

## **Incidence of Hypertension among Pregnant Women in Enugu East Local Government Area of Enugu State (2009-2012)**

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### **Abstract**

The purpose of the study was to determine the incidence of hypertension among pregnant women in Enugu East LGA of Enugu state (2009-2012). The study adopted a retrospective descriptive research design. Specifically, four research questions and two null hypotheses guided the study. The retrospective descriptive research design was adopted for the study. The population of the study comprised all pregnant women in Enugu East LGA of Enugu State for a period of four years (2009-2012). A total of 3230 case files were retrieved for the present study. The instrument for data collection was the researchers' developed inventory proforma. Data on systolic over diastolic blood pressure readings at first hospital visit were abstracted and analysed. The research questions were answered using percentages while the regression analysis was used to test the hypotheses at 0.05 level of significance. The results presented in tables and graphs showed very high incidence rate of hypertension that increased from 110 cases per 1000 women in 2009 to 341 cases of hypertension per 1000 women in 2012. Age – hypertension relationship was not statistically significant ( $P = 0.570$ ); though there was an increase with the oldest group (38 – 47 years) contributing 4.6 per cent, 6.4 per cent, 8.4 per cent and 9.4 per cent in 2009, 2010, 2011 and 2012 respectively while the youngest group (18 – 27 years) had the lowest incidence of 2.7 in 2009. Hypertension was statistically higher for women who come from rural setting than for women from urban settings ( $p = 0.016$ ). Based on the findings of the study, the researchers recommended among other things that pregnant and childbearing mothers should check their blood pressure regularly to prevent the incidence of hypertension among this group.

**Keywords:** Hypertension, incidence, pregnant women, blood pressure.

### **Introduction**

Hypertension is a major public health problem and is a leading cause of morbidity and mortality worldwide (Lee, Goyal, Moynfar, & Ebrahim, 2002). Hypertension affects approximately one billion people worldwide and 340 million of these are from economically developing countries (Chobanian, Bakris, Black, Cushman, Green, Izzo, Jones, Materson, Oparil, Wright and Roccella, 2003). They stated that this number is expected to increase to around 1.56 billion people by the year 2025 with about 7.1 million individuals dying each year from hypertension. Hypertension is a main cause of death in adult populations and cardiovascular diseases such as ischaemic heart disease

and stroke (Adika, Joffa & Apiyanteide, 2012). They further asserted that it is quite worrisome that 30 per cent of people who are affected are still unaware that they have hypertension.

Hypertension, also known as high blood pressure (HBP) according to Longe and Blanchfield (2002) implies when the force of blood pushing against the walls of arteries as it flows through them is over 140 over 90 millimetres mercury for adults. They asserted that besides complex environmental and genetic factors that could cause hypertension, other associated conditions include the use of certain prescribed drugs, alcoholism and pregnancy.

Hypertension is the most common medical problem encountered in pregnancy and is a leading cause of perinatal and maternal morbidity and mortality (Nelson-Piercy, 2007; National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy – NHBPEP, 2000). Pregnant women with hypertension are more likely to develop placental abruption, disseminated intravascular coagulation (DIC), cerebral haemorrhage, hepatic failure and acute renal failure (NHBPEP, 2000). It has been estimated that hypertension complicates 2-3% of pregnancies (Gibson & Carson, 2002). Hypertensive disorders during pregnancy are classified into 4 categories, as recommended by the NHBPEP (2000) as: chronic hypertension, preeclampsia-eclampsia, preeclampsia superimposed on chronic hypertension, and gestational hypertension (transient hypertension of pregnancy or chronic hypertension identified in the latter half of pregnancy) widely known as PIH (pregnancy-induced hypertension).

Chronic hypertension is defined by Brooks (2001) as blood pressure exceeding 140/90 mm Hg before pregnancy or before 20 weeks' gestation. When hypertension first is identified during a woman's pregnancy and she is at less than 20 weeks' gestation, Blood Pressure - BP elevations usually represent chronic hypertension (Gibson & Carson, 2002). Chronic hypertension, also regarded as pre-existing hypertension is a strong risk factor for the development of preeclampsia and requires close clinical surveillance (Lowe, Brown, Dekker, Gatt, McLintock & McMahon, 2009). Chronic Hypertension may be either essential or secondary. Essential hypertension is diagnosed in the absence of an identifiable secondary cause (Sharma and Kortas, 2002). Longe and Blanchfield asserted that primary or essential hypertension is due to an unknown cause and make up 90 to 95 percent of the people who have it. Essential hypertension has also been described to be BP greater than 140/90 mmHg preconception or prior to 20 weeks without an underlying cause or BP less than 140/90 entering pregnancy on antihypertensives (Queensland Maternity and Neonatal Clinical Guidelines Program – QMNCGP, 2013). Longe and Blanchfield (2002) stated that the type that occurs as a result of other medical conditions is known as secondary hypertension. Secondary hypertension can be caused by a number of different illnesses including chronic kidney disease (glomerulonephritis, reflux nephropathy and adult polycystic kidney disease), renal artery stenosis, systemic disease with renal involvement (diabetes mellitus, systemic lupus erythematosus), endocrine disorders (phaeochromocytoma, Cushing's syndrome and primary hyperaldosteronism) and coarctation of the aorta (QMNCGP, 2013).

PIH or gestational hypertension as described by Lindheimer, Taler and Cunningham (2008) is characterized by mild to moderate elevation of BP after mid-gestation but without abnormal proteinuria, usually near term (though more severe forms of hypertension have been described, and some of these patients are actually

preeclampsia who shortly thereafter manifest other signs and symptoms of that disorder). Villar, Carroli, Wojdyla, Abalos, Giordano and Ba'aqeel (2006) asserted that although the cause of gestational hypertension is unclear, this entity appears to identify women destined to develop essential hypertension later in life (analogous to the relationship of gestational diabetes to the subsequent development later in life of type 2 diabetes mellitus). They further stated that BP returns to normal, during the immediate puerperium (at which point some re-label the entity transient hypertension). Many of these women are hypertensive in one, some, or all of their subsequent pregnancies.

Preeclampsia is a multi-system disorder characterised by hypertension and involvement of one or more other organ systems and or the fetus (QMNCGP, 2013). Raised BP is common but not always the first manifestation and may also be accompanied by rapid weight gain and edema, appearance of coagulation or liver function abnormalities, and occurs most often in nulliparas. Preeclampsia, pure or superimposed according to Lindheimer, Taler and Cunningham (2008) is the disorder most often associated with severe maternal-fetal-neonatal complications (including fatalities).

Even though the cause of most hypertension is not known, some people have risk factors that give them a greater chance of getting hypertension (Longe & Blanchfield, 2002). Many of these risk factors can be changed to lower the chance of developing hypertension or as part of a treatment program to lower blood pressure. Risk factors for hypertension include age, geographic location (urban/rural), obesity, inactive lifestyle and heavy alcohol consumption (Longe & Blanchfield, 2002, Chobanian et al, 2003).

The incidence of hypertension increases with advancing age to the point where more than half of people 60–69 years of age and approximately three-quarter of those 70 years of age and older are affected (Burt, Whelton, Roccella, Brown, Cutler, Higgins, Horan & Labarthe 1995). The age-related rise in Systolic Blood Pressure is primarily responsible for an increase in both incidence and prevalence of hypertension with increasing age (Franklin, Gustin, Wong, Larson, Weber, Kannel & Levy, 1997).

Geographic location plays an important role in incidence of hypertension. According to Okpara and Okpara (2010), the incidence of hypertension is well known to vary from place to place, whereby, higher figures can be obtained in urban relative to rural settlements. Several studies attest to rural versus urban differences in blood pressure levels throughout sub-Saharan Africa (Onwuchekwa, Mezie-Okoye & Babatunde, 2012). The reported incidence of hypertension in rural studies in the 1970s and 1980s was generally low (Seedat, 2000). In a recent study of Port Harcourt, the urban capital city of Rivers State, Nigeria, incidence of hypertension was 40.8%. Such changes are probably the result of acculturations which can be expected to proceed at different rates in different communities. It is thought that urban societies have higher rates of hypertension when compared with the rural areas (Onwuchekwa, Mezie-Okoye & Babatunde, 2012). Reasons offered for rural - urban differences in hypertension include change in diet with higher salt and calorie intake and reduced potassium intake (Opie & Seedat, 2005). Other factors include sedentary life style and more psychosocial stress which are worse in urban dwellers.

Associated risk factors for hypertension include ignorance of the presence of disease, poor educational attainment, poverty as well as limited access to medical care (Okpara and Okpara, 2010). However, the present study shall focus on factors influencing hypertension such as age and location. Since hypertension in pregnancy poses

a risk to the life and wellbeing of mothers and their children, it requires attention. It is therefore necessary to examine the incidence of hypertension in pregnant women.

Incidence is the number of new cases of a particular disease conditions occurring in a defined population during a specific period of time (Park, 2009). Onwasigwe (2010) asserted that incidence indicates the rate at which new diseases occur in a defined previously disease free population. Park further opined that incidence measures the rate at which new cases are occurring in a population and it is not influenced by the duration of disease. In other words, incidence measures the probability that healthy people will develop disease or health related problems during a specified period of time and can be determined by following a group of people and finding the rate at which new cases of a disease appear (Onwasigwe, 2010).

Evans (1997) identified two measure of incidence. They are incidence risk and incidence rate. Incidence risk according to Evans is also known as the cumulative incidence which provides an estimate of the probability that an individual will develop a disease during a specified period of time. On the other hand incidence rate is known as the force of morbidity or incidence density. According to Evans, incidence rate is considered to be a measure of the instantaneous rate of development of disease in a population. The incidence rate is likely to be a more accurate measure of disease incidence than the incidence risk because it takes into account fact that in most studies, not everyone is followed –up for all of the time. In the context of this study, incidence will be considered as the number of new cases of malaria infections in a specific population.

Incidence as well as the trend of hypertension in Enugu East LGA can be determined using the rate. Rate is the number of times something happens or number of examples o something or events within a certain period (Hornby, 2010). Lucas and Gilles (2007) defined rate as the number of times a particular disease occurs in a given population. The incidence rate will facilitate the estimation of the trend of hypertension. Trend, according to Hornby (2010) is a general direction in which a situation is changing or developing. trend of hypertension will imply the periodic development of hypertension in the area of study. The index number was used to establish the trend of hypertension for a period of 4 years in Enugu East LGA of Enugu State.

Enugu East LGA is one of the seventeen Local Government Areas in Enugu state in South-East Nigeria. It is located in the Enugu East senatorial zone and is one of the three LGAs that make up the Enugu urban, that is, the administrative capital of the state. It is located between coordinates 6°32'N 7°32'E and 6.533°N 7.533°E and covers a total of 383 Km<sup>2</sup>. The LGA is predominantly urban alongside some rural communities. It comprises four major towns including Trans-Ekulu, Emene, Abakpa-Nike and Ugbo-odogwu. The people are Ibos and are mainly civil servants. Others are traders, farmers or artisans. Despite the large land mass of Enugu East LGA, it had been poorly populated until recent times. Consequently, of all three LGAs that make up the Enugu Urban, it has the least number of Health centres, with only five government health facilities including the National Orthopaedic Hospital (Abakpa), a dental clinic (Trans-Ekulu), and three health centres at Ugbo-Odogwu, Iji-Nike and Abakpa. There are many private health facilities in the local government. However, many of the inhabitants could not assess the private health facilities due to high cost of their bills and poor administrative processes. Ejiagha, Ojiako and Eze (2012) identified Emene as one of the most depraved areas in the

state in terms of availability of health care. The people have to travel distances of over 10 kilometres to the neighbouring Enugu North LGA to access any of the twenty-three government-owned health centres located there. Considering the effects urbanization could have on the people's health alongside the inadequacy in health care facilities in the area, it becomes essential to study the incidence of hypertension among pregnant women in the LGA. To the best knowledge of the researcher, no study exists that focused on the incidence of hypertension in pregnant women in Enugu East LGA, Enugu State. Thus, this study is poised to fill part of the gap. In the bid to accomplish this task, five principal research questions were proposed thus:

1. What is the incidence rate of hypertension among pregnant women in Enugu East LGA of Enugu State, 2009 - 2012?
2. What is the incidence of hypertension among pregnant women in Enugu East LGA of Enugu State, 2009 – 2012 based on age?
3. What is the incidence of hypertension among pregnant women in Enugu East LGA of Enugu State, 2009 – 2012 based on location?
4. What is the trend of hypertension in Enugu East LGA of Enugu State, 2009 - 2012?

### **Hypotheses**

**H<sub>0</sub> 1** – There is no statistical difference in incidence of hypertension among pregnant women in Enugu East LGA of Enugu State based on age.

**H<sub>0</sub> 2** – There is no statistical difference in incidence of hypertension among pregnant women in Enugu East LGA of Enugu State based on location.

### **Methods**

The retrospective descriptive survey design was adopted for this study. Retrospective surveys involve collecting data about past events and is useful as a means of measuring change for either explanatory or descriptive purposes (De Vaus, 2006). Descriptive surveys, according to Cohen, Manion and Morrison (2011) sets out to describe and to interpret what is, gathers data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events. This study design was preferred because of its suitability in carrying out epidemiological studies and is widely used in abstracting data from records on past occurrences.

The population of the study consisted of all pregnant women who attended health facilities in Enugu East LGA of Enugu state. According to the monitoring and Evaluation department, Enugu East LGA, there are 37 health facilities (32 private and 5 public facilities). A total number of 3230 case files were retrieved for the study. All case files available were utilized for the study and information on age, systolic and diastolic blood pressure readings at first clinic visit were abstracted and used for the present study. The study covered a period of 4 years (2009 – 2012).

The instrument for data collection was the researcher-designed inventory proforma. The face validity was established through the judgement of three lecturers in the department of Health and Physical Education, University of Nigeria, Nsukka. It was

employed to abstract data on age, location, systolic and diastolic blood pressure readings at first hospital visit from the case files.

Data generated were coded and analysed using the statistical package for social sciences (SPSS V.15). The data were analyzed using univariate and bivariate statistics where appropriate. The research questions were answered using descriptive statistics of frequency count and percentages. The tests of significance was based on 95% confidence interval ( $p < 0.05$ ) using the linear regression analysis.

## Results

The results are presented in tables and corresponding charts with brief interpretation of its content.

**Table 1**  
**Incidence Rate of Hypertension among Pregnant Women (N = 3230)**

Year	f	%	IR (per 1000)
2009	338	10.5	110
2010	401	12.4	149
2011	479	14.8	213
2012	586	18.1	341

Table 1 shows that the incidence rate of hypertension among pregnant women in Enugu East LGA increased from 110 cases per 1000 women in 2009 to 341 cases of hypertension per 1000 women in 2012.

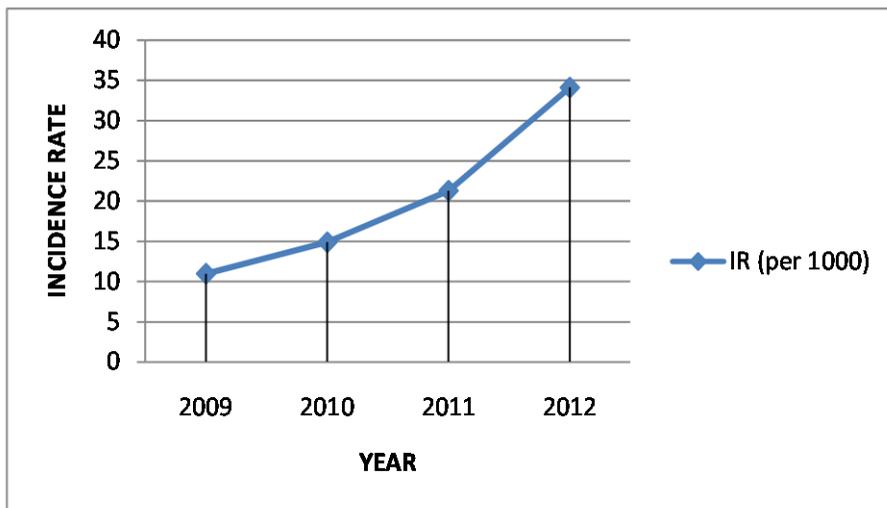


Figure 1 shows the steady increase in the incidence of hypertension among pregnant women from 2009 – 2012.

**Table 2**  
**Incidence of Hypertension among Pregnant Women Based on Age (N = 3230)**

Year	18 - 27(years)		28- 37(years)		38 – 47 (years)	
	f	%	F	%	f	%
2009	87	2.7	102	3.2	149	4.6
2010	94	2.9	99	3.1	208	6.4
2011	97	3.0	112	3.5	270	8.4
2012	139	4.3	142	4.4	305	9.4

Table 2 shows that incidence of hypertension increased with age. The oldest group (38 – 47 years) contributed 4.6 per cent, 6.4 per cent, 8.4 per cent and 9.4 per cent in 2009, 2010, 2011 and 2012 respectively while the youngest group (18 – 27 years) had the lowest incidence of 2.7 in 2009.

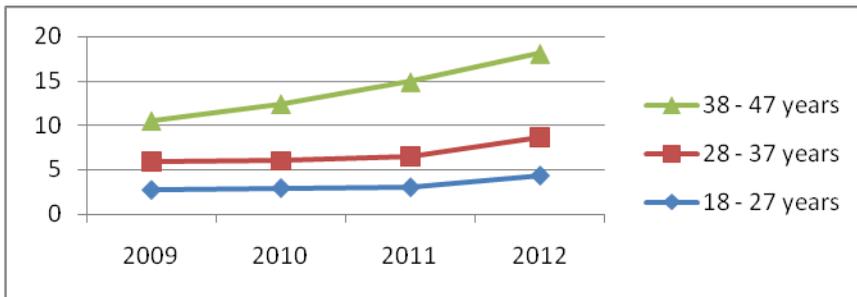


Figure 2 shows that incidence of hypertension was higher in older women than in the younger women.

**Table 3**  
**Incidence of Hypertension among Pregnant Women Based on Location (N = 3230)**

Year	Urban		Rural	
	f	%	f	%
2009	208	6.4	130	4.0
2010	238	7.4	163	5.1
2011	256	7.9	223	6.9
2012	301	9.3	285	8.8

Table 3 shows that the incidence of hypertension is higher for women who come from rural setting than for women from urban settings. There was also a steady increase in the incidence of hypertension in the rural women.

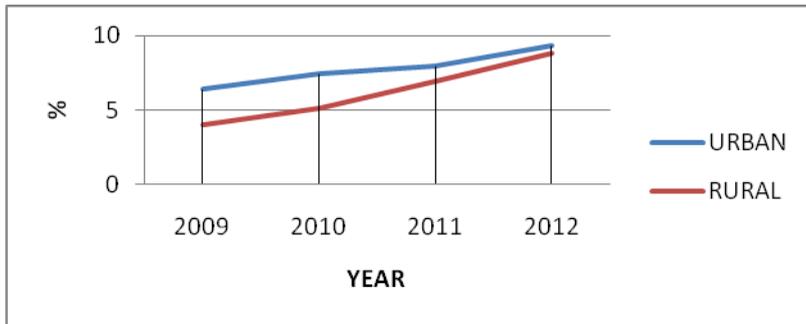


Figure 3 shows that there is a yearly decrease in the difference between the incidence of hypertension of pregnant women from urban and rural settings.

**Table 4**  
**Incidence Trend of Hypertension among Pregnant Women**

Year	f	Index number
2009	338	100
2010	401	119
2011	479	142
2012	586	173

Table 4 shows an upward trend in the incidence of hypertension among pregnant women in Enugu East LGA. Using 2009 as base line index number, the trend increased to 173 by 2012.

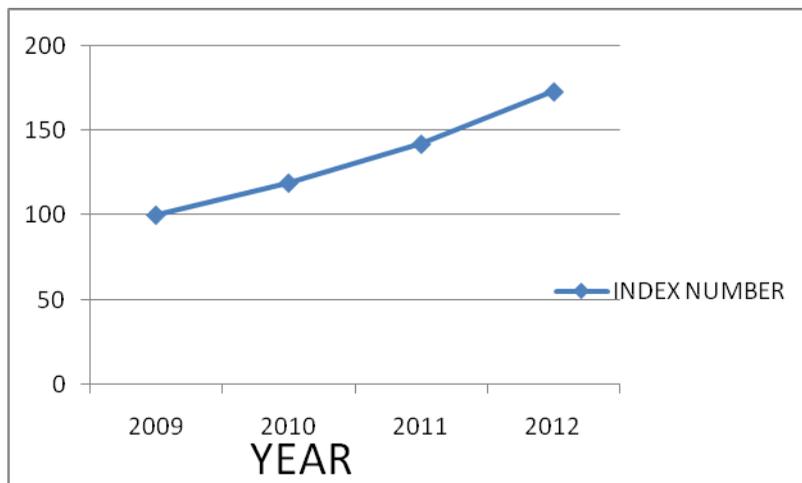


Figure 4 shows a upward trend in the incidence of hypertension among pregnant women in Enugu East LGA between 2009 and 2012.

**Table 5**  
**Summary of Regression Analysis of Incidence of Hypertension Based on Age.**

Model		Sum of Squares	df	Mean Square	F	Sig.	Decision
1	Regression	9601.719	2	4800.860	1.036	.570	Accept
	Residual	4632.281	1	4632.281			
	Total	14234.000	3				

Table 5 shows an F value of 1.036 with 2 degrees of freedom and a P-value of 0.570. The P-value obtained is greater than 0.05 and indicates that the variations observed in the incidence of hypertension according to age are not due to chance. Thus, the null hypothesis is accepted.

**Table 6**  
**Summary of regression analysis of incidence of hypertension based on location.**

Model		Sum of Squares	Df	Mean Square	F	Sig.	Decision
1	Regression	4401.466	1	4401.466	62.307	.016*	Reject
	Residual	141.284	2	70.642			
	Total	4542.750	3				

Table 6 shows an F value of 62.307 with 1 degree of freedom and a P-value of 0.016. The P-value obtained is less than 0.05 and indicates that the variations observed in the incidence of hypertension according to age may be due to chance. Thus, the null hypothesis is rejected.

### Discussion

Discussion is hereby presented according to the research questions:

1. Incidence rate of hypertension among pregnant women in Enugu East LGA.
2. Incidence of hypertension among pregnant women in Enugu East LGA based on age
3. Incidence of hypertension among pregnant women in Enugu East LGA of Enugu State based on location
4. Incidence trend of hypertension among pregnant women in Enugu East LGA.

### Incidence Rate of Hypertension among Pregnant Women in Enugu East LGA.

Table 1 showed that the incidence rate of hypertension among pregnant women in Enugu East LGA increased from 110 cases of hypertension per 1000 pregnant women in 2009 to 341 cases of hypertension per 1000 women in 2012. This result was not surprising and quite alarming. This is due to the fast rate at which the incidence of hypertension increased. In a similar study, Onwuchekwa, Mezie-Okoye and Babatunde (2012) acknowledged that the prevalence of hypertension has shown an alarming rate of increase from a 9.8 per cent to over 40 per cent in Port Harcourt city. This sharp increase can be

attributed to the fast urbanization of the area as well as the chronic job strain that is the order of the day in Enugu urban. Adika, Joffa and Apiyanteide (2011) asserted that the numbers of hypertension cases are continuously increasing each year alongside risks that may be associated with the chronic work strain.

### **Incidence of Hypertension among Pregnant Women in Enugu East LGA Based on Age**

Table 2 showed that incidence of hypertension increased with age. The oldest group (38 – 47 years) contributed 4.6 per cent, 6.4 per cent, 8.4 per cent and 9.4 per cent in 2009, 2010, 2011 and 2012 respectively while the youngest group (18 – 27 years) had the lowest incidence of 2.7 in 2009. This finding was plausible and in line with some research assertions. Franklin et al(1997) stated that the age-related rise in Systolic BP is primarily responsible for an increase in both incidence and prevalence of hypertension with increasing age. Thus, Smith and Mensah(2003) asserted that age has been established as an independent risk factor for hypertension and cardiovascular diseases.

The regression analysis of no statistical difference in incidence of hypertension among pregnant women based on age had an F value of 1.036 with 2 degrees of freedom and a P-value of 0.570. The null hypothesis was accepted. This implies that age is not a factor of hypertension among pregnant women within the age range studied. A previous study however indicated that age becomes a factor in the prevalence of hypertension in older population. Burt et al (1995) stated that the prevalence of hypertension increases with advancing age to the point where more than half of people 60–69 years of age and approximately three-fourths of those 70 years of age and older are affected.

### **Incidence of Hypertension among Pregnant Women Based on Location**

Table 3 showed that the incidence of hypertension is higher for women who come from rural setting than for women from urban settings. There was also a steady increase in the incidence of hypertension in the rural women. This result was expected and in consonant with findings from previous studies. Okpara and Okpara (2000) affirmed that there exist differences in the incidence of hypertension based on location with higher values being obtainable in the urban areas. According to Onwuchekwa, Mezie-Okoye and Babatunde (2012) changes due to location are probably the result of acculturations which can be expected to proceed at different rates in different communities. They further stated that it is thought that urban societies have higher rates of hypertension when compared with the rural areas, but in recent times, rural to urban migration have been shown to markedly increase the risk of hypertension.

The regression analysis of no statistical difference in incidence of hypertension among pregnant women based on location had an F value of 62.307 with 1 degree of freedom and a P-value of 0.016. The P-value obtained is less than 0.05 and indicates that the variations observed in the incidence of hypertension according to age may be due to chance. Thus, the null hypothesis was rejected. The implication of this finding is that location is a factor for determining the risk of having hypertension. This is in line with the assertion of Onwuchekwa, Mezie-Okoye and Babatunde (2012) that type of work, sedentary lifestyles and diet which are cultural characteristics could influence the risks of having hypertension.

### **Incidence Trend of Hypertension among Pregnant Women in Enugu East LGA.**

Table 4 showed an upward trend in the incidence of hypertension among pregnant women in Enugu East LGA. Using 2009 as base line index number, the trend increased from 100 to 173 by 2012. The upward trend was expected. This is due to inadequacies in availability of health facilities in the area as well as a fast acculturation process taking place there. Another important factor is ignorance. Chobanian et al (2003) asserted that it is quite worrisome that 30 per cent of people who are affected are still unaware that they have hypertension. NHBPEP(2000) stated that most people do not seek specialized health care even when they suspect something could be wrong. Incidentally, it is only during antenatal care hospital visits that most women get BP checks.

### **Conclusion**

Based on the finding of the study and discussion, the following conclusions were made:

1. The incidence rate of hypertension among pregnant women increased from 110 cases of hypertension per 1000 pregnant women in 2009 to 341 cases of hypertension per 1000 women in 2012.
2. The incidence of hypertension among pregnant women increased with age though the difference between the age groups was not significant.
3. The incidence of hypertension among pregnant women was significantly higher in women in the urban settings than in the women from the rural settings.
4. An upward trend was observed in the incidence of hypertension among pregnant women between 2009 and 2012.

### **Recommendations**

Based on the findings and recommendations, the following recommendations were made;

1. Pregnant and childbearing mothers should check their blood pressure regularly.
2. Health educators and other health professionals should carry out more awareness campaigns on hypertension, its factors, prevention and treatment.
3. Seminars and workshops should be organized for all pregnant and childbearing mothers to improve their utilization of MCH services.

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