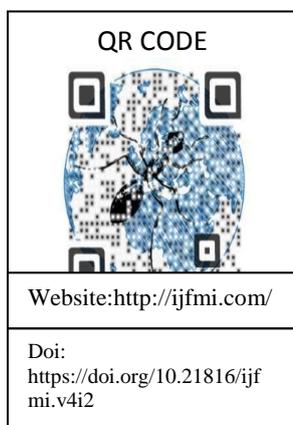


Study of Maternal Age and Pregnancy Outcome in a Federal Tertiary Health Institution in Delta State, South-South, Nigeria

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ABSTRACT

Introduction:

In humans, the reproductive age remains one of the most critical for the female. This age (20-25 years) is seen as the optimal childbearing age range, with age 35 considered the threshold for a complications-free pregnancy. With an increase in the mean maternal age at childbirth, the impact of maternal age on pregnancy outcome has become increasingly important. This retrospective study was embarked upon to investigate the impact of mode of delivery, birth weight and possible complications on mother and fetus.

Materials and Methods:

The data of 3501 women seen at a federal tertiary health institution over a 7 years period (2008 – 2014) was collated and analyzed under different age brackets. Using linear regression model to analyse the causal-effect relationship between the variables, the women were grouped into 18-25 years (n=722); 26-33 years (n=1994); 34-41 years (n=750); 42-49 years (n=35).

Results:

From the study, Mean maternal age was observed to be 29.74; with average duration of pregnancy being 38.04 weeks. Spontaneous Vaginal Delivery was most common in the 18-25 years; least in the 42-49 years group which suggested a positive correlation between age and caesarean section. With PPMCC(R) of -0.016 and a p-0.368, there was a weak negative correlation between age and duration of Labor; thus not statistically significant. Gestational diabetes was seen more in the 26-34 and 35-41 age brackets. Birth weight varied across age brackets; LBW was highest and NBW least in the 42-49 group bracket. Macrosomic babies were highest in the 34-41 years, least in the 18-25 years and absent in the 42-49 years group.

Conclusion:

Study therefore established a weak negative correlation between maternal age and duration of Labor

Key words:

Maternal age, pregnancy, complications, outcome

INTRODUCTION

Though the optimal childbearing age for the female is 20-25 years,¹ of the 131.4 million births per year worldwide, 11% of them are from 16 million teenagers aged 15-19 years. 95% of those are from third world countries. 5.5% of all adolescent births take place in the

USA, Bangladesh, Nigeria, Brazil, DR Congo, Ethiopia and India. Of the complications seen in pregnancy and childbirth, 23% occur in these teenage mothers.^{2,3}

In Nigeria, like most third world countries, effective contraception still remains a tall order while religion, poverty, early marriage and such cultural values as family size and the quest for a male child continue to play critical roles in family planning; women start childbearing quite early while some continue well into an advanced age.⁴ But in the more advanced economies, educational and career aspirations, increase in life expectancy, the availability of contraception, late marriage and remarriage⁵⁻⁷ have all added up to an increasing tendency for a delay in starting a family amongst women in the last 30 years.⁸ Though maternal age threshold has been put at 35 years and advanced maternal age at 40,⁹ advances in assisted reproductive technology, ovarian hyperstimulation and egg donation have been used to achieve pregnancy in anovulatory and postmenopausal women.¹⁰

In the light of age-related complications of pregnancy on both sides of the optimal age range, concerns abound. On the adolescent side, such pregnancy and birth complications like anaemia, hypertension, gestational diabetes, vesico-vaginal fistula abound.² In the older women, in addition to such co-morbidities as Diabetes Mellitus and hypertension,¹¹ there are well-documented effects of advancing maternal age on antepartum haemorrhage,¹² oocyte quality,¹³ conception,¹¹ miscarriage rates;⁸ preterm birth,¹⁴ low birth weight,¹⁵ increased need for caesarean sections,¹⁶ intrauterine and unexplained foetal death.^{17, 18} It is imperative to look at pregnancy outcome in different age brackets and focus on effective obstetric supervision and management.

MATERIALS AND METHODS

This was a retrospective study that was undertaken at a tertiary health institution in Delta State, Nigeria, over a period of seven years (2008 – 2014). The inclusion criteria were only those pregnant women who were between the ages 18-49 and not only booked in the ante-natal clinic of the health institution for their obstetric care, but also delivered at the health facility. Ethical clearance was obtained from the Ethics committee of the Faculty of Basic Medical Sciences, Delta State University, Abraka. With the permission of the relevant authorities in the establishment, we searched through the antenatal records for the period under review and collated the data of 3501 women seen

over the 7 years period and were grouped into 4 with age brackets: 18-25 years (n=722=20.62%); 26-33 years (n=1994=56.96%); 34-41 years (n=750=21.42%); 42-49 years (n=35=0.99 %). Linear regression model was used to analyse the causal-effect relationship between the variables after adjusting for religion, race, education, and marital status. The results were expressed as mean \pm Standard Deviation of data collected and statistical significance was analysed using the student's t-test statistics (LSD t-test), one way analysis of variance (ANOVA), followed by post HOC LSD test for multiple comparison, using Statistical Package for Social Science (SPSS, 22) windows software and significance at p-values<0.05 were considered statistically significant.

RESULTS

Pregnancy, gestation and possible complications encountered in the various age brackets were assessed in this study.

Maternal Age and Duration of Pregnancy

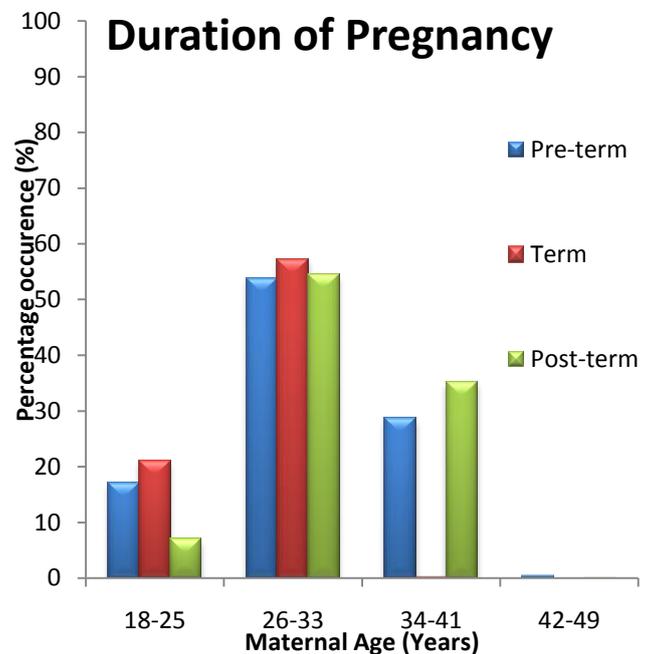


Figure 1.1: Duration of pregnancy in percentage amongst pregnant women of various age groups.

Effect of maternal age on the duration of pregnancy

Using linear regression model to analyse the causal-effect relationship between both variables, the association between maternal age and the duration of pregnancy was studied.

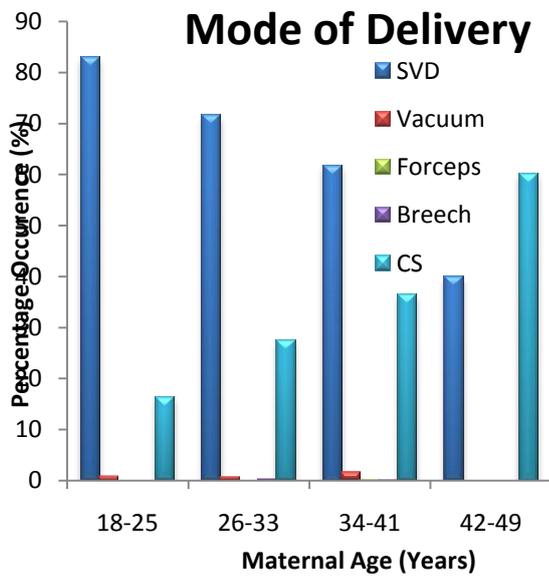


Figure 2.1: Percentage occurrence of several mode of delivery among pregnant women of various age groups.

Where: SVD – Spontaneous Vaginal Delivery

CS – Caesarean section

3.1 Maternal Age and Foetal Birth Weight

The foetal birth weight was observed among the participants of the study based on their age groups (≤ 25 yrs, 26-33 yrs, 34-41 yrs and 42-49 yrs). Foetal birth weight were classified in three categories; Low birth weight, Normal birth weight and Macrosomia as seen in the figure below.

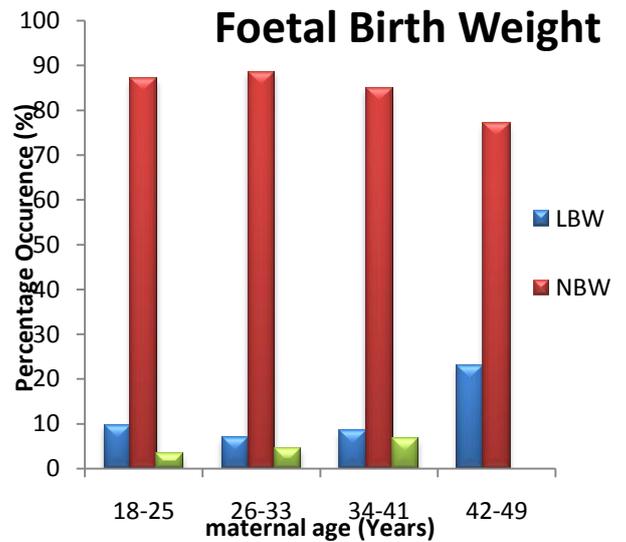


Figure 3.1: Percentage occurrence of foetal birth weight among pregnant women of various age groups.

Where:

LBW – Low birth weight

NBW – Normal birth weight

Figure 5.1a: Percentage occurrence of pregnancy complications among pregnant women of various age groups

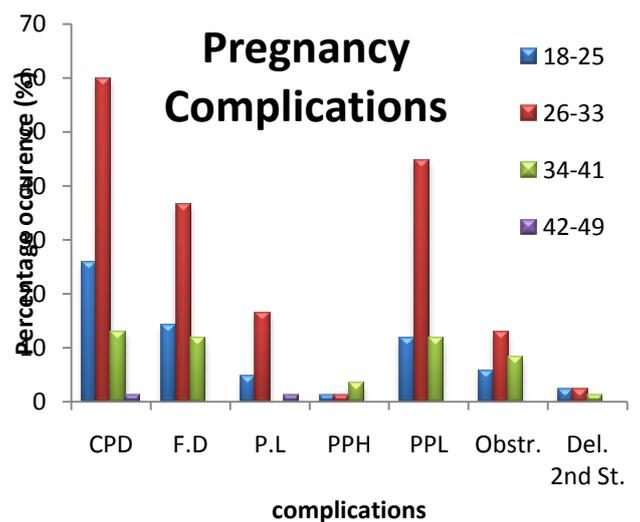


Figure 5.1b: Percentage occurrence of pregnancy complications among pregnant women of various age groups.

Where:

PE – Preeclampsia
 EC – Eclampsia
 PIH–Pregnancy induced hypertension
 Ges. Dia – Gestational diabetes
 His. CS – History of Caesarean section
 APH – Ante-partum haemorrhage
 CPD – Cephalopelvic disproportion
 F.D – Foetal distress
 P.L – Prolonged labour
 PPH – Post-partum haemorrhage
 PPL – Poor progress of labour
 Obstr. – Obstruction
 Del. 2nd St – Delayed 2nd stage

DISCUSSION

Though teenagers aged 15-19 years account for 11% of the 131.4 million births worldwide annually,¹⁹ the optimal childbearing age remains 20-25 years.²⁰ In the more developed economies, academic and career pursuits, divorce and remarriage coupled with advances in assisted reproductive technology, that have witnessed anovulatory and even postmenopausal women conceiving and birthing babies,²¹ late motherhood with associated age-related pregnancy complications,²² would present pregnancy outcome concerns. With 35 years as the maternal age threshold where spontaneous pregnancy is expected to be relatively complications-free to both mother and child, it was the objective of this study to look at the outcome of pregnancy at the different age brackets.^{23, 24}

In analyzing relationship between maternal age and the various outcomes of pregnancy in the different age brackets, it was important that the marked disparity between the number of cases seen in the 26-33 years age bracket (n=1994) and the rest of the groups where 18-25 (n=722); 34-41 (n=750) and 42-49 (n=35) be noted.

In analyzing the duration of pregnancy, there was a weak negative correlation between the maternal age and the duration of delivery with a Pearson Product moment correlation coefficient (PPMCC/R) of -0.016. This relationship is considered not significant since the relationship has a *P* value of 0.368 as compared to a significant p-value of >0.05. From table 1.3, only 0.2% variation observed in the duration of pregnancy among women was accounted for by maternal age. It is thus not a useful predictor or cause for specific duration of pregnancy. This however, is not in accordance with the findings of Jacobsson *et al.*, (2004) who reported an association between increased maternal age and preterm birth. The intercept of the linear plot from the relationship shows that even when maternal age is 0, duration of

pregnancy will be 38.64 weeks which is not far from the average duration of pregnancy seen in the study population. The slope (-0.020) also shows that with one unit increase in the maternal age, the duration of pregnancy may drop with about 0.020 weeks.

The mode of delivery was classified into five categories: Standard vaginal delivery (SVD), Vacuum, Forceps, Breech and Caesarean section (CS) as seen in figure 2.1. From Table 2.i, it was observed that the most common mode of delivery was SVD followed by CS. The histogram in figure 2.1 showed a negative correlation between the number of spontaneous vaginal delivery with age, with the number being highest in the 18-25years bracket and least in the 42-49 years group. This collaborates with the findings of Floor *et al.* (2012) whose result also showed a high rate of SVD compared to CS while a positive correlation was seen between maternal age and caesarean section. Thus, the number of deliveries through CS was least in the 18-25yrs group and highest in the 42-49yrs old age bracket which is in agreement with the findings of Delbaere *et al.* (2007) and those of Jacobsson *et al.* (2004); who in their study, reported seeing delivery via Caesarean Section in 1:3 women ≥ 45 years. Goldman *et al.* (2005), Verma, (2009), Bayrampur and Heaman(2010); all reported a positive correlation between maternal age and deliveries via caesarean section. Others being chosen by patient, CS in advance maternal age is thought to be due to a twin decrease in the elasticity of the pelvic ligaments and atony of the uterine smooth muscles.^{25, 26}

As to be expected, while multiparity was 100% in the 42-49 years group, it was 93.73% in the 34-41 group, 80.79% in the 26-33 group and 60.52% in the 18-25 years age brackets. On the other hand, nulliparity was nil in the 42-49 years group; 39.48% in the 18-25 group, 19.21% in the 26-33 group, and 6.27% in the 34-41 group.

Figure 3.1 and Table 3.1 show that women within the 42-49years age bracket were more likely to end up with low birth weight babies which agrees with the findings of such authors as Jolly *et al.* (2000) and Josephet *al.* (2005) whose findings indicated positive correlation between age and low birth weight.

Complications in pregnancy were observed to be more common within the 26-33years and 34-41 years age brackets. Our findings

was particularly prevalent amongst the 26-33 and the 34-41 age groups. Result from this study agrees with previous studies that reported a relationship between gestational diabetes and macrosomic birth weight, where diabetic mothers had higher chances of delivering macrosomic babies.²⁷⁻³⁰ While pre-eclampsia was highest in the 26-33 years group followed by the 34-41 years group, there was none in the 42-49 years bracket. On the other hand, Eclampsia was highest in the 18-25 years group and none in the 34-41 and 42-49 years groups. Pregnancy induced hypertension was highest in the 26-33 years group and least in the 42-49 years. Group 26-33 years had the highest figure of pregnancy complications for previous history of CS followed by the 34-41 years group. Antepartum hemorrhage was highest in the 26-33 age brackets but absent in the 42-49 group. Again, Cephalopelvic disproportion was highest in the 26-33 groups and least in the 42-49 groups. Fetal Distress, post-partum hemorrhage, poor progress of labor, delayed second stage and obstruction were all absent in the 42-49 group while fetal distress, prolonged labor, poor progress labor, delayed second stage and obstruction were highest in the 26-33 years bracket. However, post-partum hemorrhage was highest in the 34-41 years bracket.

Conclusion

Current study has established a weak negative correlation between maternal age and duration of Labor. Also, while there was significant relationship between maternal age and mode of delivery, there was no such significant correlation seen between maternal age and duration of pregnancy.

Disclosures: Authors affirm that there are no interests to be disclosed

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