mortality in Bauchi Town which if care is not taking will continue to take women's lives. The results above agreed with the research conducted by Ni and Rossignol (1994) and Aghoja, (2008) which shows that PPH is one of the leading causes of maternal death. However, the above results are not in agreement with the research conducted by Adamu, et al, (2003) which shows Eclampsia is the leading cause of maternal death in Northern Nigeria.

Spatial Distribution of Maternal Death in Bauchi Town

This section observed and analyzed relative locations of maternal death in Bauchi Town, this enabled the researcher to know areas with high and low maternal mortality in the study area.

Table 4 shows the inventory of maternal death based on their area of residence.

Table 4 Relative Location of Maternal Dead from January 2018 to June 2019

LOCATION	TOTAL	%
b/Airport	1	2.1
Sabon ung. Railway	2	4.2
Nasarawa	2	4.2
Gwallaga	1	2.1
Yelwa	6	12.5
Dutsen Tanshi	1	2.1
Igbo Quarters	2	4.2
Ilela	4	8.3
Bakaru	2	4.2
Sabuwar Kasuwa	3	6.2
Zango	9	18.7
Jahun	5	10.4
Doya	3	6.3
Kofar dumi	4	8.2
Tudun Salmanu	2	4.2
Unguwan Jaki	1	2.1
Total	48	100

Source: Bauchi State Specialist Hospital, 2019

Table 4 indicates high maternal mortality in Zango, Yelwa, and Jahun, with Zango, which emerged the highest with 18.7% of maternal death in the study area. Other areas have little proportion of maternal death with most of them having between 2% to 4.2%.

Cultural and Demographic Characteristic of Maternal Death among Women of Reproductive Age in Bauchi Town

Cultural and demographic characteristics are important variables in determining maternal death among women of reproductive age. This study collected information about the ages, tribes,

religion, and education of maternal death in the study area. Table 5 shows the frequency of maternal death based on the cultural and demographic characteristics of women of reproductive ages.

Table 5 Cultural and Demographic Characteristics of Maternal Death in Bauchi Town from January 2018 to December 2019.

AGE	Frequency	%
15-19	11	22.9
20-24	18	37.5
25-29	9	18.8
30-34	4	8.3
35-39	6	12.5
40-44	0	0
45-49	0	0
Total	48	100%
TRIBE		
Hausa	25	52.1
Fulani	8	16.6
Jarawa	5	10.4
Sayawa	5	10.4
Gerawa	4	8.3
Igbo	1	2.1
Yoruba	0	0
Others		
Total	48	100%
RELIGION		
Islam	42	87.5
Christianity	6	12.5
Others		
Total	48	100%
EDUCATION		
Primary	6	12.5
Secondary	24	50
Tertiary	4	8.3
No Education	10	20.8
Other	4	8.3
TOTAL	48	100

Source: Bauchi State Specialist Hospital, 2019

Table 5 shows women between the ages 20-24 remain the ages that experienced high maternal mortality which accounted for more than one-third of maternal death in the region, the result is in agreement with the findings made by Nigerian DHS, 2018, p377 which shows 41.0% of maternal death occurred within the age group 20 – 24 which emerged the highest in the country. Similarly, maternal death in the region concentrates more on the lower age cohort because is within the ages 15 – 39. The result is concurrent with Okonofua, et al. (1992) findings which stated that maternal mortality is more within the younger age groups of women. This is really dangerous to the working-age group of women if something urgent is not done.

In the case of tribes that are mostly affected, records proved that Hausa/Fulani are much more affected perhaps they are the dominant tribe within the study area because they accounted for more than half of maternal death in the study area, this is in concurrent with the research conducted by Ujah, (2005) which shows Hausa Fulani accounted the majority (45%) of maternal death in North Central: a case study of Jos Teaching Hospital. While Igbo and Yuroba who happens to be the minority tribe in the study area had an insignificant proportion of maternal mortality in the region.

In the aspect of religion, Muslims are the most affected in the study area, this may be due to their domination in the area under study with the overwhelming proportion of 87.5% or due to the fact that Muslims women give more birth than the Christian women, while Christianity as second dominant religion emerged the second religion with the significant number of maternal death.

In the aspect of literacy, those with a secondary level of education were much more affected by maternal mortality based on the record, this accounted for half of the population (50%), following by those that have not gone to school (none formal education) with a significant

percentage of more than one-fifth of the population of maternal death, this is in concurrent with Ujah, (2005) which confirmed that illiterate women of productive age were those that experienced more maternal mortality in Jos teaching Hospital. But the result above inferred that those with a high level of educational qualification experience very few maternal death, this could be the result of their knowledge which helps them to attend antenatal care as of when due.

CONCLUSION

Maternal mortality has been one of the major problems bedeviling the developing nations especially in Nigeria and more especially in the northern part of the country. Bauchi is one of the states located in the North East; experiencing this great problem of maternal death, this prompted the researcher to carry out this research in Bauchi Town. It is obvious that maternal mortality is a problem in Bauchi Town which is mostly caused by Postpartum Hemorrhage (PPH) among other causes and mostly occurred among women with lower formal educational qualification; hence this requires urgent attention of Government, stakeholders and philanthropies to key in to tackle the situation immediately before it goes out of control. As a result of the above unpleasant findings the researcher wishes to forward the following recommendations:

5.3 Recommendation

- i. There is need for the government to embark on programs (workshops, seminars, conferences, etc.) to enlighten the mothers on safe motherhood and delivery; which will enable them to be going for ante-natal so as to drastically reduce complications during delivery, especially in areas like Zango, Ilela and Yelwa.
- ii. Knowledge is very pertinent to save women of reproductive age from maternal mortality because it makes them enlighten on how to properly take care of their pregnancy from

beginning to term. It is therefore strongly encouraging to engaging females into formal education to higher levels.

- iii. Traditional leaders, religious leaders, husbands, Social Media, and teachers are an important medium to communicate with women of reproductive age to curtail the problem of maternal mortality in the study area.

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