



Determination Of The High-Risk Reproductive Age Group Among Women In Katsina State, Nigeria

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ABSTRACT

Maternal age at beginning has long been verified to have significant association with pregnancy outcome and maternal health. However, woman's age is the single most vital cause affecting her fertility. Therefore, it was sought to investigate the relationship of maternal age < 20, 20-29, 30-39, > 40 associated with maternal outcome (Dead or Survive) with the use of logistics regression approach for the collected data in Federal medical center, Katsina, Turai Yaradua Maternity and Children Hospital, and General Hospital Katsina from 1999-2017. The model acknowledged to be suitable is binary logistics regression. Furthermore, as the 13,334 data sets were used for the data analysis, the age group of < 20 & > 40 have been classified as high-risk categories compared to their age group counterparts. Physicians need to formulate effective counseling strategies for the high-risk reproductive age categories across the state. The result could help investigators in the field of public health for monitoring procedure and forthcoming managerial decision.

Keyword: Maternal age, maternal mortality, Binary logistics regression. Katsina state

INTRODUCTION

Maternal age at beginning has long been verified to have significant association with pregnancy outcome and maternal health (Hanif, 2011). Maternal mortality still remains as a major burden in many developing countries though significant progress has been made globally in the last two decades (MDG, 2011). According to WHO 2012, around 287,000 maternal deaths occurred in 2010 globally at a staggering rate of around 210 deaths per 100,000 live births. Though MMR declined from 400 to 210 per 100,000 live births between 1990 and 2010, however, the figure remains unacceptably high. Moreover, Sub-Saharan Africa and Southern Asia account for more than 85% of all maternal deaths where half of the deaths occur in Africa and one third in Southern Asia (WHO, 2012). However, woman's age is the single most vital cause affecting her fertility (NPESU, 2004). As a woman ages, it takes longer to conceive and the risk of not being able to get pregnant escalates. Also, the risk of miscarriage, and difficulties in pregnancy and childbearing, increase (NPESU, 2004). Starting at around 32 years, a woman's likelihoods of conceiving declines gradually but significantly, from age 35, the fertility decline speeds up and by 40, fertility has dropped by half (NPESU, 2004). Globally, 72 percent of all deaths in women under age 19 are attributed to complications of unsafe abortions with complications such as cervical tearing, hemorrhage, pelvic infection, infertility and death (Zabin and Kiragu, 1998). Pregnancy complications such as placenta praevia, intra-uterine growth restriction or fetal demise, gestational diabetes, hypertensive disorders of pregnancy, and caesarean delivery are well known to be more common in older pregnant women CIHI, (2004); Tough *et al.*, (2002). Many researches have been conducted in different places to compare high risk reproductive age group. Some of these are that

of (Jean *et al.*, 2013) who stated that the current study was aimed to evaluate the obstetrical outcomes among primiparous and multiparous African women aged 40 or above and compared them with their younger counterparts aged 20-29 years at two teaching hospitals in Cameroon. It was concluded that nulliparous and multiparous African women who are giving birth at 40years and above are at higher risk for cesarean delivery when compared to their younger (20-29years) counterparts. However, primiparous advanced maternal age women have no adverse perinatal outcome, while multiparous advanced maternal age women are at higher risk for adverse perinatal outcome, as compared to their younger (20-29 years) counterparts. Healthcare area stores huge amount of information about patients and their medical conditions. Medical data examination plays vital role in decision making and management in healthcare (Sorjini, 2008).

The conceptual framework shows the framework of maternal mortality variables and constraints in which the research is considered. In this research work, factors considered are maternal age at birth which is believed to be one of the major factor of maternal mortality.

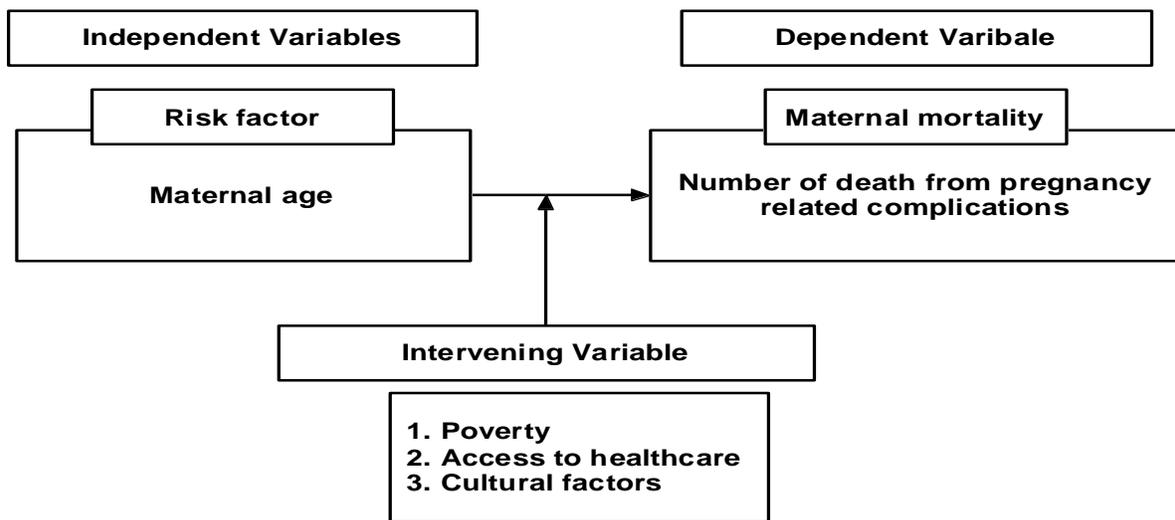


Fig 1: Conceptual frame work of maternal mortality

However, the theoretical perspective illustrates the determinants of maternal mortality mainly as discussed by Maine and McCarthy in its model framework. The framework discusses all the major factors of maternal mortality. It separates these factors into: Distant factors, intermediate and outcome.

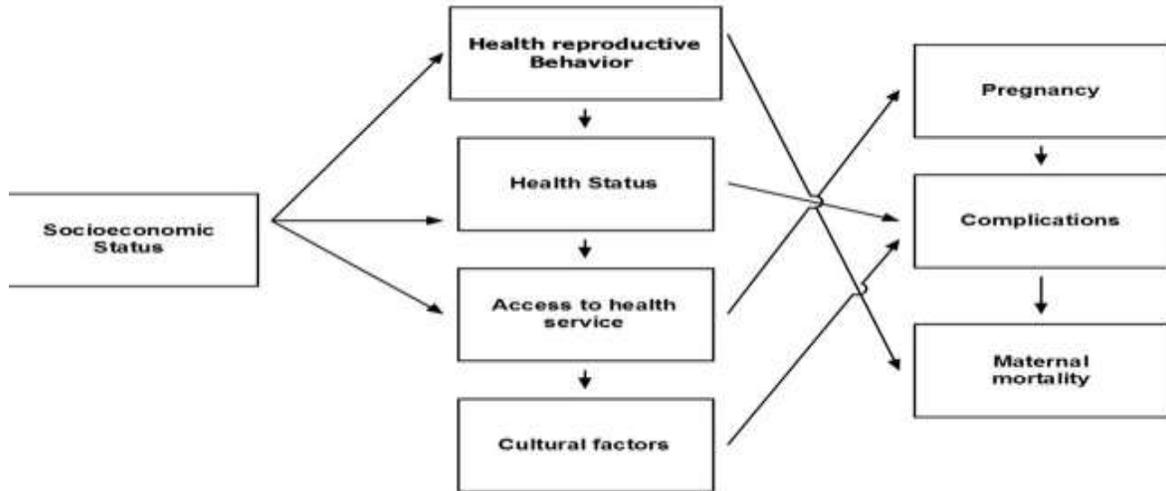


Fig2: A framework for analyzing the determinants of maternal mortality

MATERIAL AND METHODS

Study area

Katsina State is situated in Northern Nigeria with 2005 population estimate of 6,483,429 inhabitants, and graded 5th of 36. It lies between latitude 11°02’ and 13°13’, longitude 6°05’ and 9°20° with an expanse of 24,1929km² . It is bounded in the east by Jigawa and Kano States, in the west by Zamfara State, and in the North by Niger Republic (Wikipedia, 2017).

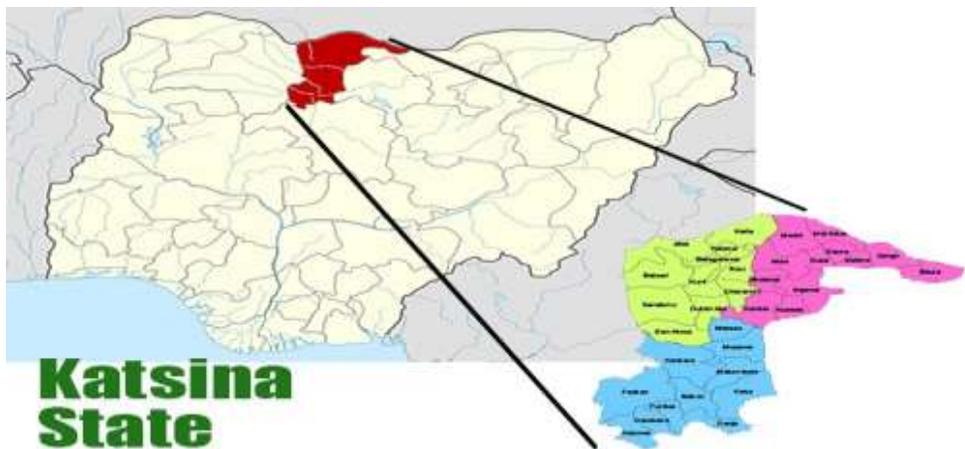


Fig3: Location of Katsina state in Nigerian Map

The data used in this research work was collected in record department of Turai Yar`adua Maternity and Children Hospital, Federal medical center, Katsina and Katsina state General Hospital from 2005-2017. A total of 13,344 women were considered in the analysis and also the 100% dataset was used to determine the high risk reproductive age group. Therefore, there are 2 attributes with their assigned codes containing MA-Maternal age (<20 = 1, 20-29 = 2, 30-39 = 3, >40 = 4) with MO-maternal outcome of (Dead=0 and Survived=1). SPSS Software version 20 was used for data analysis.

Data analysis

Each of the research hypotheses were tested using the binary logistic regression analysis. This was

done by using the ENTER method for each predictor variable and then finally all the variables at once at 95% confidence level. SPSS Software version 20 was used for data analysis and GraphPad Prism version 6.07 for the visualization of the result, with the research hypotheses and objectives of the study below:

Research Hypotheses:

- There is no significant impact of maternal mortality on maternal age H_0 (Null Hypothesis).
- There is significant impact of maternal death on maternal age H_a (Alternative Hypothesis).

Objective of the study:

- Determine the level of influence of maternal age at birth and maternal mortality.

The logistic regression model should be fitted because it allowed the estimation of the occurrence of probability of an outcome due to the effect of several explanatory factors. This technique enables adjusting for many explanatory factors and controlling for many confounders at the same time as it enables easy detection of interactions between explanatory factors. It is flexible, easy to use and usually gives meaningful interpretation by giving the magnitude and the direction of the association between explanatory and outcome variables. The logistic analysis examined the relationship between the selected risk factors and the maternal survival status. This was done through the interpretation of the odd ratios from logistic regression model. Linear logistic regression method is used to identify risk factors and predict the probability of success, say probability of death.

Suppose there are ‘n’ individuals, some Dead (failure) and others Alive (Success),

$Y_i = 1$, if the i^{th} individual is alive and 0 if the i^{th} is dead. Suppose also for each individual, there are ‘p’ independent variables $x_1 + x_2 + x_3 + x_4 + \dots + x_n$, then the probability of death is represented by the Logistics regression method.

$$p_i = \frac{e^{bjxi}}{1 + e^{bjxi}} \dots \dots \dots (1)$$

And also,

$$1 - p_i = \frac{1}{1 + e^{bjxi}} \dots \dots \dots (2)$$

Where bj are unknown coefficients, the log-odds of pi and $1 - pi$ gives the linear logistic model

i.e. $\log\left(\frac{Pi}{1-pi}\right) \dots \dots \dots (3)$

RESULTS AND DISCUSSION

Table 1: Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step	3737.690	3	.000
Step 1 Block	3737.690	3	.000
Model	3737.690	3	.000

The Omnibus test in the table1 shows the significance of the model, block and the step as being identical since the p-values are less than 0.05. The chi-square value shows that all the variables included in the model are significant in explaining maternal mortality.

Table 2: Variables in the equation

Risk factors	B	S.E.	Wald	df	Sig.	Exp(B)
Maternal Age (<20)			2884.628	3	.000	
Maternal Age (20 – 29)	-1.316	.078	282.647	1	.000	.268
Step 1 ^a Maternal Age (30 – 39)	1.620	.065	612.376	1	.000	5.054
Maternal Age (>40)	1.841	.072	649.735	1	.000	6.305
Constant	-.211	.057	13.689	1	.000	.810

a. Variable(s) entered on step 1: Maternal Age

Result in table 2 reveal that maternal age at birth is significantly related to maternal mortality (P-value < 0.05). Maternal mortality increases with the decrease in maternal age. It also explained that when the age of mothers is greater than 40, maternal mortality also increases.

In terms of odds

Maternal age >40 reduces maternal mortality by 0.268 related to mothers in the reference category <20 years. The odds of maternal age of 30-39 years of age is 5.054 times the odds of maternal age in the reference category <20 years. However, the odds of maternal age of 20-29 years of age is 6.305 times the odds of maternal age in the reference category <20 years. This implies that the likelihood of mothers experiencing maternal mortality decreases with an extreme maternal age at birth.

CONCLUSION

The main objective of this research is to determine the level of impact of maternal age at birth and maternal death. However, maternal mortality increases at the extreme age that is < 20 years of age and > 40 years of age. This is a sign that as mothers grows older, their chance of experiencing maternal death is becoming high. To control the maternal death based on the age categories, it is recommended that girls child education should the number priority in the study area, must importantly the younger and older ones of age categories <20 and >40 respectively.

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