

## **Spatial Pattern of Maternal Morbidity of Women of Childbearing Age Attending Health Facilities in Anambra State, Nigeria (2014-2016)**

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### **Abstract**

*The purpose of the study was to investigate the spatial pattern of maternal morbidity of women of childbearing age attending health facilities in Anambra State, Nigeria. One research question was formulated and one hypothesis postulated to guide the study. Cross sectional research design was adopted to achieve the objective of the study. 400 subjects were randomly sampled using Taro Yamane's formula with multi-stage sampling procedure from 32,255 population of women registered in public health facilities in Anambra State. The reliability coefficient of the questionnaire (MMPQ) was 0.90, established through Cronbach Alpha statistic. Quantitative data from 400 copies of completed MMPQ were collected and analysed using Statistical Package for Social Sciences (SPSS) batch system version 20. Research question was answered using frequency and percentage while the hypothesis was tested at .05 level of significance using Chi-square. Findings of the study indicated that the proportion of women who reported morbidity during pregnancy in the rural areas (63.5%) were more than the proportion of women who reported morbidity in the urban area (40.0%) during pregnancy and the proportion of women who reported morbidity during labour/childbirth in rural area was 39.7% more than 33.3% of the women in the urban areas. The findings further revealed that there was significant difference in the spatial pattern of maternal morbidity during pregnancy while there were no significant differences in the spatial pattern of maternal morbidity during labour/childbirth and postpartum periods. The study recommended among others that the government and health workers should organize seminars and workshops for women, paying more attention to those who reside in the rural areas on the need to take care of themselves during pregnancy, childbirth and postpartum periods by seeking care from appropriate source.*

**Keywords:** *Maternal morbidity, Spatial pattern.*

### **Introduction**

Maternal morbidity is a public health problem. Despite the aggressive measures taken to control it, the proportion of women who suffer morbidity still remains worrisome. Maternal morbidity remains a major cause of death and disability among women of childbearing age worldwide, with an estimated 287,000 women dying from causes related to pregnancy and childbirth each year (World Health Organization, 2012). Millions of women in developing countries experience life threatening morbidities related to pregnancy and childbirth. World Health Organization (2007) estimates indicate that there are 1,000 maternal morbidities for every 100,000 live births in the country and that a

woman's life time chance of developing complications during pregnancy, childbirth, or the postpartum period is one in 18. It was reported that Nigeria has the second highest number of annual maternal deaths in the world after India and contributes to 14 per cent of the total global maternal figure of 287000 (WHO, 2012). The Nigerian Demographic Health Survey (2013) estimated that maternal mortality ratio for Nigeria is 576 deaths per 100,000 live births which are not significantly different from the 2008 NDHS ratio of 545 deaths per 100,000 live births. Anambra State still faces high risks in pregnancy, labour and after delivery. In general, there appears to be a high prevalence of morbidity among women of childbearing age in Anambra State as many of them suffer from long lasting complications such as fistulae, prolapses, anaemia, eclampsia and haemorrhage among others (Anambra State Ministry of Health & family Welfare, 2012). The Nigerian Demographic and Health Survey (NDHS) (2013) stated that Anambra State recorded the ratio of maternal morbidity to be 100 out of 100,000, live births which is unacceptably high considering the fact that the target of the Sustainable Development Goal (SDG) 5 was to improve maternal health by reducing maternal death to less than 70 per 100,000 live births in developing countries of which Anambra State, Nigeria is certainly one. World Health Organization (2009) noted that pregnancy and childbirth are special events in a woman's life and in the lives of their families and can be a time of fear, suffering and may lead to maternal morbidity.

Maternal morbidity is morbidity as a result of pregnancy and childbirth. Koblinsky, Chowdhury, Moran and Ronsmans (2012) defined maternal morbidity as an overarching term that refers to any physical or mental illness or disability directly related to pregnancy and childbirth that are not necessarily life-threatening but can have a significant impact on the quality of life. World Health Organization (WHO) Maternal Morbidity Working Group defines maternal morbidity as any health condition attributed to and or aggravated by pregnancy and childbirth that has a negative impact on the woman's well-being (Firoz, Chou, Agrawal, Vanderkruik, Tuncalp, Magee, Broek & Say, 2013). Maternal morbidity refers to the health problems that women encounter during pregnancy, delivery, or postpartum period. These morbidities become dangerous to the lives of women of childbearing age. According to Izuagbara, Wekesah and Adedini (2017) some women of childbearing age experience health problems during pregnancy and these problems can endanger the mother's health, the foetus's health or both. According to them, childbearing women who were healthy before getting pregnant may experience complications and these complications may make the pregnancy a high-risk pregnancy. Consequently, Izuagbara, Wekesah and Adedini (2017) reported that 109 women die each day from preventable causes related to pregnancy and childbirth and that, for each death, there are estimated 30-50 women who will experience life-long conditions and disabilities such as obstetric fistula. Evidence suggests that maternal morbidity has not received adequate attention, as such maternal morbidity, disability and consequences (such as haemorrhage, placenta abruption, retained placenta, ruptured uterus and pelvic inflammatory diseases among others) which

continue to account for most maternal death have been described as neglected agenda in maternal health (Koblinsky, 2012) Consequently, women are encouraged to receive continuous maternity care from a skilled provider to avert complications. Getting early and regular prenatal care can help decrease the risk of complications by enabling health care providers to diagnose, treat, and manage conditions before they become serious. Maternal morbidity may occur in patterns such as spatial pattern.

A spatial pattern is a perceptual structure, placement, or arrangement of objects on earth. It also includes the space between those objects. Centre for Cancer Education (1998) defined spatial pattern as interaction of an individual or groups of individuals in relation to the immediate surrounding area including the animate or inanimate objects within that area. Pattern may be recognized because of their arrangement; maybe in a line or by a clustering of points. Three classifications are often used when discussing spatial patterns; aggregated or clustered, random and regular (Agbaje, 2007). Spatial pattern is based on geographical location in a particular country, state or local government (Pridemore, Andrew & Spivak, 2003). It could be urban or rural areas. Geographical pattern according to them can be based on country type which reflects level of urbanicity and metropolitan area. In the present study, spatial pattern refers to places or locations in relation to illnesses, diseases and complications. Hence, spatial pattern of maternal morbidity is referred to as occurrence of maternal morbidity according to location which could be urban and rural. The urban and rural locations have influences on maternal morbidity. The Society of Gynaecology and Obstetrics of Nigeria (2004) stated that maternal morbidity ratio varies considerably between rural and urban areas with considerably high morbidity in rural areas as compared to urban parts. Fredrick (2005) posited that in a rural area of developing countries with little or no access to maternity care for the pregnant woman, both the woman and the foetus might be exposed to maternal health problems and complications. Ponle (2007) reported in a study carried out in northern Nigeria that maternal morbidity and death are severe in rural areas especially in predominately rural Islamic Northern State where women marry at an early age and owing to complications and lack of care die during childbirth. The United Nations Development Programme (2012) asserted that women who are vulnerable and are excluded from health care are those in rural (remote) areas. According to UNDP, women who live in rural areas experience morbidity compared to their urban counterparts and cannot access medical services easily thereby which could make them give birth at home and develop complication which can lead to death. Therefore, the spatial pattern of women of childbearing age was investigated. The purpose of the study was to investigate the spatial pattern of maternal morbidity of women of childbearing age attending health facilities in Anambra State, Nigeria. Specifically, the study investigated the spatial pattern of morbidity of women during pregnancy, childbirth, and postpartum periods from 2014-2016 and tested the null hypothesis of significant difference in the spatial

pattern of morbidity of women during pregnancy, childbirth, and postpartum periods of 2014-2016.

### **Methods**

In order to achieve the objective of this study, a cross-sectional research design was employed. The population of the study was 32,255 registered women of childbearing age attending health facilities in Anambra State. A sample of 400 women of childbearing age derived using Taro Yamane's formula participated in the study. Multi-stage sampling procedure was employed to draw the sample for the study. The first stage involved the use of cluster sampling technique using the existing senatorial districts, namely: Anambra North Senatorial District, Anambra Central Senatorial District and Anambra South Senatorial District. Each of the senatorial districts has seven local government areas. The second stage involved the use of disproportionate stratified random sampling technique to select four local government areas from Anambra South Senatorial District and three LGAs each from Anambra North and Anambra Central respectively. This procedure produced a total of 10 LGAs. The third stage involved the use of random sampling technique of balloting without replacement to select four health facilities in each of the selected 10 LGAs in Anambra State. This procedure produced a total of 40 health facilities that were used in the study. The fourth stage involved convenience random sampling technique to select 10 women each who were accessing antenatal and postnatal care at the selected 40 health facilities. At the end of sampling procedures, a total of 400 women of childbearing age were used for the study.

Two instruments were used for data collection. These include Maternal Morbidity Pattern Questionnaire (MMPQ) comprising of 20 items. The MMPQ is divided into two sections of A-B. Section 'A' elicited information on socio-demographic variables of participants namely: age, parity, and level of education, income, location, mode of delivery, marital status, and religious denomination. Section B contained 20 items on maternal morbidity (morbidity during pregnancy, morbidity during labour or childbirth, and morbidity during postpartum period) of women of childbearing age. All the items in section "B" were assigned dichotomous response option of "Yes" or "No". The respondents are required to tick (✓) either "Yes" or "No" against items. Another instrument for collecting data was Maternal Morbidity Pattern Focus Group Discussion Guide (MMPFGDG) comprising 4 items. The MMPFGDG consisted of open-ended questions on maternal morbidity pattern. It was used to elicit qualitative information from the 20 focus groups of women of childbearing age at the 20 sampled health facilities. The face validity of the instrument (MMPQ) was established through the judgement of five experts from the department of Human Kinetics and Health Education, University of Nigeria, Nsukka. Data were collected by the researcher and two research assistants. All the 400 questionnaires administered were completely filled and used for analysis. Data was analysed using SPSS version 20. The reliability of MMPQ was established by administering 30 copies of the instrument on the women of childbearing age

attending health facilities in Nsukka urban, Enugu State. Enugu State is a neighbouring State to Anambra State and has similar attributes with Anambra State. Cronbach's Alpha statistic was used to establish the reliability of the instrument and a correlation coefficient of .090 was obtained. Frequency and percentage were used to answer the research question while the null hypothesis was tested using Chi-square ( $\chi^2$ ) statistic at .05 level of significance. The qualitative data via FGDs was analysed by first editing the documented verbal communications of the various groups, and assigning interpretations to the non-verbal communications (transcriptions). The edited and interpreted responses were analysed using open coding and thematic analysis.

## **Results**

**Table 1**  
**Distribution of the Spatial Pattern of Morbidity among Women in Anambra State**

S/ N	Items	2014				2015				2016			
		Urban		Rural		Urban		Rural		Urban		Rural	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1	Maternal morbidity during pregnancy period	11(36.7)	19(63.3)	230(62.2)	140(37.8)	11(36.7)	19(63.3)	192(51.9)	178(48.1)	12(40.0)	18(60.0)	235(63.5)	134(36.5)
2	Maternal morbidity during labour/childbirth	12(40.0)	18(60.0)	196(53.0)	174(47.0)	11(36.7)	19(63.3)	156(42.2)	214(57.8)	10(33.3)	20(66.7)	147(39.7)	223(60.3)
3	Maternal morbidity during postpartum period	9(30.0)	21(70.0)	214(57.8)	156(42.2)	7(23.3)	23(76.7)	197(53.2)	173(46.8)	10(33.3)	20(66.7)	184(49.7)	186(50.3)
	<b>Cluster Total</b>	<b>% 35.6%</b>	<b>64.4%</b>	<b>57.7%</b>	<b>42.3%</b>	<b>32.2%</b>	<b>67.8%</b>	<b>49.1%</b>	<b>50.9%</b>	<b>35.5%</b>	<b>64.4%</b>	<b>50.9%</b>	<b>49.0%</b>

**(n=400)**

Table 1 shows the proportion of women who reported morbidity during pregnancy in 2014: Rural (62.2%), Urban (36.7%), during pregnancy in 2015: Rural (51.9%), Urban (36.7%) during pregnancy in 2016: Rural (63.5%), Urban (40.0%). The Table shows the proportion of women who reported morbidity during childbirth in 2014: Rural (53.0%), Urban (40.0%), during childbirth in 2015: Rural (42.2%), Urban (36.7%), during childbirth in 2016: Rural (39.7%), Urban (33.3%). The Table further reveals the proportion of women who reported morbidity during postpartum period in 2014: Rural (57.8%), Urban (30.0%), during postpartum period in 2015: Rural (53.2%), Urban (23.3%) and during postpartum period in 2016, Rural (49.7%), Urban (33.3%)

Table 2  
**Summary of Person Chi-square Analysis of Spatial Pattern of Maternal Morbidity**

S/ N	Item	Urban		Rural		$\chi^2$ - value	d f	p- values	decision
		Yes O (E)	No O (E)	Yes O (E)	No O (E)				
<b>2014</b>									
1	Maternal morbidity during pregnancy period	11(18.1)	19(11.9)	230(222.2)	140(147.1)	7.532	1	.006*	Significant
2	Maternal morbidity during labour/ childbirth	12(15.6)	18(14.4)	196(192.4)	174(177.6)	1.871	1	.171	Not significant
3	Maternal morbidity during postpartum period	9(16.7)	21(13.3)	214(206.3)	156(163.7)	8.717	1	.003*	Significant
<b>2015</b>									
1	Maternal morbidity during pregnancy period	11(15.2)	19(14.8)	192(187.8)	178(182.2)	2.574	1	.109	Not significant
2	Maternal morbidity during labour/ childbirth	11(12.5)	19(17.5)	156(154.5)	214(215.5)	.345	1	.557	Not significant
3	Maternal morbidity during postpartum period	7(15.3)	23(14.7)	197(188.7)	173(181.3)	9.934	1	.002*	Significant
<b>2016</b>									
1	Maternal morbidity during pregnancy period	12(18.5)	18(11.5)	235(223.5)	135(141.5)	6.496	1	.011*	Significant
2	Maternal morbidity during labour/ child birth	10(11.8)	20(18.2)	147(145.2)	223(224.8)	.476	1	.490	Not significant
3	Maternal morbidity during postpartum period	10(14.6)	20(15.5)	184(179.5)	186(190.6)	2.987	1	.084	Not significant

Table 2 shows chi-square analysis for spatial pattern of maternal morbidity of WCA. The Table shows that in 2014, there was significant difference in spatial pattern of maternal morbidity during pregnancy ( $\chi^2=7.532,df=1,p$ -value=.006) and postpartum period ( $\chi^2=8.717,df=1,p$ -value=.003) since the p-values were less than .05 level of significance at one degree of freedom while there was no significant difference in the spatial pattern of maternal morbidity during labour/childbirth ( $\chi^2=1.871,df=1,p$ -value=.171). The null hypothesis of no significant difference in spatial pattern of maternal morbidity during pregnancy and postpartum period is therefore rejected while the null hypothesis of no difference in the pattern of maternal morbidity for labour/childbirth is accepted. This implies that there was a significant difference in the urban and rural pattern of maternal morbidity during pregnancy and postpartum period while maternal morbidity during labour/childbirth was the same for urban and rural locations.

The Table further shows that in 2015, there was no significant difference in spatial pattern of maternal morbidity of WCA during pregnancy ( $\chi^2=2.574,df=1,p$ -value=.109) and labour/childbirth ( $\chi^2=.345,df=1,p$ -value=.557) since the p= values were greater than .05 level of significance at one degree of freedom while there was significant difference in the spatial pattern of maternal morbidity during postpartum period ( $\chi^2=9.934,df=1,p$ -value=.002). The null hypothesis of no significant difference in spatial pattern of

maternal morbidity is therefore accepted for pregnancy and labour/childbirth periods while the null hypothesis is rejected for postpartum period. This implies that maternal morbidity for urban and rural locations was the same for pregnancy and labour/childbirth periods while maternal morbidity for postpartum period differed.

The Table also shows that in 2016, there was no significant difference in spatial pattern of maternal morbidity during labour/childbirth ( $\chi^2=.476, df=1, p\text{-value}=.480$ ) and postpartum periods ( $\chi^2=2.987, df=1, p\text{-value}=.084$ ) since the p-values were greater than .05 level of significance at one degree of freedom while there was significant difference in the spatial pattern of maternal morbidity during pregnancy ( $\chi^2=6.496, df=1, p\text{-value}=.011$ ). The null hypothesis of no significant different in spatial pattern of maternal morbidity is therefore accepted for labour/childbirth and postpartum period while the null hypothesis is rejected for pregnancy. This implies that maternal morbidity for urban and rural locations were the same while maternal morbidity differed during pregnancy period.

### ***Discussion***

The finding in Table 1 showed that maternal morbidity was reported more in rural (62.2%) than urban (36.7%) in 2014, more in rural (51.9%) than in urban (36.7%) in 2015 and more in rural (63.5%) than urban (40.0%) in 2016 during pregnancy. Maternal morbidity was reported more in rural (53.0%) than urban (40.0%) in 2014, more in rural (42.2%) than urban (36.7%) in 2015 and more in rural (39.7%) than urban (33.3%) in 2016 during labour/childbirth. During postpartum period, maternal morbidity was reported more in rural (57.8%) than urban (30.0%) in 2014, more in rural (53.2%) than urban (23.3%) in 2015 and more in rural (49.7%) than urban (33.3%) in 2016.

This finding was expected and not a surprise because health services are scarcely distributed in the rural communities and even where it is available, it is not easily accessible as it is in the urban location. From personal observation during the study, some of these mothers travel long distances in order to have access to maternal health services. This could be dangerous leading to emergency situation especially where there is no access road especially during rainy season. The finding agrees with the assertion of Society of Gynaecology and Obstetrics of Nigeria (2004) that maternal morbidity ratio varies considerably between rural and urban areas with considerably high morbidity in rural areas as compared to urban areas. The finding is also in consonance with Fredrick (2005) assertion that in a rural area of developing countries with little or no access to maternity care for the pregnant woman, both the woman and the foetus might be exposed to maternal health problems and complications. The finding is supported by the assertion of United Nations Development Programme (2012) that women who are vulnerable and are excluded from health care are those in rural (remote) areas. The finding was supported by qualitative data collected through FGD which revealed that maternal morbidity was reported more by childbearing women in the rural communities than in the urban communities. Based on the finding, efforts should be made to improve maternal

health outcome by educating and empowering women to take right decision concerning their health. This is achieved by employing the services of health educators and other health professionals to sensitize the women about the dangers of maternal morbidity as well as how to prevent it.

Findings in Table 2 showed that in 2014, there were significant differences in the spatial pattern of maternal morbidity of WCA during pregnancy ( $\chi^2 = 7.532$ ,  $df = 1$ ,  $p$ -value = .006) and postpartum period ( $\chi^2 = 8.717$ ,  $df = 1$ ,  $p$ -value = .003) while there was no significant difference in the spatial pattern of maternal morbidity of WCA during labour/childbirth ( $\chi^2 = 1.871$ ,  $df = 1$ ,  $p$ -value = .171). The findings that there were significant differences in spatial pattern of maternal morbidity during pregnancy and postpartum period was expected in 2014 because place of residence can affect the lifestyle of women and the use maternal health services of women since there are little or no maternal health services. The finding is in consonance with Fredrick (2005) report of significant difference between urban and rural area of developing countries. Fredric opined that in the rural areas with little or no access to maternity care for the pregnant woman, both the woman and the foetus might be exposed to maternal health problems and complications. The finding was supported by qualitative data collected through FGD which revealed that maternal morbidity was reported more by childbearing women in the rural communities than in the urban communities. The finding that there was no significant difference in spatial pattern of maternal morbidity during labour/childbirth in 2014 was surprising because where one resides can influence where she seeks health care or delivers her baby. This is because most women who live in the rural area may not be able to access the appropriate services when giving birth. However, the finding disagrees with the assertion of Asamoh, Moussa, Stastron and Musingui (2011) who reported significant difference between rural and urban areas by asserting that most maternal morbidity and deaths occurred among women that resided in rural areas compared to those in urban areas.

There were no significant differences in the spatial pattern of maternal morbidity of WCA during pregnancy ( $\chi^2 = 2.574$ ,  $df = 1$ ,  $p$ -value = .109) and labour/childbirth ( $\chi^2 = .345$ ,  $df = 1$ ,  $p$ -value = .557) in 2015 while there was a significant difference in the spatial pattern of maternal morbidity of WCA during postpartum period ( $\chi^2 = 9.934$ ,  $df = 1$ ,  $p$ -value = .002). The findings that there were no significant differences in spatial pattern of maternal morbidity during pregnancy and labour/childbirth in 2015 were not anticipated because location affects the use of maternal health services. The finding is at variance with the Society of Gynaecology and Obstetrics of Nigeria (2004) who reported statically significant difference between urban and rural areas by reporting that maternal morbidity ratio varies considerably between rural and urban areas with considerably high morbidity in rural areas as compared to urban parts. The finding that there was a significant difference in spatial pattern of maternal morbidity during postpartum period in 2015 was expected because location determines where one can seek for health care. The finding is in consonance with the assertion of United Nations Development Programme (2012) who



reported statically significant difference in urban and rural locations by asserting that women who are vulnerable to morbidity and are excluded from health care are those in rural (remote) areas. The finding was supported by qualitative data collected through FGD which revealed that maternal morbidity was reported more by childbearing women in the rural communities than in the urban communities.

There were no significant differences in the spatial pattern of maternal morbidity of WCA during labour/childbirth ( $\chi^2 = .476$ ,  $df = 1$ ,  $p\text{-value} = .480$ ) and postpartum period ( $\chi^2 = 2.987$ ,  $df = 1$ ,  $p\text{-value} = .084$ ) in 2016 while there was a significant difference in spatial pattern of maternal morbidity during pregnancy of WCA ( $\chi^2 = 6.496$ ,  $df = 1$ ,  $p\text{-value} = .011$ ). The findings that there were no significant differences in the spatial pattern of maternal morbidity of WCA during labour/childbirth and postpartum period in 2016 were surprising. The finding is at variance with Fredrick (2005) who reported significant difference between rural and urban location by asserting that in a rural area of developing countries with little or no access to maternity care for the pregnant woman, both the woman and the foetus might be exposed to maternal health problems and complications. The finding that there was a significant difference in the spatial pattern of maternal morbidity during pregnancy in 2016 was expected. The finding is in line with Asamoh, Moussa, Stastron and Musingui (2011) who reported significant difference between rural and urban areas by asserting that most maternal morbidity and deaths occurred among women that resided in rural areas compared to those in urban areas. This is because there are more maternal health facilities scattered at the urban areas compared to the rural areas which made it difficult for rural women to enjoy quality health care services. The finding was supported by qualitative data collected through FGD which revealed that maternal morbidity was reported more by childbearing women in the rural communities than in the urban communities.

### ***Conclusion***

Women of childbearing age reported more morbidity in the rural areas than women in the urban area during pregnancy, labour/childbirth and postpartum periods. Maternal morbidity was reported more in rural areas than urban areas during pregnancy, childbirth/labour and postpartum period in 2014, 2015 and 2016.

### ***Recommendations***

Government should ensure that maternal health facilities in the rural communities are well equipped and are evenly distributed at peoples' doorstep and provide good road to make sure that every WCA has access to them. The maternal health services should also be free of charge so that women who are poor could also gain access.

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