FACTORS ASSOCIATED WITH THE OCCURANCE OF POST PARTUM OBESITY: A SURVEY OF WOMEN IN YENAGOA, LOCAL GOVERNMENT AREA, OF BAYELSA STATE

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CERTIFICATION

This thesis on Factors Associated with Postpartum Obesity: A Survey of Women in Yenagoa, Yenagoa LGA, Bayelsa State, Nigeria written by **Timidi Iniebi Timidi (20094748668)** has been certified as meeting the requirements for Masters Degree projects in Public Health Department, Federal University of Technology, Owerri.

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DEDICATION

This research work is dedicated to the ALMIGHTY GOD who for his grace and strength has helped me these past years despite all odds, to my lovely mother, sister, Madam Bebedonghen Timidi who never relented in her psychological, emotional and financial support even in her sick bed, my daughter and husband; my hero for their untiring support.

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ABSTRACT

The aim of this study is to ascertain the relationship between age parity, breastfeeding practices, mode of delivery, occupation of mother and postpartum obesity. This study was carried out in three (3) Primary Health Centers, a Federal Medical centre (FMC), and Niger Delta University Teaching Hospital (NDUTH) all in Yenagoa, Local Government Area of Bayelsa State, Nigeria. A total of 400 postpartum mothers of 18-49years were randomly selected and questionnaires were administered. IBM Statistical package for Social sciences (SPSS) version 20.0 was used to analyze the data. The average weight before pregnancy was 76.83+/-13.69kg. Mean post pregnancy weight was 74.54+/-13.53kg and mean height of 1.60+/-0.28 meters. Majority of the respondent 116(29.0%) have BMI of 25.0-29.9kg/m^2, meaning that majority were overweight with only (6.3%) underweight with BMI of less than 18.5kg/m^2. About 182(45.5%) of them were obsessed with BMI≥30.0kg/m^2. Based on these the result shows , the result has no significant relationship between parity, occupation of mother and the Body Mass Index of postpartum mothers; but

there is a significant relationship ($p < 0.05$) between age of mother(p=0.00),practice of breastfeeding (p=0.02) and method of delivery of baby (p=0.00) with Body Mass Index of mother. Pregnancy has been cited as a contributor to overweight in women. This is as a result of excessive weight that is gained during pregnancy. It shows that indeed breastfeeding exclusively for 6-months and continuous breastfeeding till 2 years, age of mother and having normal baby delivery, helps to maintain a normal Body Mass Index of the mother.

Keywords: *A*ge parity; Breastfeeding practices; Mode of delivery; Occupation of mother; Postpartum obesity and Women in Yenagoa.

CHAPTER ONE

1.1 BACKGROUND OF THE STUDY

Obesity is a major public health problem throughout African with increasing prevalence in woman of childbearing age. Pregnancy and postpartum period is time of increase vulnerability to weight gain and body composition changes in women and these could be as a result of breastfeeding method, age and occupation of mother. Although most woman have a desire to return to their pre-pregnancy weight following childbirth (krummel DA, 2007); very few achieve this goals. Excessive postpartum weight retention is also recognized as a strong contributing factor to the fore development of overweight and obesity. (Gore SA, Brown DM, West DS, 2003, Linne Y, Dye L, Barkeling B, 2004, Rooney BL, Schauberger CW, 2002) and this is directly associated with obesity related illness such as type 2 diabetes and cardiovascular disease (Rooney BL,Schauberger CW, Mathiason MA, 2005). Furthermore excessive weight gained in one pregnancy can have a cumulative effect on weight gain in subsequent pregnancies; Thus amplifying trajectory of weight gain and risk of obesity in a woman's lifetime (Gore,*et al*, 2003).Little is known about the trajectory of postpartum weight change, particularly in relation to breastfeeding. Although breastfeeding is associated with health benefit for both mother and baby (Schwarz B, Ray RM, Stuebe AM, Allison MA, Ness RB, Freiberg MS, Cauley JA, 2009), its role in postpartum weight management remains.

Theoretically, breast feeding should promote weight loss due to increased energy cost of lactation. A recent report by the National Institute for Health and Clinical Excellence (National Institute for Health and Clinical Excellence 2010) highlighted the lack of evidence regarding the role of breastfeeding in weight management, with a key research need highlighted to determine whether breastfeeding can help women to achieve a healthy weight.

With obesity currently regarded as public health problem, this study seeks to find out if age, parity, breastfeeding practice, mode of delivery and occupation of mother are some of the underlying factors.

1.2 STATEMENT OF THE PROBLEM

It is has been observed that Nigerian women tend to increase in weight due to the number of children given birth to, the mode of delivery, number of months or years a mother breastfeeds, the age of the mother, and occupation of mother. But it is not clear if these factors mentioned are actually the cause of the weight gain. This research tends to find out if there is actually a link or relationship between the age of a mother, parity, breastfeeding practices, mode of delivery and the occupation of mother with postpartum obesity.

1.3 MAIN OBJECTIVE OF THE STUDY

The purpose of the study is to establish the phenomenon that postpartum obesity has a relationship with age, parity breastfeeding practices, mode of delivery, occupation of mother, time elapsed since delivery.

Specific objectives of the study

1. To determine the relationship between postpartum obesity and age.
2. To determine the relationship between postpartum obesity and parity.
3. To determine the relationship between postpartum obesity and breastfeeding practices.
4. To determine the relationship between postpartum obesity and mode of delivery.
5. To determine the relationship between postpartum obesity and occupation of mother.

RESEARCH QUESTIONS

1. Is there a relationship between the postpartum obesity and parity of a mother?
2. Is there a relationship between postpartum obesity and the age of a mother?

3. Is there a relationship between postpartum obesity and breastfeeding practices?

4. Is there a relationship between postpartum obesity and mode of delivery of a mother?

5. Is there a relationship between postpartum obesity and the occupation of a mother?

1.4 RESEARCH HYPOTHESES

1. There is an increase in postpartum obesity in mothers with increase Parity than those with less parity.

2. The Age does not have effect on the postpartum obesity of a mother.

3. Postpartum mothers that practice complimentary feeding are more obesecompared to those that practice exclusive breastfeeding.

4. The type or mode of Delivery does not have effect on the postpartum obesity of a mother.
5. The occupation of a mother does not have effect on the postpartum obesity of a mother.

1.5 SIGNIFICANCE OF THE STUDY

The significance of this study is that the society will have knowledge on how breast feeding practices can contribute to postpartum weight gain or obesity. Also if there is actually a relationship between age, parity, mode of delivery, occupation of mother and obesity. This can help one choose best practices during and after delivery.

1.6 SCOPE OF THE STUDY

This is a survey study. This study will examine the relationship between obesity and age, parity, breastfeeding practices, mode of delivery, occupation of mother over different time intervals. This study is delimited to 5 Hospitals in Yenagoa Local Government Area, Bayelsa State, Nigeria, where a study will be carried out on postpartum obesity in relation to age, parity, breastfeeding practices, mode of delivery, occupation of mother, time elapsed since delivery. The hospitals are located in one Local Government Area. Primary Health Centre,Agudama, Family Support programmes Clinic (FSP), Primary Health

Centre,Biogbolo, Federal Medical Centre (FMC), Niger Delta Teaching Hospital (NDUTH), All in Yenagoa Local Government Area, Bayelsa State.

1.7 DEFINITION OF VARIABLES

Concept/ variables	Nominal/conceptual Definition.	Operational definition
Postpartum	After giving birth or delivery	6 weeks after giving birth/delivered a child.
Obesity	A person's body mass index	This is the weight of person compared to his/her age.
Age	How old a person is.	This is the number of days, weeks months or years a person have lived after being delivered
Parity	The total number of children a person has given birth to either dead or alive.	How many children a person have delivered/giving birth (a) One (1) (b) Two (2) (c) Three (3) (d) Four (4) (e) Five and above
Breastfeeding Practice	If a mother practices exclusive breastfeeding or complimentary feeding for the first six months.	The type of breastfeeding method a mother practices. (a) Only breast feeding for first six months (b) Only breast feeding for first 5months (c) Only breast feeding for first 4 months (d) Only breast feeding for first 3 months (e) Complementary feeding
Mode of delivery	This is the way/ pattern in which a person delivers or gives birth.	Pattern of delivery (a) Caesarean session (b) Normal delivery
Occupation of mother	This is the kind of job the mother does for a living	What the woman does for a living. (c) Full housewife (d) Teacher (e) Civil servant (f) Others

CHAPTER TWO

LITERATURE REVIEW

The increasing prevalence of obesity worldwide has prompted the World Health Organization to designate obesity as one of the most important global Public Health treats (WHO 2002). Obesity is defined as a body mass index (BMI≥30). It is generally considered to be a disease of affluent nations. Obesity in pregnancy has long been associated with significant adverse fetomaternal outcomes in studies done in Western countries (Vinayagam D, Chandraharan E, 2012, Heslehurst N, Simpson H, Ells LJ, 2008, Verdiales M, Pacheco C, Cohen WR,2009). In African societies known more for poverty and disease, it is hardly surprising that obesity in pregnancy has not received much attention from researchers. However, recent hospital based studies show that the prevalence of obesity in pregnancy could be significant in urban communities in Africa (Chigbu CO, Ajah LO, 2011, Ezeanochie MC, Ande AB, Olagiyi BN, 2011).

Maternal weight gain during pregnancy depends to some extent on pre-pregnancy weight (Zhang S, Rattanatray L, Morrison JL, Nicholas LM, Lic S, MacMillan IC, 2011) and abnormal weight gain in pregnancy has been associated with adverse outcomes. A recent systematic review showed that excessive weight gain in pregnancy was associated with macrosomia and postpartum weight retention, while inadequate weight gain was associated with

preterm delivery and infant with low birth weight. (Viswanathan M, Siega-Riz AM, Moos M, 2003).

Postpartum obesity is the excessive weight gained after the successful expulsion of the product of pregnancy of a woman. Postpartum period is an important and interesting period in the life of the nursing mothers. It is a period in a women's life that is characterized by the return of pelvic organs to non-gravid state, reversal of metabolic change of pregnancy and establishment of lactation, (Ekwempu CC Jr, Otubu JA, 2006, Howie PW,1999, Arulkumaran S, Tamizian O, 2004) a period of lifestyle modification, and psychological adjustment from pregnancy (Arulkumaran, *et al*, 2004), a period of exclusive breastfeeding, a period of emotional support by relatives and friends, a time to eat and merry for God's blessing and sometimes a period of depression and altered self-image (Okeudo C, Ezem BU, Ojiyi EE,2012) . In Nigeria and other developing countries, factors such as illiteracy, poverty, nature, customs and cultural beliefs with paucity of health care facilities and personnel, further compound the problem of postpartum obesity in women (Howie, 1999). The effect of age, parity, breastfeeding practices, mode of delivery and occupation of mother on postpartum obesity is what this research seeks to find.

Overweight and obesity are increasing dramatically among US, adults. In the period between National Health Examination Survey111(1988-1994), and the

National Health and Nutrition survey (1994-2000), there was 97.6% increase in the prevalence of obesity (Body mass index (BMI≥ 27) among adults 20-74 years of age (Flagal KM,Carroll MD, Ogden CL, Johnson CL, 2002). This rise in obesity could have troubling consequences. Obesity has been found to increase the risk of diabetes (Colditz GA, Willett WC, Rotnitzky A, Manson JE, 1995), heart disease (Harris TB, Ballard-Barbasch R, Madans J, Makuc DM, Feldman JJ, 1993) and cancer(Terry PD,Miller AB, Rohan TE, 2002) etc. The adverse effect of obesity may be more severe for women than men. For example obesity has also been found to be associated with developing asthma in women but not in men (Beckett WS, Jacobs DR Jr, Yu X,Iribarren C, Williams OD, 2001). Further more women are more likely to be obese, with 34% of women obese compared with 27.7% of men (Flagal, *et al*, 2002). In addition, women are twice as likely as men to experience a major weight gain (an increase in BMI>5kg/m^2) over a 10-year period (Williamson DF, Kahn HS, Remington PL, Ands RF, 1990). Women age 25-34 have the greatest risk of major weight gain compared with men of all ages and compared with older women (Williamson, *et al*, 1990). Studies have shown that minority women are particularly vulnerable to obesity (Flagal, *et al*, 2002, Williamson, *et al*, 1990). The prevalence of obesity is the highest for non Hispanic African American women (49.7%) compared with white women (30.1%) and higher among African American women than among any ethnic group (Flagal,*et al*, 2002). Furthermore, African

American women are 40% more likely than any white woman to experience a major weight gain during adulthood (Williamson, *et al*, 1990). Thus obesity with all its associated health risks, present a particular problem for women and minority women are most at risk. Besides young adulthood appears to be a time of specific vulnerability for women to experience significant weight gains, which may magnify the problem of obesity (Flagal,*et al*, 2002).

The average estimates of weight retention associated with pregnancy are small, ranging from -0.27kg to 3kg, these modest changes have led many investigators to conclude that pregnancy has little effect on weight retention or weight gain during young adulthood. In the largest sample followed, Greene, Smiciklas-Wright, Scholl and Karp (Greene GW, Smiciklas-Wright H, Scholl TO, Karp RJ, 1988) examined more than 7,000 women from the beginning of one pregnancy to the beginning of a subsequent pregnancy, majority (73%) weighed more at the at the onset of the second pregnancy, and average inter-pregnancy weight change was +3kg. On the other hand Harris, Ellison, Holliday and Lucassen (Harris HE, Ellison GT, Holliday M, Lucassen E, 1997), controlled for age related gain when they measured body weight from the beginning of a first pregnancy to the beginning of a second pregnancy and found the average weight change between pregnancies to be -0.27kg. They concluded that weight gain is not significantly affected by pregnancy. Furthermore, Harris, Ellison,

Clement (Harris HE, Ellison GT, Clement S, 1999) followed a similar sample for 2.5years postpartum, the average weight gain over prepregnancy weight was 0.5kg.

The child bearing years are an important life stage for woman that may result in substantial weight gain leading to the development of obesity. When compared with other age groups, US women, aged 35 to 44years have experienced the greatest increase in obesity prevalence in the past 45 years (Flegal, *et al,* 2002). Furthermore, according to the center for Disease Control and Prevention, 45% of women begin pregnancy overweight or obese, up from 24% in 1983. Gestational weight gain is also higher than before, with 43% of pregnant women gaining more than recommended.

Maternal overweight and obesity is the most common high-risk obstetric condition and is associated gestational diabetes mellitus, hypertensive disorders, and newborn macrosoma, among other perinatal complications (Catalano PM, 2007). Women who are already over-weight or obese before a first pregnancy tend to retain or gain more weight after pregnancy than average weight woman (Gunderson EP, Abrams B, 1999, Billewicz WZ,1970, Gunderson EP, Murtaugh MA, Lewis CE, 2004, Rosenberg L, Palmer JR, Wise LA, 2003), despite larger newborns and wider variability in gestational weight gain. Weight

gain before, during, and after pregnancy not only affects the current pregnancy but may also be a primary contributor to the future development of obesity in women during midlife and beyond (Rooney, *et al*, 2005, Linne Y, Dye L, Barkeling B, 2003, Gunderson EP, Sternfeld B, WellonsMF,Whitmer RA, Chiang V, Quesenberry CP Jr, Lewis CE, Sidney S, 2008).

Evidence consistently shows that excessive gestational weight gain contributes to higher postpartum body weight; however, higher maternal body size before pregnancy and biologic factors are also important (Gunderson EP,Rifas-Shiman SL, Oken E, 2008, OkenE, Taveras EM, Popoola FA, 2007, Parker JD, Abrams B, 1993, Olson CM, Strawderman MS, Hinton PS, 2003). For example, the age at menarche and a short interval from menarche to first birth may be as important as high gestational weight gain to the development of overweight after pregnancy(Gunderson EP, Abrams B, Selvin S, 2000). Being heavy before a first pregnancy has important implications for long-term persistent weight changes. Most studies have examined the independent relationships of pregravid body size, gestational weight gain, and parity to postpartum weight retention with conflicting results. These traits were first proposed in the 1950s and again in the 1970s as important correlates of weight changes after pregnancy; Billewicz EP, (1970) and McKeown T and Record RG, (1957), however stated that, the joint influences of parity and pregravid body size on long-term weight changes have been examined in only a few large epidemiologic studies with

sufficient numbers of primiparas across all BMI groups. Billewicz, (1970), in his studies found out that gestational weight gain, primiparity, and maternal body size before pregnancy jointly influence long-term postpartum weight retention and the development of over-weight and obesity among women of childbearing age (Gunderson, *et al* 2004, Rosenberg , *et al* 2003).

According to previous studies, overweight and obese women are two to six times more likely to exceed the weight gain recommendations during pregnancy (Brawarsky P, Stotland NE , Jackson RA, 2005, Wells CS, Schwalberg R, Noonan G, 2006) than other BMI groups. These women are also predisposed to higher postpartum weight gain and retention after pregnancy. Moreover, the incidence of high birth weight increases with higher gestational weight gain among average and high maternal BMI groups (Cogswell ME, Serdula MK, Hungerford DW, 1995). According to the institute of Medicine, Obese women are also more likely to give birth to macrosomic infants, even with lower average pregnancy weight gain (Brawarsky, *et al*, 2005, Gunderson EP, Abrams B, Selvin S, 2001) , and normal glucose tolerance. Some evidence indicates that gestational weight gain below 15 lbs in obese women may lower the risk of large-for-gestational age infants,(Jensen DM, Damm P, Sorensen B, 2003, Kiel DW, Dodson EA, Artal R, 2007).

Gestational weight gain is strongly positively correlated with maternal weight change from preconception to beyond 6 months postpartum and exerts long-term effects on maternal body weight (Ohlin A, RossnerS, 1990, Boardley DJ, Sargent RG, Coker AL, 1995,Kac G, Benicio MH, Velasquez-Melendez G, *et al* 2004). In multiple linear regression models, total gestational gain has accounted for 20% to 35% of the variability in the weight change (Gunderson EP, *et al*, 1999, Ohlin, *et al*, 1990, Boardley, *et al*, 1995, Kac G, *et al*, 2004). Gunderson and colleagues(Gunderson EP, Abrams B, Selvin S, 2000) reported that gestational gain above the recommended levels was associated with a threefold higher risk of becoming overweight after pregnancy (BMI ≥26) among women who were under or average weight before pregnancy in a large, multi-ethnic cohort.

Although gestational weight gain is linked to postpartum weight retention, primiparity and larger body size before pregnancy exert important influences. According to Institute of Medicine, findings on pre-gravid body size and primiparity have been inconsistent. Women who are overweight or obese before pregnancy are generally more likely to have excessive as well as inadequate gestational weight gains (Brawarsky, *et al*, 2005). Their accelerated pregravid weight gain trajectories and other factors may make overweight women more susceptible to substantial weight gain related to pregnancy, as well as more severe levels of obesity in midlife.

In observational epidemiologic studies, the average weight change from preconception to the first year postpartum is referred to as “postpartum weight retention.” Postpartum weight retention includes the weight gain during gestation (preconception through gestation), early postpartum weight loss (delivery to 6 weeks postpartum), and later postpartum weight changes (after 6 weeks postpartum). Few studies have obtained serial measurements during the 12 to 24 months postpartum to assess patterns of weight change (ie, weight loss versus gain).

Average postpartum weight retention (preconception to 6–18 months postpartum) is relatively small, ranging from 0.5 to 1.5 kg based on self-reported pregravid weights(Ohlin A,*et al*, 1990, Olson , *et al*, 2003, Greene , *et al*, 1988,Schauberger CW, Rooney BL, Brimer LM, 1992, Keppel KG, Taffel SM, 1993. Kac G, Benicio MH D’Aquino, Valente JG, 2003). Never-the less, the variability in postpartum weight change is large; 13% to 20% of women are 5 kg or more above their preconception weight by 1 year postpartum (Ohlin, *et al*,1990, Greene ,*et al*, 1988, Schauberger , *et al*, 1992, Keppel, *et al*, 1993). The weight increases observed among black women versus white women in surveys may reflect differences in social, cultural, and behavioral factors rather than pregnancy itself. Long-term postpartum weight retention (beyond 1 to 2 years postpartum) has been examined in relatively few studies (Billewicz, 1970, Gunderson,*et al*, 2001, Maddah M, Nikooyeh B, 2008). Some evidence

indicates that both gestational weight gain and weight retention at 1 year postpartum are directly associated with maternal body weight and overweight status decades after pregnancy(Gunderson,*et al,* 2004,Linne Y,*et al,* 2004)

Both primiparity and maternal pregravid body size are directly associated with high gestational weight gain, which, in turn, is highly correlated with postpartum weight retention. Given this evidence, characterization of the interrelationships of these maternal attributes is essential to an understanding of postpartum weight changes and obesity.

HIGH PREGRAVID BODY SIZE

Pregravid body size exerts a strong influence on weight changes during and after pregnancy. According to the Institute OfMedicine, (1990), Women who are overweight before pregnancy experience greater and more variable increases in body weight during and after pregnancy. In 1957, McKeown and colleagues reported that weight change during the 12 months postpartum was largely influenced by the woman's weight before pregnancy; the heavier the woman, the larger amount of weight retained. Similarly, Aberdeen primiparas (1950s to 1960s) who were overweight in the first pregnancy were heavier by the middle of the subsequent pregnancy than other primiparas of average body size even after adjusting for weight increments related to age and secular trends (Billewicz ,1970). The1988 National Maternal and Infant Health Survey

(NMIHS) found that women who were overweight before pregnancy were more likely to experience substantial weight retention at 10 to 18 months postpartum than underweight and average weight groups (Keppel, *et al,*1993).

RISK OF BECOMING OVERWEIGHT AFTER PREGNANCY

Approximately 6% to 14% of women are likely to become overweight within 1 year after delivery (Gunderson *et al,* 1999, 2000). In the year 1988 NMIHS, 8.2% of average weight white women were heavier by more than 9kg at 10 to 18 months after delivery versus 22% of black women (Keppel *et al,* 1993).

Among pregnant women who were not overweight before pregnancy, Gunderson and colleagues (2000) examined the racial and ethnic differences in becoming overweight after pregnancy. In a study carried out in, 1980 to 1990 multi-ethnic pregnancy cohort, overall, 6.4% became overweight by 1.5 years (median follow-up time) after the index pregnancy. Black women were about 40% more likely to become overweight within a median of 2 years after delivery when compared with white women (10% versus 7%). Although the adjusted risk estimate for black women was not statistically significant, it was comparable in magnitude to estimates from a population-based sample of women aged 30 to 55 years in which black women were 50% more likely than white women to gain 10 kg or more over 10 years (Williamson DF, Kahn HS, Byers T, 1991). According to the Institute of Medicine (1990), Asian women

had a greatly reduced risk of becoming overweight (2% versus 7%) when compared with white women, whereas Hispanic women had no increased risk when compared with white women. Although these women did not become overweight, approximately 40% more Asians shifted from a BMI below 19.8 (underweight) to a BMI between 19.8 and 26.0 (normal weight), indicating that significant weight increments occurred among Asian women.

A higher prevalence of overweight and obesity for black women has been reported in population-based epidemiologic studies of US women (Williamson, *et al*, 1991).

In a 10-year prospective study of women aged 18 to 30 years at baseline, black women were three times more likely to become overweight than white women when controlling for age, parity, smoking, socio-demographics, and other risk factors (Gunderson, *et al*, 2000). The higher risk of becoming overweight among black women was not related to childbearing but to differences in secular trends in weight gain trajectories for black women versus white women.

Moreover, other studies found that maternal characteristics independently associated with a twofold to threefold higher risk of becoming overweight after pregnancy included gestational weight gain exceeding the Institute of Medicine (IOM) recommendations, age at menarche of less than 12 years, less than 8 years between menarche and first birth, first birth between age 24 to 30 years (Gunderson,*et al*, 2000), and short sleep duration (<5 hours per 24-hour period)

at 6 months' postpartum (Gunderson, *et al*,2008). These risk factors may indirectly represent genetic or biologic influences on adult body weight before pregnancy, socioeconomic differences in maternal age when childbearing begins, or postpartum changes.

Although the strengths of associations were similar to total gestational weight gain, their lower prevalence in a population may result in relatively lower attributable risk from these factors for postpartum weight retention.

CHILD BEARING AND LONG TERM WEIGHT GAIN

Among women of reproductive age, high pregravid body size and primiparity predispose women to substantial weight gain related to childbearing (paras versus nulliparas). Studies of weight gain related to childbearing are designed to estimate weight change due to pregnancy and its aftermath relative to weight changes that would normally occur among women of similar reproductive age who did not give birth during the same time interval (ie, removes weight gain due to secular trends and aging). Only four longitudinal studies have measured weight before and after pregnancy during fixed intervals and obtained estimates of weight gain attributed to childbearing by comparing changes among parous women with those among nulliparous or nonparous women (Gunderson, *et al,* 2004, RookusMA, Rokebrand P, Burema J, 1987, Smith DE, Lewis CE, Caveny JL,1994, Williamson DF, Madans J, Pamuk E, 1994)

A fifth study relied on survey methodology to estimate weight changes based on self-reported body weight associated with childbearing (Rosenberg, *et al*, 2003).The evidence from these studies, as summarized herein, is consistent, except for one study (Williamson, *et al*, 1994) in which fewer than 27% of women were primiparas.

Specifically, population-based longitudinal studies, the NHANES I Epidemiologic Follow-up Study (NHEFS), the Coronary Artery Risk Development in Young Adults (CARDIA) Study, and the Black Women's Health Study (BWHS), prospectively estimated net weight changes from before to after pregnancy relative to the weight changes related to secular trends and aging in the population (Gunderson, *et al*, 2004, Rosenberg, *et al*, 2003, Smith, *et al* 1994, Williamson, *et al*, 1994).

Two studies that measured body weight before and after pregnancy reported an average weight gain of 2 to 3 kg associated with a single birth versus no pregnancy in a biracial cohort (black and white women) (Smith, *et al*,1994), and a 1.7-kg weight increase per birth among white women (Williamson, *et al*, 1994).

These studies included fewer than 90 primiparas, limiting their ability to examine whether pregnancy-related weight gain varied by pregravid BMI.

In the larger study cohorts, the CARDIA study and the BWHS, weight gain due to childbearing was greatest after the first birth (primiparas versus nulliparas), and this association depended on body size before pregnancy. The estimates from these two studies were remarkably similar; the average gain associated with having a first child was 3 to 6 kg among women who were overweight before pregnancy (BMI ≥25) and about 1 kg among women who were average weight (BMI <25) before pregnancy, accounting for secular trends, aging, and changes in lifestyle versus nulliparas (Gunderson, *et al*, 2004, Rosenberg ,*et al* 2003).

The CARDIA data also provided evidence that weight gain attributed to childbearing did not differ between black women and white women (Gunderson, *et al*, 2004) when weight changes were examined separately within pregravid body size categories and within parity groups. Among women nulliparous at baseline, black women gained more weight overall than white women during the 10-year follow-up period regardless of the number of births (0, 1, or 2+ birth groups); however, weight gain attributed to a first birth was similar by race (1 kg for normal BMI, and 3–6 kg for overweight BMI). Cultural as well as biologic and behavioral factors may influence the

predisposition of over-weight women to gain weight associated with childbearing. Similar gains in central adiposity (waist circumference) by race were linearly associated with the number of births during follow-up (Gunderson, *et al*, 2004).

In prospective longitudinal studies in women of reproductive age, the evidence indicates that persistent weight gain attributed to pregnancy occurs primarily after the first birth (ie, cumulative increases do not occur with subsequent births), and that weight gain is greater with increasing maternal body size. Steeper weight gain trajectories after pregnancy observed within certain race groups may be actually due to secular trends or differences in the prevalence of women who are overweight or obese before pregnancy.

CHILD BEARING AND RISK OF BECOMING OVERWEIGHT (PARIOUS AND NULLIPARIOUS)

Childbearing is associated with the development of overweight in women of reproductive age (Gunderson, *et al*, 2008). A longitudinal study of US women aged 25 to 45 years at baseline found a 60% to 110% greater risk of becoming overweight among women with one birth when compared with women with no births during the 10-year follow-up period (Williamson, *et al*, 1994). Limitations of this study included the relatively small number of parous women

and the inclusion of peri- and postmenopausal women in the nongravid comparison group.

Another longitudinal study of women aged 18–30 years found that the risk of becoming overweight after pregnancy depended on smoking habits in women (Gunderson EP, QuesenberryCP,Jr, Lewis CE, 2004). Among never smokers, those who bore children were twice as likely to become over-weight as those who never gave birth (odds ratio [OR] = 2.66 [95%CI, 1.80–3.93] for one birth and 2.10 [95%CI, 1.24–3.56] for two or more births). Among current smokers, those who bore children were half as likely to become overweight as those who never gave birth (OR = 0.41 [95%CI, 0.17–0.96] for one birth and 0.36 [95%CI, 0.08–1.65] for two or more births) (Gunderson, *et al*, 2004).

Other characteristics associated with becoming overweight among women of reproductive age (18–30 years at baseline) independent of parity included a higher risk for black versus white race (OR = 3.49 [95%CI, 2.59 - 4.69]), frequent weight cycling versus none (OR = 1.45 [95%CI, 1.03 - 2.04]), and a high school diploma or less versus 4 years of college (OR = 2.21 [95%CI, 1.50 - 3.26]). High versus low physical activity (OR = 0.62 [95%CI, 0.43–0.90]) was associated with a reduced risk of becoming overweight (Gunderson, *et al,* 2004). These findings are consistent with previous studies of postpartum weight changes.

PREGNANCY AND REGIONAL FAT DISTRIBUTION AND CENTRAL ADIPOSITY

During pregnancy, fat is preferentially deposited in the femoral and abdominal regions. In aprospective study of 557 healthy women, subcutaneous body fat was measured via skinfold thicknesses before, during, and 6 weeks after pregnancy (Sidebottom AC, Brown JE, Jacobs DR, Jr 2001). Central body fat gains in the sub scapular area were relatively high during pregnancy but mobilized (or reduced) to a lesser extent than in triceps and thigh regions within the first 6 weeks' postpartum. Moreover, primiparas gained more at both thigh and subscapular locations than multiparas(Sidebottom, *et al*, 2001). Another study using MRI tomographs found that 68% of gestational fat gain was deposited in the trunk, and that excess fat gain remaining at 1 year postpartum tended to be localized centrally(Sohlstrom A, Forsum E, 1995).

Regional fat distribution may differ for women already overweight or obese before pregnancy. Obese women experience more variable changes, including lower lower or higher gestational weight gains (Wells CS, *et al*, 2006) and lower or similar gestational fat gains (Lederman SA, Paxton A, Heymsfield SB, 1997) but have greater increases in central adiposity and fat deposition during the postpartum period when compared with lower BMI groups. (Soltani H, Fraser RB, 2000). Body fat accessed via skin fold thicknesses and waist and hip

circumferences in parous women (n = 47) showed that obese women developed more central obesity by 6 months' postpartum. (Soltani,*et al*,2000). Women who are overweight before pregnancy accumulate excessive fat stores in response to pregnancy that continue into the postpartum period, or experience patterns of postpartum fat deposition that differ from those who are not overweight.

In population-based, cross-sectional studies, multiparity correlated positively with abdominal girth in women for whom childbearing ended many years earlier, and with larger waist-hip ratios (WHR) in both pre- and postmenopausal women (Troisi RJ, Wolf AM, Mason JE, 1995, denTonkelaar I,Seidell JC, van Noord PA, 1990, Kaye SA, Folsom AR, Prineas RJ, 1990). Similarly, longitudinal studies of women of reproductive age reported greater increments in WHR (Smith, *et al*, 1994) and waist circumference from preconception for up to several years postpartum associated with an increasing number of births independent of age, secular trends, preconception BMI, weight gain, education, and selected behavioral attributes (Gunderson, *et al*,2004). Parity-related increases in central adiposity were also similar for blacks and whites.

Longitudinal changes in visceral and overall adiposity from preconception to postpartum were examined in 122 premenopausal women (50 black, 72 white), of whom 14 gave birth and 108 did not give birth between 1995 and 2000

(Gunderson,*et al*, 2004). Adipose tissue compartments were measured via CT and dual energy x-ray absorptiometry in 1995 to 1996 and again in 1999 to 2000. In multiple linear regression models adjusted for age, race, and changes in total and subcutaneous adiposity, visceral adipose tissue levels increased by 40% and 14% above initial levels for the 1 birth and 0 birth groups, respectively; the visceral fat level was 18.0 cm^2 (4.8–31.2) higher for 1 birth versus 0 births groups controlling for gain in total body fat and covariates (P< .01). There was a borderline greater increase in waist girth of 2.3 cm (0–4.5) (P = .05), a gain of 6.3 cm (4.1–8.5) versus 4.0 cm (3.2–4.8). This study provides evidence that pregnancy may be associated with preferential accumulation of adipose tissue in the visceral compartment for similar gains in total body fat.

BREASTING FEEDING REDUCES POSTPARTUM WEIGHT RETENTION

In the latest national data, US women of reproductive age are alarmingly heavy: 25% are overweight, 29% are obese and 80% have a body mass index (BMI, in $Kglm^2$) of ≥40, which places them in the obese 111 category (Ogden CL, Carroll MD,Curtin LR, McDowell MA, Tabak CJ, Flegal KM, 2006).As mentioned earlier those who are obese have difficulty in conceiving (Ramlau-Hansen CH,Thulstrup AM, NohrEA, Bonde JP, Sorensen T1A, Olsen J, 2007)

and complications during pregnancy and delivery are more common in obese than in normal weight women (Sebire NJ, Jolly M, Harris JP, 2001,Cedergren M, 2006, Cedergren MI, 2004,). In addition, reproduction itself is associated with a net gain in weight. On average, weight retention postpartum is thought to be modest -1.3kg at 10-18 months after delivery in 1.59 million women in the 1988 National maternal and infant health survey (Keppel KG, Taffel SM, 1993); but it is more generally estimated as $\simeq$ 0.5kg in us (Brown JE, Kaye SA, Folsom AR, 1992, Sichieri R, Field AE, Rich-Edwards J, Willett WC, 2003), Swedish (Rossner S, Ohlin A, 1995) and British women (Newcombe RG, 1982). For individual women, however, pregnancy may be quite an important cause of weight gain (Williamson DF, Marians J, Pamuk F,Flegal KM, Kendrick JS. Serdula MK, 1994). For example Olson et al (13Olson CM, Strawderman MS, Hinton PS, Peerson JM, 2003) found that 25 % of the 540 women in their study experienced a major weight gain ($\geq 4.55kg$) associated with pregnancy.

Weight retention may be higher after first birth than after higher births order (Smith DE. Lewis CE, Caveny JL, Perkins LL, Burke GL, Bild DE,1994, Wolfe WS, Sobal J, Olson CM, Frongillo EA Jr, 1997, Gunderson EP. Murtaugh MA. Lewis CE, Quesenberry CP, 2004). Gestational weight gain (GWG) may contribute to complication during labor and delivery (Cedergren M, 2006, Dietz PM, Callaghan WM, Morrow B, Cogswell ME, 2005), and it is an important determinant of postpartum weight retention (PPWR). In general, the more

weight that women gain during pregnancy, the more weight that they retain after wards (Greene GW, Smicjklas-Wright H, Scholl TO, Karp RJ, 1988) interventions to restrain (GWG).

Gestational weight in United States and elsewhere has not been uniformly successful in reducing postpartum weight retention (PPWR) (Pulley BA, Wing RR, Sims CJ, 2002, Olson CM, Strawderman MS, Reed RG, 2004, Claesson1-M, Sydsjo G, Brynhildsen J, Cedergren M. Jeppsson A, Nystrom F,2007, Gray-Donald K. Robinson E, Collier A. David K. Renaud L, Rodrigues S,2000) infant, the proportion of US women who gain weight excessively during pregnancy is growing according to Quick and Stats. In 2005, 20.6% gained 18.2 kg (401b) (Martin JA, Hamilton BE, Sutton PD, *et al*, 2007) the upper limit recommended by the institute of medicine (10m) for women of any height.

BREAST FEEDING

Breastfeeding is the act of putting the child to suck or it is the act of giving the child milk from the breast. This is done immediately after child birth or delivery. It is not all children born that are breastfeed. Some are only giving milk from artificial sources, such as milk from cow or already processed foods (Infants formula; from cereals such as Nan, Cerelac, Nutrients etc). Some children take breast milk in addition to bottle feeding.

Exclusive breastfeeding is the act of giving the child only breast milk for the first six months without giving any other form of food or milk including water with exception to drugs. Whereas, Complimentary feeding is giving of other form of milk or food to the child in addition to breast milk and water. Some are giving only artificial source of food.

Breastfeeding is one of the oldest practices known to mankind. For almost all infant, breastfeeding remains the simplest, healthiest and least expensive feeding method that fulfils the infants' needs. It is considered as the most complete nutritional source for infants because breast milk contains the essentials fats, carbohydrates, proteins, and immunological factors needed for infants to thrive and resist infection in the formative first year of life.

Exclusive breastfeeding is recommended by WHO for each newborn up to six months of age and the "innocent declaration" emphasizes that breastfeeding should be for at least two years.

Breastfeeding may have many benefits both to mother and the child. It confers both short-term and long-term benefits to the child. It reduces infections and mortality among infants, improves mental and motor development and protect

against obesity and metabolic diseases later in the life course (Gareth J, Richard WS, Zulfiqar AB, Saul SM, 2003)

According to the Centers for Disease Control and Prevention, Frequent and exclusive breastfeeding can delay the return of fertility through lactation amenorrhea method. Exclusive breastfeeding (EBF) in the first six months of life and continued breastfeeding from six (6) to eleven (11) months has been identified as the single most effective preventive intervention in reducing child mortality, with the potential of saving 1.3 million lives annually. In addition, during breastfeeding beneficial hormones are released into the mother's body, the material bond can be strengthened.

Furthermore, studies have shown that infants who are exclusively breastfeed for 6 months and those with longer total breastfeeding time have a lower risk of infections, cancers metabolic disease such as obesity and diabetes in the future. (Arenz S, Ruckerl R, Koletzko B, Von Kries R, 2004, Stuebe A, 2009). It has been estimated that exclusive breastfeeding reduces infant mortality rate by up to 13% in low income countries (Jones G, Steketee R, Black R, Bhutta Z, Morris S, 2003)

Recent analysis showed that sub-optional breastfeeding, especially non-EBF in the first six months result in about 1.4 million deaths and up to 100% of the disease burden in children younger than five years in low income and middle income countries (Black R, Allan LH, Bhutta ZA, 2008)

A recent study also confirmed that breastfeeding children for more than 18 months are one of the factors associated with reduced risk of under-five mortality (KoyodeGA,Adekanmbi VT, Uthman OA, 2012)

In spite of the enormous benefit of breastfeeding, its prevalence has remained low all over the world. Poor breastfeeding practices have been widely documented in the developing countries. Only about 39 % of infants in the developing countries (25% in Africa) are exclusively breastfeed for the first six months. Additionally 6% of infants in developing countries are never breastfed. Moreover the prevalence of not breastfeeding is 5.6%, the prevalence of continued feeding is 86% and 68% for infants and children age 6-11 months and 12-23 months respectively (Lauer J, Betran A, Victora C, de Onis M, Barros A, 2004).

Poor breastfeeding practices, together with high rate of morbidity from infectious diseases are the prime proximate causes of malnutrition in the first two years of life (Oddy WH, Kendall GE, Blair E, 2003).

The first two years of life are critical stages for a Childs growth and development. Any damage caused by nutritional deficiencies during this period could lead to faltered growth disease, impaired cognitive development, compromised educational achievement, low economic productivity and death (Victora CG, Adair L, Fall C, 2008)

A quarter (25%) of children under five years of age in Sub-Saharan Africa are under weight, 43% are stunted, 11.4% of them are wasted (UNICEF2010).

In Nigeria neonatal mortality rate is 75/1000 births while the under-five mortality rate is 157/1000 live births (NPC, 2009).

In Nigeria breastfeeding practices continue to fall well below the WHO/UNICEF recommendations for developing countries. Report of Kenya Demographic and Health Survey 2008-2009 revealed that 32% of children under the age of six months are exclusively breastfeed, improving from only 13% in 2003. Whereas in Nigeria, proportion of children less than 6 months who are exclusively breastfed decreased from 17% in 2003 to only 13% in 2008. The proportion of children less than six months who received complementary foods increased from 18% to 35%. Various factors associated with suboptimal breast feeding practices have been identified in various

settings. These include maternal characteristics such as age, marital status, occupation and educational level, antenatal and maternity health care. Others are health education and media exposure, socio-economic status and area of residence and the child's extension including birth weight, method of delivery, birth order, and the use of pacifiers (KNBS,2008-09, Patel A, Badhoniya N, Khadse S, Senarath U, Agho KE, Diblry MJ, 2010).

Breastfeeding has been accepted as the most vital invention for reducing infant mortality and ensuring optimal growth and development of children (Gupta and Arora 2007). Breastfeeding is the ideal method suited for the physiological and psychological needs of an infant (Subbiah, 2003), it is estimated that sub-optimal breastfeeding, especially nonexclusive breastfeeding in the first 6 months of life results in 1.4 million deaths and 10% disease burden in children younger than 5 years of age (WHO 2009). Exclusive breastfeeding for the 6 months of life improves the growth , health, and survival status of newborns (WHO, 2003) and is one of the most natural and best forms of preventive medicine (WHO, 2001). Exclusive breastfeeding plays a pivotal role in determining the optimal health and development of infants, and is associated with a decreased risk for many early life diseases and conditions, including otitis media, respiratory tract infection, diarrhea and early childhood obesity (lp*et al*, 2007).

A large cohort study undertaken in rural Ghana concluded that 22% of neonatal deaths can be prevented if all infants were put to breast within the first hour of birth (Edmund *et al*; 2006). Reviews of studies from developing countries show that infants who are not breastfed are 6-10 times likely to die in the first months of life than infants who are breastfed (WHO, 2000; Bahl*et al* 2005).

PARITY

Parity, this is the total number of children a woman has given birth to either dead or alive. It has been observed that African women give birth to more children than their white counterpart. This is as a result of their male preference. Cultures and tradition that have preference or value for the male child force/compel their women to give birth to more children in order to achieve this goal.

Polygamous setting where each of the wives wants to have the love of the husband and please him by having a male child; Parity tends to increase to achieve this. It is also a pride in some cultures to have many children. This shows that you are a "real man". The number of children (parity) also increases in a situation where more hands are needed in the farm. Indeed the number of children could be a source of joy in a family; as it could also be a problem. Parity could have a negative effect on the life of the mother in terms of her health. A woman who gives birth to many children especially when they are not

properly spaced tends to reduce her life span. This is because there are enormous issues which could arise in pregnancy, labor and child birth.

AGE

Age is the number of days, weeks, months or years a person have lived after been delivered. It is believed that a person's age can have effect on the weight of a person, especially the postpartum mother. As a person grows older naturally, the weight tends to increase as a result of the intake of food, drinks and drugs etc. women are twice likely as men to experience a major weight gain (an increase in BMI$\geq$5kglm^2) over a ten year period (Williamson, *et al,*1990), A woman age 25 to 34 have the greatest risk of major weight gain compared with men of all ages and compared with older women (Willamson, 1990), that's also the age of highest productivity. Young adulthood appears to be a time of specific vulnerability for women to experience significant weight gains, which may magnify the problem of obesity (Flegal km, Caroll MD, Ogden CL, Johnson CL, 1999-2000).

As mentioned earlier, according to the research carried out by the Institute of Medicine (IOM) recommendation, the age at menarche of less than 12 years, less than 8 years between menarche and first birth and first birth between 24 to 30 years. (Gunderson, *et al*, 2008)

CHAPTER THREE

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study employed a cross-sectional study survey design to look at the relationship between post-partum obesity and pre-disposing factors of age, parity, occupation, breastfeeding practices, mode of delivery, mother's occupation, time elapsed since delivery. Cross sectional survey involve no intervention rather a representative sample of the study population was observed in its natural setting.

AREA OF STUDY

This study was carried out in Yenagoa Local Government Area of Bayelsa State using 5 hospitals/ clinics as sampling points. These sampling points were, Primary Health Centre Agudama, Family Support Programme clinic (FSP), Primary Health Centre Biogbolo, Federal Medical Centre (FMC), Niger Delta Teaching Hospital (NDUTH) Okolobiri all in Yenagoa Local Government Area of Bayelsa State. These hospitals /clinics are widely distributed in the Local Government Area. Niger Delta Teaching Hospital is located in the rural part of the local Government Area.

STUDY POPULATION

This study was targeted at post-partum mothers of child bearing age (15 - 49 years). Breast feeding mothers of child bearing age is selected

because this is the age at which obesity of women of mothers is believed to occur.

Below is the total number of women who registered for Anti-natal, delivered and those that brought their children for immunization.

Table 1: Number of women who registered for Anti-natal in the hospitals/clinics

Mothers/ samples point	Oct.	Nov.	Dec.	Jan.	Feb.	Sept.
P.H.C Agudama	120	90	85	115	105	88
P.H.C Biogbolo	80	45	48	88	72	67
F.S.P Clinic	117	67	89	95	90	102
F.M.C Yenagoa	96	52	145	227	217	91
NDTH Okolobiri	101	75	92	246	248	120

The above table shows the number of women that registered for anti-natal in the various clinics/hospitals from the months of September 2015 to February 2016.

Table 2: Number of women who delivered in the hospitals/clinics

Mothers/ samples point	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
P.H.C Agudama	19	32	41	18	15	32
P.H.C Biogbolo	16	20	31	20	19	27

F.S.P Clinic	25	31	15	19	21	33
F.M.C Yenagoa	47	39	25	72	83	67
NDTH Okolobiri	60	47	21	73	72	60

The above table shows the number of women that delivered in the hospitals/clinics from September to February 2016.

Table 3: Number of women who came for immunization in the hospitals/clinics

Mothers/ samples point	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
P.H.C Agudama	95	70	52	66	66	112
P.H.C Biogbolo	80	64	43	55	58	89
F.S.P Clinic	75	54	41	61	72	85
F.M.C Yenagoa	117	96	85	73	89	97
NDTH Okolobiri	118	112	99	73	65	80

The table below shows the number of mothers who registered their children for immunization clinic and attends clinic from months of September 2015 to February 2016.

NOTE: This tables are to give you the overview of the total number of women who attend the clinics where the sample size was selected

SAMPLE AND SAMPLING TECHNIQUES

Sample size estimation

To estimate-the sample size of the study, the below formula was used (Charan and Biswas, 2013);

$$ME = z\sqrt{\frac{p(1-p)}{n}}$$

n = Desired sample size

ME = Desired margin of error

z = The standard normal deviate, usually set at 1.96 (more simply 2.0) which corresponds to the 95% confidence level.

p = The population in the target population estimated to have a particular characteristics.

Sample size = $(1.96)^2$ (0.20) (0.80) = 0.614656/0.0016

$(0.04)^2$

n =384.16

An iteration of 5% will be added to the sample size to cover for non response; n= 19.208+ 384.16- 403.

The final sample size was taken at a closest hundred=400

Sampling Techniques

The samples were selected using simple random sampling techniques. Samples were selected from mothers attending infant welfare clinic in the selected hospitals in Bayelsa State.

Instrument for data collection

The instrument for data collection was a structured questionnaire. Questionnaires were prepared in sections to capture the Socio-demographic characteristics of mother, child care practice of the mothers as well as some other practice. The questionnaire was prepared in a simple English to allow clear understanding by mothers.

Subsequently, a meter rule that is graduated in meter was used to take the height of the respondent. And a weighing scale was used to take the weight of the respondent in kg.

Validity of instrument

The instrument was validated for both face and content by the supervisor and an expert in maternal and child health care services. All necessary criticism, input and corrections were reflected for improvement.

Reliability of instrument

The reliability was ascertained by calculating a Chronbach's alpha reliability coefficient after pre-testing the data collection instrument on few samples of similar setting. A reliability coefficient 0.667 was termed reliable for the study (George and Mallery, 2003)

Data collection method

Data on the subject characteristics were collected using a structured questionnaire.

Consequent to the collection of information like weight and height of the mother as well as BMI of mothers (weight in kg divide by square of the height in meter square), weighing balance and meter rule was used. Specific BMI reference as developed by World Health Organization (WHO, 1995 and 2000) was used.

Data Collection Period

Data was collected over a six months period spanning from September 2015 to February 2016.

Method of Analysis

The data was analyzed using ***IBM*** Statistical Package for Social Science (SPSS) version 20.0. Descriptive statistics was used for most variables such as sociodemographic will be presented in tables and charts.

Chi-square was used for inferential statistical analysis and decisions on outcome atP<0.05.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

Table 4: Distribution of socio-demographic characteristics

Variables	Frequency	Percentage
Age of respondents		
Below 15 years	4	1.0
16-25 years	96	24.0
26-30 years	190	47.5
31-35 years	102	25.5
36 years and above	2	0.5
Missing	6	1.5
Marital status		
Single	28	7.0
Married	358	89.5
Divorced	8	2.0
Separated	6	1.5
Level of Education		
No formal Education	8	2.0
Primary	10	2.5
Secondary	174	43.5
University	162	40.5
Postgraduate Education	44	11.0
Missing	2	0.5
Religious denomination		
Christian	382	95.5
Muslim	14	3.5
Traditional Religion	4	1.0
Occupation of respondents		
Schooling	28	7.0
Civil servant	66	16.5
Business	234	58.5
House wife '	38	9.5
Other	32	8.0
Missing	2	0.5

Table 4 shows that majority 190(47.5%) of the respondent mothers are aged 26- 30 years. 102 (25.5%) are aged 31-35 years, only 2(0.5%) are aged 36 years and above with only 4(1%) aged below 15 years.

Majority 358(89.5%) are married with only 28(7%) singles and 6(1.5%) separated.

Those with secondary and university education were majority 174(43.5%) and 162(40.5%) respectively.

The most common religion is Christianity 382(95.5%) with only 14(3.5%) Muslim. And majority 234(58.5%) of the respondents are into business with 38(9.5%) housewives and 66(16.5%) civil servants.

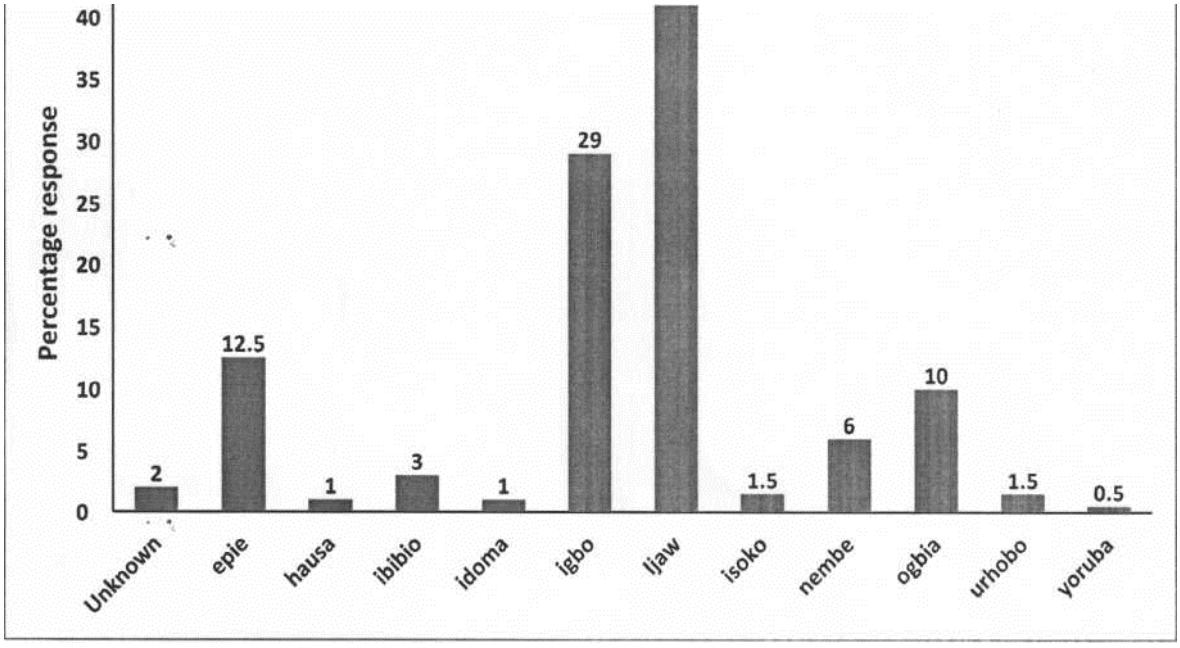

Figure 1: Distribution of tribes of the respondents

Figure 1 shows the distribution of tribes of the respondents in the study. Majority 29% and 41% of them were Igbos and Ijaws respectively with other tribes making minorities.

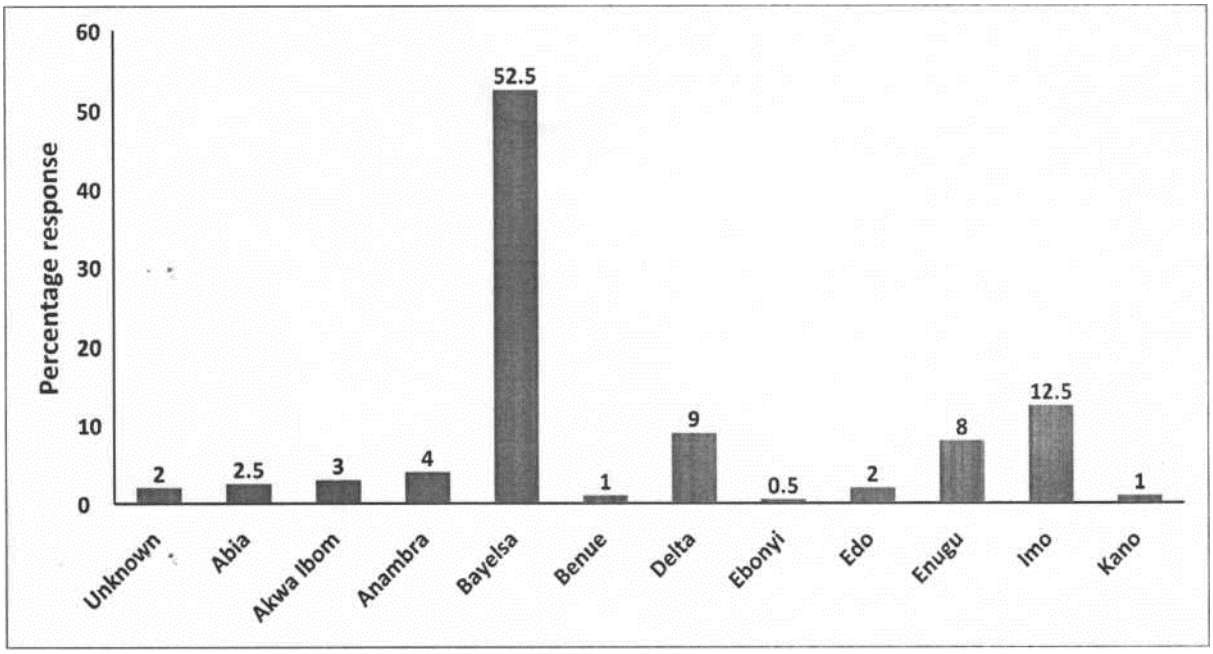

Figure 2: Distribution of State of the respondents

Figure 2 show that majority 52% of them were from Bayelsa, 12.5% from Imo and 9% from Delta among other states.

Table 5: Distribution of mother's characteristics

Variables •	Frequency	Percentage
Age at first baby/child		
Less than 24 years	116	29.0
24-29 years	162	40.5
More than 29 years	122	30.5
Number of work hours per day		
Less than 8 hours	222	55.5
More than 8 hours	178	44.5
Job affects breastfeeding		
Yes	68	17.0
No	242	60.5
Not so Much	90	22.5
Age of baby		
0-6 months	202	50.5
7-12 months	72	18.0
1-18 months	48	12.0
2 years and Above	58	14.5
Missing	20	5.0
Method of baby delivery		
Normal delivery	342	85.5
Caesarean session	34	8.5
Forceps delivery	10	2.5
Episectomy	4	1.0
Missing	10	2.5
Number of caesarean session		
Once	26	6.5
Twice	10	2.5
Thrice	6	1.5
None	348	87.0
Missing	10	2.5
Length of last pregnancy		
35 week	14	3.5
36 weeks	350	87.5 .
37 weeks	22	5.5
38 weeks	14	3.5

Table 5 shows that majority 162 (40.5%) of the mothers were aged between 24 and 29 years at first birth. 116 (29%) were aged less than 24 years and 122 (30.5%) more than 29 years at first births.

About 222 (55.5%) work less than 8 hours per day and only 68 (17%) indicated that job affects their breast feeding baby.

Majority 202 (50.5%) have babies aged below 6 months and also majority 342 (85.5%) declared normally. Among those who had caesarean session, 26 (6.5%) had only, 10 (2.5%) trice and 6 (1.5%) thrice.

Majority 350 (87.5%) of the pregnant lasted 36 weeks with only 14 (3.5%) getting up to 38 weeks.

Table 6: Distribution of baby according to breastfeeding practice

Variables	Frequency	Percentage
Breastfeed baby		
Yes	354	88.5
No	28	7.0
No response	18	4.5
Form of Breastfeeding		
Exclusive breastfeeding	202	50.5
Supplementary breastfeeding	160	40.0
Not applicable	38	9.5
When breastfeeding was started		
Immediately after delivery	234	58.5
After few hours	122	30.5
after some weeks	22	5.5
After some months	6	1.5
No response	16	4.0
Length of breastfeeding		
0-1 month •	24	6.0
0-20 months	62	15.5
0-6 months	114	28.5
0-1 year	114	28.5
0-2 years	76	19.0
No response	10	2.5
Only breast milk for first 6 months		
Yes	184	46.0
No	182	45.5
Undecided	34	8.5
When breastfeeding was stop		
3 months	20	5.0
6 months	32	8.0
1 year	170	42.5
1 year and 6 months	100	25.0
2 years	56	14.0
No response	22	5.5

Table 6 shows that although 354 (88.5%) breastfeed their baby, only 202 (50.5%) practiced exclusive breastfeeding. Others 28 (7%) used complimentary breastfeeding. About 234 (58.5%) started breastfeeding immediately after delivery, 122 (30.5%) after some weeks and 22 (5.5%) after some months.

Majority 114 (28.5%) of the breastfeeding was within 0-1 year and only 104 (46%) gave only breast milk with the first 6 months despite the claim of 50.5% exclusive breastfeeding.
Majority 170 (42.5%) stops breastfeeding within a year with only 56 (14%) encroaching 2 years.

Table 7: Other supplementary feeding characteristics

Variables	Frequency	Percentage
Give water during breastfeeding		
Yes	220	55.0
No	154	38.5
Missing	26	6.5
When starts taking water		
From Birth	124	31.0
3 months	68	17.0
4 months	26	6.5
5 months	4	1.0
6 months	158	39.5
Missing	20	5.0
Age of last baby		
0-6 months	160	40.0
7-12 months	74	18.5
12-18 months	30	7.5
19 months - 2 years	64	16.0
Others	24	6.0
Missing • *	48	12.0

Table 7 shows that 220 (55.4%) gives baby water doing breast feeding and 124 (31%) stars from births.

Majority 60 (40%) of the last or previous baby aged o-6 months with only 64 (16%) aged 19 months - 2years.

Majority 40% of the reported have one child 26% two and only 8% having 5-10 children (see figure 3).

Table 8: Distribution of mother's weight and Height

Variables	Frequency	Percentage
Ranges of BMI		
< 18.5 kg/m^2	25	6.3
18.5-24.9 kg/m^2	77	19.
25.0-29.9 kg/m^2	116	29.
30.0-34.9 kg/m^2	86	21.
35.0-39.9 kg/m^2	36	9.0
> 40.0 kg/m^2	60	15.
Classification of BMI		
Underweight	25	6.3
Normal	77	19.
Overweight	116	29.
Obese	182	45.
Postpartum obesity		45.
Yes	182	5
No	218	54.

Table 8 shows the distribution of mother's weight and height.

The average weight before pregnancy was 76.83+/-13.69kg. Mean post pregnancy weight was 74.54+/-13.53kg and mean height of 1.60+/0.28 metres. Majority of the respondents have BMI range 25.0-116 (29%) 29.9 kg/m^2 meaning that majority were overweight with only 25 (.3%) underweight with BMI of less than 18.5kg/m^2.

About 182 (45.5%) of them were obese with BMI >greater than equal to 30.0kg/m^2.

Table 9: Relationship of maternal factors and Body mass index

Variables	BMI classification					p-value
	Underweight	Normal	Overweight	Obese		
Parity					**14.93**	**0.25**
One	15	28	51	66		
Two	4	24	30	46		
Three	2	9	13	24		
Four	0	8	10	22		
5-10 children	2	2	8	20		
Age of mother					**39.77**	**0.00**
< 15 years	2	2	0	0		
16-25 years	8	28	30	30		
26-30 years	9	35	52	94		
31-35 years	6	10	32	54		
>36 years	**0**	0	2	0		
Practice of breastfeeding					**14.78**	**0.02**
Yes	23	65	98	16		
No	**2**	10	12	4		
No response	0	2	6	10		
Method of baby delivery					**25.84**	**0.00**
Normal delivery	25	69	102	14		
Caesarean session	**0**	4	6	24		
Forceps delivery	**0**	0	2	8		
Episectomy	**0**	0	4	0		
Occupation of respondents					**17.79**	**0.12**
Schooling	**2**	4	6	16		
Civil servant	**2**	12	30	22		
Business	**17**	47	62	10		
House wife	**2**	10	8	18		
Other	2	2	10	18		

Table 9 shows no significant relationship between partly as well as occupation of mother and their body mass index.

There was a significant relationship ($p<0.05$) between age of mother ($p=0.00$), -practice of breastfeeding ($p=0.02$) and method of delivery of baby ($p=0.00$) with body mass index of mother.

Table 10: Relationship of maternal factors and postpartum obesity

Variables	Postpartum	Obesity	I^1	p-value
	No	Yes		
Parity			**6.68**	**0.15**
One	94	66		
Two	58	46		
Three	24	24		
Four	18	22		
5-10 children	12	20		
Age of mother			**16.36**	**0.00**
< 15 years	4	0		
16-25 years	66	30		
26 - 30 years	96	94		
31-35 years	48	54		
>36 years	2	0		
Practice of breastfeeding			**12.28**	**0.00**
Yes	186	168		
No	24	4		
No response	8	10		
Method of baby delivery			**17.85**	**0.00**
Normal delivery	196	146		
Caesarean session	10	24		
Forceps delivery	2	8		
Episectomy	4	0		
Occupation of respondents			**7.04**	**0.13**
Schooling	12	16		
Civil servant	44	22		
Business	126	108		
House wife	20	18		
Other	14	18		

Table 10 shows a significant relationship ($p<0.05$) between age of mother, practice of breast feeding and method of baby delivery.

With postpartum obesity, Parity and mothers occupation was not significantly related to the occurrence of postpartum obesity.

BMI classification

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2). For example, an adult who weighs 70kg and whose height is 1.75m will have a BMI of 22.9.

BMI = 70 kg / (1.75 m^2) = 70 / 3.06 = 22.9

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Table 11: The International Classification of adult underweight, overweight and obesity according to BMI

Underweight	<18.50	<18.50
Severe thinness	<16.00	<16,00
Moderate	16.00 -16.99	16.00 -
Mild thinness	17.00 -	17.00 -
Normal	18.50 -	18.50 -
		23.00 -
Overweight	>25.00	>25.00
Pre-obese	25.00 -29.99	25.00 -
		27.50 -
Obese	>30.00	>30.00
Obese class I	30.00 -	30.00 -
		32.50 -
Obese class	35.00 -39.99	35.00 -
		37.50 -
Obese class	>40.00	>40.00

Sources: WHO, 1995; WHO, 2000

BMI values are age-independent and the same for both sexes. However, BMI may not correspond to the same degree of fatness in different populations due, in part, to, different body proportions. The health risks associated with increasing BMI are continuous and the interpretation of BMI grading in relation to risk may differ for different populations.

In recent years, there was a growing debate on whether there are possible needs for developing different BMI cut-off points for different ethnic groups due to the increasing evidence that the associations between BMI, percentage of body fat, and body fat distribution differ across populations and therefore, the health risks increase below the cut-off point of 25 kg/m^2 that defines overweight in the current WHO classification.

There had been two previous attempts to interpret the BMI cut-offs in Asian and Pacific populations (WHO/IASO/IOTF, 2000; James, Chen

and Inoue, 2002), which contributed to the growing debates. Therefore, to shed the light on this debates, WHO convened the Expert Consultation on BMI in Asian populations (Singapore, 8-11 July, 2002) (WHO expert consultation, 2004).

The WHO Expert Consultation concluded that the proportion of Asian people with a high risk of type 2 diabetes and cardiovascular disease is substantial at BMI's lower than the existing WHO cut-off point for overweight (= 25 kg/m^2) (WHO expert consultation, 2004). However, the cut-off point for observed risk varies from 22 kg/m^2 to 25 kg/m^2 in different Asian populations and for high risk;

it varies from 26 kg/m^2 to 31 kg/m^2. The Consultation, therefore, recommended that the current WHO BMI cut-off points (Table 1) should be retained as the international classification.

But the cut-off points of 23, 27.5, 32.5 and 37.5 kg/m^2 are to be added as points for public health action. It was, therefore, recommended that countries should use all categories (i.e. 18.5, 23, 25, 27.5, 30, 32.5 kg/m^2, and in many populations, 35, 37.5, and 40 kg/m^2) for reporting purposes, with a view to facilitating international comparison.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 SUMMARY OF FINDINGS

In the course of this research, it was found out that postpartum obesity is not affected by parity; there is no significant relationship between the number of children and postpartum obesity.

1. There is no relationship between occupation of mother and postpartum obesity.
2. There is a significant relationship ($p < 0.05$) between age of mother (p=0.00) and postpartum obesity.
3. There is a significant relationship (p>0.05) between practice of breastfeeding (p=0.02) and postpartum obesity.
4. There is a significant relationship (p>0.05) between method of baby delivery (p=0.00)with postpartum obesity.

5. There is no significant relationship between parity and postpartum obesity

5.2. DISCUSSION

This is a survey study that is carried out on postpartum mothers. The possibility that breastfeeding may assist women in minimizing weight retention has long been controversial. This research was able to find out that there is a significant relationship between breastfeeding and postpartum obesity. If breastfeeding is practiced as recommended (ie breastfeeding exclusively for 2years), it made an independent contribution to the reduction of postpartum weight retention at 6 months postpartum. In the research carried out by Okeke and colleagues; 18% of the women in their study returned to their prepregnancy weight by 6weeks postpartum (Althuzien E, van Popple MN, de Vries JH, Seidell JC, van Mechelen W, 2011,Peurperium and Lactation, 2007). Since one (1) in every five women had compete weight reduction 6 weeks

postpartum, effective interventions are needed for prevention in the remaining 82% of women postpartum (Gore SA, Brown DM, West DS, 2003).

Studies have shown a wide a variability in factors that are likely to influence BMI among women including maternal status , education level, age at menarche, economic status, smoking status and other factors in this study, it was found out that, there is no significant relationship between parity and postpartum obesity . in a prospective longitudinal studies, in women of reproductive age, the evidence indicates that persistent weight gain attributed to pregnancy occurs primarily after the first birth (ie cumulative increases do not occur with subsequent birth), and that weight gain is greater with increasing maternal body size (Rosenberg L, Palmer JR, Wise LA,2003). In the larger study cohorts, the CARDIA study and the BWHS, weight gain due to childbearing was greatest after the first birth (pimiparas versus nulliparas), and this

association depends on body size before pregnancy. The average gain associated with having a first child was 3 to 6kg among women who were overweight before pregnancy (BMI≥25) and about 1kg among women who were average weight(BMI< 25) before pregnancy, according for secular trends, aging, and changes in lifestyle (Gunderson et al 2004, Rosenberg, et al, 2003). The higher risk of becoming overweight among black women was not related to childbearing but to differences in secular trends in weight gain trajectories for black women versus white women. McKeown and colleagues reported that weight change during the 12 months postpartum was largely influenced by the woman's weight before pregnancy; the heavier the woman, the larger amount of weight retained. But in a longitudinal study of women aged 18-30years, among never smokers, those who bore children were twice as likely to become overweight as those who never gave birth (Gunderson, *et al*, 2004)

There is a significant relationship ($p < 0.05$) between age of mother (p= 0.00) and postpartum obesity. From this study BMI tends to be higher in the age bracket between 26-30years. Majority of the respondent have BMI range 25.0-116(29%) 29.9kg/m2which is above the IOM recommendation of ≥25(WHO, 1995) and this is the age of highest reproductivity. Other studies found that maternal characteristics independently associated with twofold to threefold higher risk of becoming overweight after pregnancy including gestational weight gain exceeding the INSTITUTE OF MEDICINE (IOM) recommendations, age at menarche of less than 12years, less than 8years between 24-30years and short sleep duration (≤5-hours per 24-hour period) at 6 months postpartum.

From findings of this research, there is significant relationship between methods of baby delivery and postpartum obesity. This is because in the

analysis of the work, we have 146 postpartum mothers who had a normal delivery are obese. Much research has not been carried out in this area to be compared if this research is in line with other research.

There is also a significant relationship between occupation of mother and postpartum obesity. In the study carried out it was discovered that more businesswomen were more obsessed

5.3LIMITATION OF THE STUDY

The limitation of this study was that most of the health workers were very adamant in helping with the administration of the questionnaires and it was also difficult in convincing most of the mothers in answering the questionnaires as most of them expect to be compensated with money. Furthermore, the cross sectional nature of the study allowed for finding associations but not allow for definitive conclusions on cause and effect. However, this is a stepping stone for further research on

postpartum obesity in relation to age, parity, breastfeeding practices, mode of delivery, and occupation of mother.

Most of the mothers gave self-reported weight before pregnancy and some could not remember their weight which made it difficult in calculating their body mass index (BMI) before pregnancy.

Most the instrument (weighing balance and measuring scale) were dad and giving wrong readings (either below or above) which made the work cumbersome as there were a lot of repetitions which made the mothers stressed out as they complained of being disturbed.

5.4 RECOMMENDATION

Postpartum obesity has been a public health issue but it is pertinent to know that no interest and concern is put in making it less of a problem; even after researches are made and solutions are proffered, it is not made known to the public how these issues can be addressed. Maternal

obesity indeed is described by Sheldon (1949) as the development of obesity and other long lasting health consequence of having a baby. In other these issues to be addressed I strongly recommend that;

1. The government should partner with such media to publicize the information's in the media.
2. Religious leaders (churches and mosques) should also be enlightened to their members.
3. They can also be used as adverts in television programs home videos and soap operas.
4. Governmental and nongovernmental offices should establish crèche and daycare centers close to their offices where nursing mothers can have access to their babies during official hours.
5. If possible, Governments policies towards maternity leave should reflect the need to provide reasonable timefor nursing mothers to

breastfeed their babies for the first six months before returning to work.

6. Focus should be on the nutritional health of women in the preconception period and on what weight loss interventions can be safely introduced in obese women seeking to become pregnant. This is why preconception care and planning should be promoted even in developing countries like ours.
7. Health policy makers should work with health care providers to develop appropriate to help most especially postpartum weight loss interventions,

CONCLUSION

Though there is high prevalence of breastfeeding, breastfeeding practices are still suboptimal in this region , despite evidence of numerous benefit to both child and mother, most especially exclusive breastfeeding in the control of postpartum obesity. Community based breastfeeding promotion programs should remain a priority with renewed emphasis on exclusive breastfeeding

especially for the first 6 months as this is a very important tool against postpartum obesity in mothers. Awareness should be created in having their babies early in life as this could cub the problem of postpartum obesity. A lot of persons are also unaware that the mode of delivery could also affect weight of the mother after delivery. It should also be noted that a mother's weight before pregnancy plays a very important role in postpartum obesity.

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OUR REF: FUT/SOHT/PHT/CS/006/VOL.1 **Date:** April 15, 2016

YOUR REF:

TO WHOM IT MAY CONCERN

Sir,

LETTER OF INTRODUCTION

The bearer **Timidi Iniebi Timidi** with Reg. No.20094748668s an MPH Student of the Department of Public Health Technology. As part of requirements for graduation, every student is required to carry out a well articulated research.

Accordingly, **Timidi Iniebi Timidi** is seeking to carry out her research on the the topic ***"Post-partum Obesity In Relations to Age, Parity, Breastfeeding Practices, mode of delivery, occupation of mother time elapsed since delivery.***

We would appreciate your kind assistance towards the realization of this compulsory requirement for her graduation.

Please give her the necessary assistance she requires for a successful programme.

HEAD OF DEPARTMENT 15/4/16

Rev. Sr. Prof. E. T. Oparaocha
HOD, Public Health

QUESTIONIARE ON POST-PARTUM OBESITY IN RELATION TO AGE, PARITY, BREASTFEEDING PRACTICES, MODE OF DELIVERY, OCCUPATION OF MOTHER, TIME ELAPSED SINCE DELIVERY.

SECTION A:

Demographic Characteristics.

1. Age: PLEASE INDICATE THE OPTION THAT INCLUDES YOUR AGE IN YEARS.
   (A) BELOW 15
   (B) 16-25 YEARS
   (C) 26-35YEARS
   (D) 36-45YEARS
   (E) 46 AND ABOVE
2. MARITAL STATUS: PLEASE SELECT THE OPTION THAT DESCRIBES YOUR MARITAL STATUS.
   (A) SINGLE
   (B) MARRIED
   (C) DIVORCED
   (D) SEPERATED
   (E) WIDOW
3. LEVEL OF EDUCATION: INDICATE YOUR HIGHEST LEVEL OF EDUCATION.
   (A)NONE
   (B)PRIMARY SCHOOL
   (C)SECONDARY SCHOOL
   (D)COLLEGE OF EDUCATION
   (E)UNIVERSITY
   (f)POST GRADUATE EDUCATION
4. RELIGION: WHAT RELIGION DO YOU PRACTICE?
   (A) CHRISTIANITY
   (B) MUSLIM
   (C) TRADITIONAL RELIGION.
5. OCCUPATION: WHAT DO YOU DO FOR A LIVING
   (A) SCHOOLING
   (B) CIVIL SERVANT

(C) BUSINESS
(D) HOUSE WIFE
(E) OTHERS: ……

6. TRIBE/LANGUAGE: WHAT TRIBE DO YOU BELONG TO?
(A) IJAW
(B) NEMBE
(C) OGBIA
(C) EPIE
(D) OTHERS……

7. WHAT IS YOUR STATE OF ORIGIN: ……

8. NIGERIA YES ( ) NO ( )

SECTION B

9. HOW OLD WERE YOU WHEN YOU HAD YOUR FIRST CHILD/BABY:……
10. HOW MANY HOURS DO YOU WORK IN A DAY?
(A) 2-3 HOURS
(B) 4-5 HOURS
(C) 6-7 HOURS
(D) 8-10 HOURS
(E) 10-12 HOURS
(F) MORE THAN 12HRS
11. DOES YOUR JOB AFFECT YOUR BABYS FEEDING (EXCLUSIVE)?
(A) YES
(B) NO
(C) NOT MUCH.
12. DO/DID YOU BREAST FEED YOUR BABY?
(A)YES
(B) NO.

IF YES ABOVE ,

13. WHICH FORM OF BREASTFEEDING?
(A) EXCLUSIVE BREASTFEEDING.
(B) (B)COMPLIMENTARY BREASTFEEDING.
14. WHEN DID YOU START BREASTFEEDING YOUR BABY
(A) IMMIDIATELY AFTER BIRTH
(B) AFTER FEW HOURS

(C) AFTER SOME WEEKS

(D)AFTER SOME MONTHS

15. HOW LONG HAVE YOU BREASTFEED YOUR BABY

(A)O-1 MONTH

(B)O-2 MONTHS

(C)O-6 MONTHS

(D) O-1 YEAR

(E)O-2 YEARS

16. DID/DO YOU GIVE ONLY BREAST MILK FOR THE FIRST SIX MONTHS (A)YES (B)NO

17. WHEN WILL YOU STOP OR END BREASTFEEDING YOUR BABY? (A)3MONTHS

(B) 6MONTHS

(C) 1 YEARS

(D) 1YEAR, 6 MONTHS

(E) 2 YEARS

18. DID/DO YOU GIVE WATER DURING BREASTFEEDING

(A)YES

(B) NO

19. WHEN DID YOU START GIVING YOUR BABY WATER

(A)FROM BIRTH

(B) 3MONTHS

(C) 4MONTHS

(D) 5MONTHS

(E) 6MONTHS

20. HOW OLD IS YOUR BABY

(A) 0—6 MONTHS

(B) 7—12 MONTHS

(C) 1—$1^{1/2}$ YEARS

(D) 2—AND ABOVE

21. HOW DID YOU DELIVER YOUR LAST BABY

(A) NORMAL DELIVERY

(B) INDUCTION

(C) CAESAREAN SESION

(D) FORCEPT DELIVERY

(E) EPISECTOMY

22. HOW MANY TIMES HAVE YOU HAVE CAESAREAN SESION
    (A) 1 TIMES
    (B) 2 TIMES
    (C) 3 TIMES
    (D) 4 TIMES
23. HOW LONG WAS YOUR LAST PREGNANCY? .....
24. HOW MANY CHILDREN HAVE YOU GIVIEN BIRTH TO?
    (A) 1
    (B) 2
    (C) 3
    (D) 4
    (E) 5- 10
25. HOW OLD IS YOUR LAST BABY?
    (A) 0-6 MONTHS
    (B) 7-12 MONTHS
    (C) 12-18 MONTHS
    (D) 19-2 YEARS
    (E) OTHERS.....
26. WHAT IS YOUR WEIGHT? .....Kg
27. WHAT WAS YOUR WEIGHT BEFORE PREGNANCY? .....
28. WHAT IS YOUR HEIGHT? .....m
29. WAS THERE ANY COMPLICATION DURING YOUR LAST PREGNANCY?
    (A) YES
    (B) NO.

IF YES TO ABOVE QUESTION,

30. WHEN
    (A) DURING PREGNANCY
    (B) DURING LABOUR
    (C) IMMIDIATELY AFTER DELIVERY.
    (D) AFTER AN HOUR.
    (E) 24 -72 HOURS (1-3DAYS) LATER