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Table of Content: Volume 10 Number 6 June 2018

ARTICLES

- Disparities in adverse pregnancy outcomes between advanced maternal age and younger age in Ethiopia: Institution based comparative cross-sectional study** **54**
Mekiya Ediris, Tefera Belachew, Fekadu Yadassa and Kidest Getu
- Women autonomy and maternal healthcare services utilization among young ever-married women in Nigeria** **62**
Awolaye Abayomi F, Victor Chima and Alawode Oluwatobi A

Full Length Research Paper

Disparities in adverse pregnancy outcomes between advanced maternal age and younger age in Ethiopia: Institution based comparative cross-sectional study

Mekiya Ediris^{1*}, Tefera Belachew², Fekadu Yadassa³ and Kidest Getu³

¹Department of Midwifery, College of Health Sciences and Medicine, Wolaita Sodo University, Wolaita Sodo, Ethiopia.

²Department of population and family health, College of Health Sciences, Jimma University, Jimma, Ethiopia.

³Department of Nursing and Midwifery, College of Health Sciences, Jimma University Jimma, Ethiopia.

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Women older than 35 years are known to bear "advanced maternal age" and considered to be at risk of adverse pregnancy outcome. Data, on adverse birth outcomes and the risk factors are still scarce in developing countries including Ethiopia. The aim of this study was to examine the obstetrical outcomes among primiparous and multiparous women of advanced age (35 and above) when compared to the younger age group (20 to 34) and identify its predictors among women delivering at public health facilities of Shashemene Town, Ethiopia. Institution based comparative cross sectional study were conducted from March to April, 2016. A consecutive sampling technique was employed to select 306 study participants. Data were collected using pretested structured questionnaires through face to face interview and checklist. Data were entered into Epi-data version 3.1 and analyzed using SPSS version 20.0. Logistic regression analyses were used to identify associated factors. A total of 306 mothers were involved in this study with response rate of 100%. Advanced maternal age, antenatal follow up, mode of current delivery and previous caesarian section were factors associated with adverse pregnancy outcome.

Key words: Adverse pregnancy outcomes, advanced maternal age, participants.

INTRODUCTION

Globally, women and children are among the most vulnerable in terms of unfavorable influences in the environment including insufficient nutrition, inadequate health care and poor education. In addition, pregnancy brings those factors as high risk for women. Worldwide, it is estimated that more than 50 million women suffer from

poor reproductive health and serious pregnancy related complications (Tsfay et al., 2015).

Mothers age 35 and above at estimated date of delivery is known to be old maternal age (Yogev et al., 2010). Older age is risk factor for decreasing fertility and increasing miscarriage. For women who succeed in

*Corresponding author. E-mail: mekediris@gmail.com.

conception at higher age, the risk of complication during pregnancy and delivery is high (Almhfooth et al., 2013). Older pregnant mothers have an increased risk of pregnancy, labour complications and adverse fetal outcome. Medical complications like hypertensive disorders, gestational diabetes and preterm birth and labour related complications like induction of labour, prolonged labour and hemorrhage are the most common ones. This aged group mothers mostly delivered with caesarean section and their children will have a higher risk of congenital anomalies and will face fetal and neonatal mortality (Tromp et al., 2010). Even if the issue is essential and its effect is bad to the mother and fetus, studies on this area lack adequate data. Therefore this study aimed to compare pregnancy outcomes between advanced maternal age and younger age and identify predicting factors among women delivering at public health facilities of Shashemene Town.

MATERIALS AND METHODS

Study setting and Study period

Shashemene town is situated in West Arsi Zone in Oromia Regional State, Ethiopia ("CSA-Ethiopia", 2012). The city lies on the trans-African highway 4 of Cairo-Cape town, about 150 miles (240 km) from Addis Ababa. Based on the 2007 population Census, the population size of Shashemene were 102,062 of which 51,477(50.4%) are males and 50,585 (49.6%) are females. According to the Central Statistical Agency of 2005, females 35.2% (16,288.5) were in reproductive age group (15 to 49), the total fertility rate was 4.2. The population expected for 2013 using the census data in 2007, was 129,084, of which 65,091 were men and 63,993 were women.

Study design and population

A comparative cross sectional study was conducted on pregnancy outcomes among women aged 20 to 34 years and 35+ delivering at public health facilities in Shashemene town. All pregnant mothers who gave birth at public health facilities of Shashemene town, Ethiopia, from March to April, 2016 were taken as source population and selected mothers who gave birth during the study period at public health facilities of Shashemene town, Ethiopia taken as study population. All mothers 20 years and above who gave birth at public health facilities of Shashemene town, Ethiopia during data collection period were included and women who were seriously ill and unable to respond were not included in the study.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Board (IRB) of Jimma University College of Health Sciences to shashemene town health facility authorities. Permission letters were obtained from Shashemene Referral Hospital and Melkaoda Hospital Administration, after the objectives of the study were explained, consent was obtained from head of maternal and child health unit. Written and verbal consent were taken from selected participant to validate willingness to participate in the study before the interview. Privacy and confidentiality were ensured by using coding.

Sampling technique

A comparative cross sectional study was conducted among women aged 20 to 34 years and 35+ delivering at public health facilities in the town.

Data collection tools

Data were collected using pretested and structured questionnaire and through chart review. Questionnaire contained socio demographic, obstetrics, medical history and other characteristics.

Data analysis and quality control

Collected data were entered into Epi data version 3.1 and exported to SPSS version 20.0 for analysis. After cleaning data for inconsistencies and missing value in SPSS, binary logistic regressions with p value < 0.25 were transferred to multivariable logistic regression. Variables with p value < 0.05 were considered as significant variable. Training for data collectors, pretest and supervision were undertaken to control data quality.

RESULTS

Socio demographic characteristics of the respondent

Three hundred and six study participants participated with a response rate of 100%. The mean age of women (20 to 34) was 24.39 (SD ± 3.865). Regarding residence in the age group 20 to 34, 88 (50.3%) were living in urban. Married women between age 20 to 34 was 151. Those mothers who can read and write were 49(32.02) and 31(20.2) in both age group, respectively. Oromo was the dominant ethnicity in the study area with 110 (71.89%) and 102 (66.69%). Majority of participants in both age group were housewives in their occupation 116 (48.7%), 112(79.7%) and their Income ranged from 1801 to 3000 48.3 (31.37%) (Table 1).

Obstetric characteristics of participants

Majority of normal reproductive age group participants are multigravida which accounts for 92(41.3) and 131(58.7) in advance reproductive age group. Moreover, multiparas were 86(41.1%) and 123(58.9%). Those mothers with 1 to 3 antenatal visits were 89(50.9%) and 86(49.1%), respectively. Mothers who took iron/folic acid during antenatal care visit were 98(44.1%) and 124(55.9%). For mothers in both age group, their current mode of delivery of SVD was 112(73.2%) and 106(26.8). Current labour with no complication in advanced age group was 129(84.3%) (Table 2).

Medical related complications of the respondents

Advanced reproductive age group mothers who do not

Table 1. Sociodemographic characteristics of participants in women attending public health facilities of Shashemene Town, Ethiopia, 2016 (N =153).

Variables	Normal reproductive age group (20-34)	Advanced reproductive age group (35-49)
	N (%)	N (%)
Residence		
Rural	65(49.6%)	66(43.1%)
Urban	88(50.3%)	87(56.86%)
Marital status		
Married	151(98.69)	152(99.34)
Others ¹	2(1.31%)	1(0.65%)
Educational status		
Can't read and write	35(22.87)	39(25.49)
Can read and write only	49(32.03)	31(20.26)
Elementary	38(24.8)	47(30.72)
Secondary	14(9.1)	25(16.34)
College and above	17(11.11)	11(7.19)
Ethnicity		
Oromo	110(71.89)	102(66.66)
Amhara	26(16.99)	28(18.3)
Silte	11(7.19)	15(9.8)
Gurage	5(3.28)	9(5.88)
Others ²	1(0.65)	9(5.88)
Occupation		
Housewife	116(48.7)	122(79.74)
Merchant	17(51.5)	16(10.46)
Others ³	20(13.07)	15(9.8)
Income		
300-1000	44(28.76)	46(30.06)
1001-1800	43(28.1)	27(17.64)
18001-3000	48(31.37)	48(31.37)
>3000	18(11.76)	32(20.9)

Others¹- Single, widowed

Others²- Wolayita, Hadiya, Tigire, Kambata

Others³- farmer, daily labour

report medical illness before pregnancy was 136(88.88). Whereas in both age group from those who reported previous medical illness 22(14.37) and 17(11.11) anemia is commonly mentioned one 17(11.11) and 6(3.92) respectively (Table 3).

Frequency of maternal adverse pregnancy outcomes of the respondent

While comparing the prevalence of adverse maternal pregnancy outcomes among women aged 20 to 34 and

35+, the risks were high among advanced maternal age (Table 4).

Frequency of fetal adverse pregnancy outcomes of the respondent

Adverse pregnancy outcome at normal reproductive age group was 45(29.41%) and in advanced age group it was 62(40.5%). Adverse fetal outcomes were more at advanced maternal age in comparison with normal reproductive age group except still birth which was the

Table 2. Obstetric characteristics of participants in women attending public health facilities of Shashemene Town, Ethiopia, 2016 (N= 153).

Variable	Normal reproductive age group (20-34) N (%)	Advanced reproductive age group (35-49) N (%)
Gravidity		
Primigravida	61(73.5)	22(26.5)
Multigravida	92(41.3)	131(58.7)
Parity		
Multipara	86(41.1%)	123(58.9)
Primiparous	67(69.1%)	30(30.9)
Number of visit		
1-3	89(50.9)	86(49.1)
>=4	31(38.3)	50(61.7)
Take Iron /folic acid during ANC		
Yes	98(44.1)	124(55.9)
No	55(65.5)	29(34.5)
Mode of current delivery		
SVD	112(73.2)	106(26.8)
Caesarian section	41(46.6)	47(53.4)
Current labor have any problem or complication		
Yes	26(16.99)	24(15.69)
No	127(83)	129(84.3)
Type of complication		
Prolonged labor	13(8.49)	8(5.23)
Mal position or Mal presentation	8(5.23)	11(7.19)
Obstructed labor	2(1.31)	4(2.61)
Others	4(2.61)	2(1.31)

²Obstructed labour, Failure of VBAC, uterine rupture, Postterm, APH.

same frequency among the two age group (Table 5). In binary multiple logistic regression age, education, ethnicity, occupation, outcome of last delivery, previous caesarian section and antenatal follow up showed association with p value < 0.2, these variables transferred to multivariate logistic regression then age, antenatal follow up, previous caesarian section and mode of current labour showed significant association with p value < 0.05 (Table 6).

DISCUSSION

The study revealed that the prevalence of adverse pregnancy outcomes was 45(29.41%) and 62(40.5%) among mothers aged 20 to 34 and 35⁺, respectively. This

study showed that adverse pregnancy outcomes were highly prevalent in advanced maternal age when compared to younger age group. The study done in Norway from 2004 to 2007 ruled out that the prevalence of adverse pregnancy outcomes among advanced maternal age was 33.4% (Laopaiboon et al., 2014). Another study conducted in Taiwan found that the prevalence is from 11.4 to 19.1% (Jahromi and Hussein, 2008). A large, population-based cohort study in the UK showed an 18.2% prevalence of adverse pregnancy outcome among maternal ages of 35 years or older (Kenny et al., 2013).

The prevalence of hypertensive disorder of pregnancy in advanced maternal age was higher when compared to their younger counterparts. This study was similar to the study conducted in Nigeria (Liou et al., 2010). This might

Table 3. Medical related complications of women attending public health facilities of Shashemene Town, Ethiopia, 2016. N =153.

Variables	Age	
	Normal reproductive age group (20-34)	Advanced reproductive age group (35-49)
	N (%)	N (%)
Medical illness before pregnancy		
Yes	22(14.37)	17(11.11)
No	131(85.6)	136(88.88)
Type of medical illness		
Anemia	17(11.11)	6(3.92)
Malaria	0(0.0)	3(1.96)
Upper urinary tract infection	4(2.61)	2(1.31)
Chronic hypertension	1(0.65)	2(1.31)
Diabetes mellitus	0(0.0)	4(2.61)
On treatment		
Yes	17(11.11)	13(8.49)
No	136(88.88)	140(91.5)

be due to the reason that old age is one of a risk factor for pregnancy induced hypertensive disorder.

The prevalence of postpartum hemorrhage in advanced maternal age was higher when compared to their younger counter parts. This study was supported by the study done in Israel (Tsfay et al., 2015). Also according to Laopaiboon et al. (2014), the prevalence of caesarian delivery was 6 times higher among advanced maternal age when compared to younger mother. Study done in Nigeria supports this result; advanced age has higher incidence of cesarean delivery than their counterparts (Bako et al., 2013). These two findings can be based on the reason that advanced age women are more likely to be grand multi-para and this may lead them to face postpartum hemorrhage due to uterine atony. Obstructed labour, prolonged labour, mal presentation and related fetal complications which is more common in advanced maternal age may lead them to caesarean section than their counter part.

Adverse fetal outcome like low birth weight, preterm birth, Apgar score 5 min < 7, congenital anomaly, admission to neonatal intensive care unit (NICU) and fetal death are highly related with advanced age group. This result is similar with a study conducted in Turkey which ruled out that advanced maternal age were significantly associated with fetal complication and Apgar score 5 min < 7 (Lamminpää, 2015). Similarly, study conducted in Flemish found that advanced maternal age were associated with very preterm and low birth weight (Delbaere et al., 2007).

Advanced maternal age (35+) was 2 times risky of wide range of adverse pregnancy out come when compared to mothers in normal reproductive age group (20 to 34). The result is in line with a case control study conducted in

Iran, which revealed that advanced maternal age of 40 and above were more complicated by maternal and neonatal complication (Khalil et al., 2013). A retrospective study done in Spain supports this result (Jahromi and Hussein, 2008). In this study antenatal care follow up was significantly associated with adverse pregnancy outcome. Studies done in Gondar University Hospital, Northwest Ethiopia rule out that lack of ANC follow up were associated with adverse pregnancy outcome like still birth (Adane et al., 2014).

A prospective study done at University Hospital UZ Brussels proved that lack of antenatal follow up was associated with adverse pregnancy outcome like preterm (Beeckman et al., 2012). Mode of current labour is significantly associated with adverse pregnancy outcome. Most mothers who came to this hospital were referred from health center with complication that leads to caesarian section. Mothers who deliver by caesarian section were more risky to develop adverse pregnancy outcome than those who delivered by spontaneous vaginal delivery. Caesarian section is a major operation which can be associated with significant maternal and fetal, morbidity and mortality. This can be due to the fact that bleeding in caesarian section is higher than vaginal delivery, this can lead mother to risk of death (Arulkumaran, 2016).

Conclusion

In this study, adverse pregnancy outcome is high in advanced maternal age. Postpartum hemorrhage and Hypertensive disorders are mostly observed adverse outcomes in advanced maternal age. Age, antenatal

Table 4. Frequency of maternal adverse pregnancy outcomes of women attending public health facilities of Shashemene Town, Ethiopia, 2016.

Variable	Age	
	Normal reproductive age group (20-34) N (%)	Advanced reproductive age group (35+) N (%)
Pregnancy induced hypertension		
Yes	18(46.2)	21(53.8)
No	135(50.6)	132(49.4)
Type of pregnancy induced hypertension		
Gestational Hypertension	9(42.9)	2(57.1)
Preeclampsia	7(50)	7(50)
Eclampsia	2(50)	2(50)
Ante partum hemorrhage		
Yes	19(57.6)	14(42.4)
No	134(49.3)	139(50.7)
Post-partum hemorrhage		
Yes	23(48.9)	24(51.1)
No	130(50.2)	129(49.8)
Instrumental delivery		
Forceps	3(2%)	2(1.3)
Induction		
Yes	150(98)	151(98.7)
No	25(59.5)	17(40.5)
Cesarean section		
Yes	126(48.5)	136(51.5)
No	41(46.6)	47(53.4)
Indication for cesarean section		
Previous cesarean section	12(46.2)	14(53.8)
Fetal distress	20(43.5)	26(56.5)
Others ²	7(58.3)	5(41.7)

²Obstructed labour, Failure of VBAC, uterine rupture, Postterm, APH

Table 5. Frequency of fetal adverse pregnancy outcomes among women at public health facilities of Shashemene Town, Ethiopia 2016.

Variable	Age	
	Normal reproductive age group (20-34) N (%)	Advanced reproductive age group (35 and above) N (%)
Neonatal condition		
Live birth	143(93.5)	143(50)
Still birth	10(0)	10(50)

Table 5. Cont'd.

Gestational age		
Term	146(50.7)	142(49.3)
Preterm	5(45.5)	6(54.5)
Post term	2(28.6)	5(71.4)
Current pregnancy condition		
Single	152(50.3)	150(49.7)
Others	1(33.3)	2(66.7)
Twins	0(0)	1(100)
Birth weight		
<1500g	1(14.3)	6(85.7)
1500-2500g	4 (28.6)	10(71.4)
2500-4000g	145(52.5)	131(47.5)
≥4000g	3(33.3)	6(66.7)
5 minute APGAR score <7		
Yes	13(27.7)	34(72.3)
No	140(54.1)	119(45.9)
Congenital anomaly		
Yes	7(33.3)	14(66.7)
No	146(51.2)	139(48.8)
Death	2(28.6)	5(77.4)

Table 6. Multivariable logistic regression Analysis of Adverse pregnancy outcome among women age 20-34 and 35⁺ delivering at public health facilities of Shashemene Town, Ethiopia 2016.

Predictors	P value	AOR	95% C.I. for EXP(B)	
			Lower	Upper
Age	20-34 35 ⁺	0.026	1.00 1.883	1.078 3.288
Antenatal follow up	Yes No	0.004	1.00 3.902	1.529 9.960
Previous caesarian section	No Yes	0.000	1.00 0.094	0.027 0.321
Mode of current labour	SVD Caesarian section	0.002	1.00 3.381	1.581 7.234

follow up, mode of current delivery and previous caesarian section are risk factors for adverse pregnancy outcome.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Women autonomy and maternal healthcare services utilization among young ever-married women in Nigeria

Awoleye Abayomi F, Victor Chima* and Alawode Oluwatobi A

Department of Demography and Social Statistics. Obafemi Awolowo University, Ile-Ife, Nigeria.

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In Nigeria, the lifetime risk of death from pregnancy or childbirth complications is 1 in 30. Maternal healthcare utilisation addresses the risk of maternal mortality and morbidity but its utilisation is influenced by varying factors of which autonomy has been neglected especially for young married women. Therefore, this study examined the relationship between young married women's level of autonomy and maternal health care utilisation in Nigeria. Secondary data from the 2013 Nigeria Demographic and Health Survey was analysed (n=4996) with consideration of young ever married women (age 15 to 24), who had at least one live birth in the last five years preceding the survey. The binary logistic regression models were fitted into the data. Findings revealed that only 30% of women aged 15 to 24 delivered at a health facility while 44% of the total pregnant women had four or more antenatal care visits before delivery. Also, young women with low autonomy were less likely to meet the minimum requirement of four antenatal visits (OR=0.35: CI: 0.29-0.43) and less likely to deliver at a health facility (OR=0.32: CI: 0.27-0.39). The study underscores the need to empower young women to achieve higher levels of autonomy due to its obvious implication on their health and to encourage integrated interventions that considers engaging household and community structures on the benefits of women autonomy and its importance for mother and child's health. Policy and program considerations that would enable the removal of socio-cultural/demographic barriers towards women autonomy in Nigeria should be encouraged.

Key words: Maternal healthcare utilization, antenatal, postnatal, place of delivery, women autonomy

INTRODUCTION

Maternal mortality refers to the death of a woman during pregnancy or within 42 days after the termination of a pregnancy, from any cause related to the pregnancy or its management but not from accidental causes (PRI, 2013). On a global scale, developing countries account for almost all maternal deaths (99%) of the world maternal deaths (WHO, 2015), while in Nigeria, one

woman dies every thirteen minutes from preventable causes related to pregnancy or childbirth making the country to account for 14% of the global total maternal deaths second only to India (APHRC, 2017). It is however interesting to note that it has been established in literature that most of these deaths and health consequences faced by women are preventable (Anyia et

*Corresponding author. E-mail: chimavictor1@yahoo.com.

al., 2008; APHRC, 2017).

The challenge of reducing maternal mortality remains a major health problem in Nigeria and recent statistics from national surveys show that in 2008 the estimated maternal mortality ratio (MMR) was 545 /100,000 live-births while in 2013 it estimated to be 576 /100,000 live births implying that the ratio increased between that five-year period and Nigeria did not achieve the millennium development goal 4 of improving maternal health (WHO, 2015). Literature has established utilisation of maternal health care services such as antenatal care visits, place of delivery (delivery at health facility) and postnatal care received from skilled health workers as veritable and effective way of reducing the risk of maternal mortality and morbidity (Bayu et al., 2015; Deo et al., 2015; Hagos et al., 2014; Ochako et al., 2011; Situ, 2013).

The world currently has the highest number of young people in all of human history, with about 1.2 billion people aged 15 to 24 as at the year 2017 (PRB, 2017). This large numbers of young people are faced with numerous challenges which threaten their health and social wellbeing including their sexual and reproductive life. Many of these young people especially girls in less developed countries get married at young ages, fall victim of adolescent or teenage pregnancies and so on.

Adolescent girls who get pregnant in Nigeria have been reported to be at heightened risk of maternal mortality as report has been found that they are less likely to use maternal healthcare services compared to older women (APHRC, 2017). Another study showed that most of these young women due to their uniqueness (Banke-Thomas et al., 2017), neither benefited from these services nor derive any joy of motherhood, as a result of their young age, lack of autonomy and inexperience (Baral et al., 2010). Studies have examined the relationship between women's autonomy and utilisation of any or all of the maternal health care services, and have found association between them (Asweto et al., 2014; Baral et al., 2010; Bhandari et al., 2017; Hagos et al., 2014; Lowe et al., 2016; Speizer et al., 2014; Thapa, 2012; Tiruneh et al., 2017). Other factors such as age, education, employment or labour force participation and wealth quintile have also been found to be associated with maternal healthcare utilisation (Acharya et al., 2017; Adhikari, 2016; Asweto et al., 2014; Banke-Thomas et al., 2017; Baral et al., 2010; Dahiru and Oche, 2015; Deo et al., 2015; Fawole and Adeoye, 2015; Kamiya, 2010; Okeshola and Sadiq, 2013; Sebayang et al., 2017; Sharma et al., 2007; Situ, 2013; Tarekegn et al., 2014; Teklehaymanot et al., 2017; Tiruneh et al., 2017; Urbaeva, 2015; Woldemicael, 2007a, 2007b; Workineh and Hailu, 2014; Yaya et al., 2017).

Umar (2017) submitted that the ability of a young woman to make independent decisions and take appropriate actions on her reproductive desire is dependent on her level of autonomy especially in a society like Nigeria where in some cultures young girls

are married off to older men. Further, owing to their inexperience, the married female adolescent need to seek permission from their mother-in-law or husband before taking steps on health matters including maternal healthcare services and that of their babies because they lack the needed autonomy or decision-making power to seek health services (Baral et al., 2010).

However, most, if not all of these studies have focused on the full reproductive age spectrum of 15 to 49 years while little attention has been paid to how young married women's autonomy influence their utilisation of maternal health care services in Nigeria especially the married ones, as increasing the autonomy of these young women could be an effective strategy to maximize the use of maternal healthcare services in developing countries if research findings and recommendations are put in place, and this would give these women the much needed "voice" to be able to seek health care services.

Hence, this study seeks to examine the relationship between autonomy and utilisation of maternal health care services among young ever-married women in Nigeria.

MATERIALS AND METHODS

The study utilized secondary data from the 2013 Nigeria Demographic and Health Survey (NDHS) with a total sample size of 4996 young married women aged 15 to 24 who had at least one child in the last five years preceding the survey. Sampling for the survey involved the use of a nationally representative two-stage cluster sampling design with stratification for rural and urban residence. The outcome variable was utilisation of maternal health care service using place of delivery and number of antenatal care visits. Each of the outcome variables were dichotomized; those who delivered their babies in government hospital, government health center, government health post, other public sectors, private health center and other private sector were coded as (1) while those who delivered their babies at respondent home, other home and others are coded as (0). The number of antenatal care visits was also dichotomized as (0) less than four visits, (1) four visits and above.

Further, the principal explanatory variable was women's autonomy which was measured using women decision on large household purchase, decision on visits to relative/family and decision on woman's own health care. In these three indicators an overall composite score was created to reflect number of decision women participate either alone or jointly. This was achieved by generating a new variable by adding the 3 variables measuring women's autonomy. This produced a minimum of 0 and a maximum of 3. Respondent who had scored between 2 to 3 were classified as "high autonomy" and respondent who scored between 0 to 1 classified as "low autonomy". Other important socio-demographic variables included in the analysis were; wealth index, employment status, highest level of education, religion, place of resident, marital status and age of respondents.

Data was analysed at the univariate, bivariate and multivariate levels. At the univariate level, simple frequencies were obtained, test of associations were conducted between the dependent and independent variables at the bivariate level while variables were fitted into the binary logistic regression in the multivariate level analysis and these variables fitted into the logistic regression were those that were found to be associated with the dependent variable at the bivariate level. For the model specification, in an experiment with possible outcomes as either success or failure, coded 1 or 0

respectively representing a binary outcome, the rate of change in the outcome of interest with respect to explanatory variable(s) can be achieved examining its log odds as shown in the binary logistic model below;

$$\ln p/1-p = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

Where $\ln p/1-p$ represents the log odds of using maternal healthcare services, β_0 represents the maternal healthcare service utilisation risk without interplay with any explanatory variable, and $\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$ represents the fraction by which the use of maternal healthcare services is altered by a unit change in the respective explanatory variables $X_1, X_2, X_3, \dots, X_n$, which in this case includes women autonomy and selected women's socio-demographic characteristics of these young women.

RESULTS

Background of respondents

Table 1 presents the socio-demographic characteristics of the study respondents. Youths of age 20 to 24 years made up three-quarter of the study respondents. Approximately 76% of the respondents were either in the poorest or poor categories of wealth status, with 53% of the respondents reported to be currently working. Exactly 9 in 10 respondents were married, slightly more than half (54 percent) had no education and more than two-thirds of the respondents reported Islam as their religion, with almost the same proportion residing in rural areas.

Utilization of maternal health care services

Table 2 presents the selected intervening variables and their frequency distributions among study respondents. Exposure to mass media was reported by 61% of the women. Almost all women in the study reported having either high or average level of autonomy in their households. Further analysis revealed that the proportion of women who reported average autonomy tripled the proportion with high autonomy while less than one percent reported having low autonomy in the household. On household decision making, more than 70% of the women reported that their husbands alone make decision on the women's health and large household purchases while less than 25% stated these decisions are made jointly. Only 3% of these women reported making decisions alone on their health and on large household purchases. Slightly more than three-fifth of the women (62%) reported that their husbands make decision alone on visit to family or relatives while a small proportion (4%) stated that they make decision on visit to family or relatives alone.

Tables 3 and 4 shows the relationships between the independent, intervening variables and maternal health care utilisation among the respondents. It was revealed that increasing age amongst married youths lead to

increase in number of antenatal care visits and facility delivery.

The chi-square statistics indicated significant association between respondents' age, antenatal care ($\chi^2=66.27, p<0.05$) and place of delivery ($\chi^2=46.7, p<0.05$). The chi-square statistics also confirmed the significant association between the respondents' wealth status, antenatal care ($\chi^2=975.15, p<0.05$) and place of delivery ($\chi^2=1044.26, p<0.05$). Women in the poorest wealth quintile were found to have attended less antenatal care and least utilized facility delivery. Further results showed that the higher the wealth status of respondents the higher the utilisation of maternal health care services.

Respondents who reported being employed had four or more antenatal care visits and also utilized facility delivery than their counterparts who were unemployed. The Chi-square statistics showed a significant association between respondents' employment status and antenatal care visit ($\chi^2=59.14, p<0.05$) and place of delivery ($\chi^2= 56.47, p<0.05$). Findings revealed that the higher the respondents level of education, the higher the utilisation of maternal health care services. Respondents with higher education had four or more antenatal care and utilized facility delivery in comparison with other educational levels. The Chi-square test showed significant association between respondents' level of education and antenatal care ($\chi^2=930.89, p<0.05$) and place of delivery ($\chi^2= 1,138, p<0.05$). Examining religious affiliation, Christians reported four or more antenatal care visits and utilized facility delivery than their counterparts and the Chi-square statistics revealed that respondents' religion is significantly associated with antenatal care ($\chi^2=329.92, p<0.05$) and place of delivery ($\chi^2= 634.29, p<0.05$). Results show respondents who reside in urban area had four or more antenatal care and utilized facility delivery in comparison to rural residents, with the Chi-square statistics also showing that place of residence is significantly associated with antenatal care ($\chi^2=452.33, p<0.05$) and place of delivery ($\chi^2= 541.85, p<0.05$).

Women who reported taking decisions alone on her health, large household purchases and visit to relatives reported attending four or more antenatal visits and utilized facility delivery than other women. The Chi-square statistic showed significant association between decision on health and number of antenatal visit ($\chi^2=224.17, p<0.05$) and place of deliver ($\chi^2= 290.0, p<0.05$); Also, decision on large household purchase was found to be significantly associated with antenatal care ($\chi^2=230.31, p<0.05$) and place of delivery ($\chi^2=326.36, p<0.05$), and this was also the case between women who make decision alone on visit to relative and antenatal care visits ($\chi^2=232.79, p<0.05$) and place of delivery ($\chi^2=285.95, p<0.05$).

Analysis of the influence of autonomy on antenatal visits and facility delivery revealed that an increasing level of autonomy lead to increase in number of antenatal visits

Table 1. Distribution of respondents by selected socio-demographic characteristics.

Variable	Frequency (4996)	Percentage (%)
Age of respondent		
15-17 years	338	6.8
18-19 years	851	17.0
20-24 years	3.807	76.2
Wealth index		
Poorest	1.338	26.8
Poorer	1.384	27.7
Middle	993	19.9
Richer	812	16.3
Richest	468	9.4
Employment status		
Not working	2.332	47.0
Working	2.632	53.0
Level of education		
No Education	2.720	54.4
Primary	811	16.2
Secondary	1.383	27.7
Higher	83	1.7
Religion		
Catholic	334	6.7
Other Christians	991	20.0
Islam	3.595	72.5
Traditional	39	0.8
Place of residence		
Urban	1.313	26.3
Rural	3.682	73.7
Marital status		
Married	4.850	97.1
Widowed	19	0.4
Divorced/Separated	127	2.5

Source: 2013 NDHS.

and facility delivery. The Chi-square statistic revealed that women's level of autonomy is significantly associated with antenatal care ($\chi^2=239.33$, $p<0.05$) and place of delivery ($\chi^2=332.48$, $p<0.05$). Exposure to mass media also had a positive influence antenatal visit and facility delivery with the Chi-square test showing a significant association ($\chi^2=397.82$, $p<0.05$) and ($\chi^2=306.20$, $p<0.05$) for antenatal and place of delivery respectively. Distance to health facility was assessed and it was found that respondents who reported that distance to health facility was not a big problem had four or more antenatal care visits and utilized facility delivery than their counterparts with the Chi-square test showing a

significant association between distance to health facility and antenatal care visit ($\chi^2=306.50$, $p<0.05$) and place of delivery ($\chi^2=195.10$, $p<0.05$).

Multivariate analyses

Table 5 presents results of the influence of independent variables on antenatal care visits and place of delivery. In model I, results show that women in the highest wealth quintile are 6 times more likely to attend four or more antenatal care visits than those in the poorest quintile (OR= 6.91, $p< 0.05$). Women who are employed are 3 times more likely to attend antenatal care than the

Table 2. Distribution of respondents by women's level of autonomy, household decision making and healthcare utilization.

Variable	Frequency (4.996)	Percentage (%)
Level of autonomy		
High	1.057	21.9
Average	3.761	77.7
Low	20	0.4
Exposure to mass media		
Not exposed	1.921	39.0
Exposed	3.005	61.00
Distance to health facility		
Big problem	1.749	35.1
Not a problem	3.233	64.9
Number of antenatal care visits		
Less than four visits	2744	56.0
Four visits and above	2.159	44.0
Place of last delivery		
Health facility	1.490	29.9
Home	3.496	70.1
Decision on own health		
Respondent alone	164	3.4
Respondent and husband	1.145	23.7
Husband alone	3.510	72.5
Others	22	0.5
Decision on large household purchase		
Respondent alone	155	3.2
Respondent and husband	1.069	22.1
Husband alone	3.591	74.2
Others	24	0.5
Decision on visit to family or relative		
Respondent alone	233	4.8
Respondent and husband	1.572	32.5
Husband alone	3.018	62.4
Others	18	0.4

Source: 2013 NDHS.

unemployed and a woman's level of education was found to significantly influence antenatal care visit as women with secondary or higher educational level were more than 3 times likely to attend antenatal care than those who had no education (OR=3.94, $p<0.05$). Further results at the multivariate level showed that there was no significant relationship between respondents' religion and antenatal care visit but residence played an important role in antenatal care visit as rural residents were 27% less likely to attend antenatal care in comparison to their

counterparts who reside in urban areas.

The inclusion of intervening variables in model II alters the nature of the relationship between respondents' socio-economic determinants and antenatal care visit. In the model, results show that respondents who are in the highest wealth quintile are more than 5 times likely to attend 4 or more antenatal visit. Likewise, educated women were 2 times more likely to attend antenatal care in comparison to those who had no formal education.

Results further revealed a significant relationship

Table 3. Cross tabulation of maternal health care utilization and independents and intervening variables.

Variable	Antenatal care		Place of delivery	
	4 visits and above	< 4 visits	Health facility	Home
Age of respondents				
15-17 years	92 (27.4)	244 (72.6)	62 (18.3)	276 (81.7)
18-19 years	308 (36.9)	527 (63.1)	200 (23.5)	649 (76.5)
20-24 years	1.759 (47.1)	1.973 (52.9)	1.229 (32.3)	2571 (67.7)
Statistic	$\chi^2=66.27$	DF=2 p<0.05	$\chi^2=46.7$	DF=2 p<0.05
Wealth index				
Poorest	243 (18.3)	1.081 (81.7)	95 (7.2)	1.240 (92.9)
Poorer	441 (32.4)	921 (67.7)	248 (17.9)	1.133 (82.1)
Middle	523 (53.8)	450 (46.2)	372 (34.5)	620 (62.5)
Richer	567 (71.6)	225 (28.5)	429 (52.9)	383 (47.1)
Richest	386 (85.2)	67 (14.8)	346 (74.20)	120 (25.8)
Statistic	$\chi^2=975.15$	DF=4 p<0.05	$\chi^2=1044.26$	DF=4 p<0.05
Employment status				
Not working	872 (38.0)	1.420 (62.0)	569 (24.4)	1.760 (75.6)
Working	1.272 (49.3)	1.310 (50.7)	904 (34.4)	1.721 (65.6)
Statistic	$\chi^2=59.14$	DF=1 p<0.05	$\chi^2= 56.47$	DF=1 p<0.05
Level of education				
No education	667 (24.9)	2.016 (12.9)	306 (11.3)	2.408 (88.7)
Primary	424 (53.9)	363 (46.1)	256 (35.3)	523 (64.7)
Secondary	1000 (73.9)	353 (26.1)	824 (59.7)	556 (40.3)
Higher	69 (85.1)	12 (14.9)	75 (90.3)	8 (9.7)
Statistic s	$\chi^2=930.89$	DF=3 p<0.05	$\chi^2= 1,138$	DF=3 p<0.05
Religion				
Catholic	201 (61.6)	125 (38.4)	220 (66.0)	114 (34.0)
Other Christian	647 (67.7)	309 (32.3)	539 (54.5)	450 (45.5)
Islam	1.285 (36.2)	2.261 (63.8)	716 (20.0)	2.872 (80.0)
Traditional	15 (36.9)	25.0 (63.2)	7 (18.9)	32 (81.2)
Statistics	$\chi^2=329.92$	DF=3 p<0.05	$\chi^2= 634.29$	DF=3 p<0.05
Place of residence				
Urban	898 (70.0)	385 (30.0)	732 (55.7)	582 (44.3)
Rural	1.262 (34.9)	2.359 (65.2)	759 (20.7)	2.914 (79.3)
Statistics	$\chi^2=452.33$	DF=1 p<0.05	$\chi^2= 541.85$	DF=1 p<0.05
Mother marital status				
Married	2.085 (43.8)	2.676 (23.5)	1.429 (29.5)	3.412 (70.5)
Widowed	13 (73.5)	5 (26.5)	10 (55.0)	8 (45.0)
Divorce	62 (49.2)	64 (50.8)	51 (40.5)	75 (59.5)
Statistics	$\chi^2=7.21$	DF=2 p<0.05	$\chi^2= 12.18$	DF=2 p<0.05
Decision on respondent health				
Respondent alone	120 (75.9)	38 (24.1)	98 (59.4)	67 (40.6)
Respondent and husband	661 (59.0)	458 (41.0)	519 (45.4)	625 (54.6)
Husband alone	1.286 (37.3)	2.167	793 (22.7)	2.708 (77.3)
Others	14(65.1)	7 (34.9)	15 (68.1)	7 (31.9)
Statistics	$\chi^2=224.17$	DF=3 p<0.05	$\chi^2= 290.0$	DF=3 p<0.05

Table 4. Cross tabulation of maternal health care utilization and independents and intervening variables.

Variable	Antenatal care		Place of delivery	
	4 visits and above	< 4 visits	Health facility	Home
Decision on large household purchase				
Respondent alone	105 (70.5)	44 (29.5)	86 (55.6)	69 (44.4)
Respondent and husband	640 (61.40)	403 (38.0)	523 (49.0)	545 (51.0)
Husband	1.318 (37.3)	2.217 (62.7)	802 (22.4)	2.781 (77.6)
Others	16 (72.1)	6 (27.9)	14 (57.5)	10 (42.5)
Statistics	$\chi^2=230.31$	DF=3 p<0.05	$\chi^2=326.36$	DF=3 p<0.05
Decision on visits to relative				
Respondent alone	159 (69.7)	69 (30.3)	122 (52.4)	111 (47.7)
Respondent and husband	863 (56.0)	679 (44.0)	668 (42.6)	902 (57.5)
Husband	1.047 (35.3)	1.918 (64.7)	627 (20.8)	2.383 (79.2)
Others	11 (66.0)	5 (34.0)	9 (52.0)	8 (48.0)
Statistics	$\chi^2=232.79$	DF=3 p<0.05	$\chi^2=285.95$	DF=3 p<0.05
Women's level of autonomy				
High autonomy	674 (65.3)	358 (34.7)	553 (52.3)	504 (47.7)
Medium autonomy	1.394 (37.7)	2.304 (62.3)	860 (22.9)	2.891 (77.1)
Low autonomy	11(62.0)	7(3.0)	11 (29.5)	9 (44.0)
Statistics	$\chi^2=239.33$	DF=2 p<0.05	$\chi^2=332.48$	DF=2 p<0.05
Exposure to mass media				
Not exposed	489 (25.9)	1.398 (74.1)	293 (15.3)	1.624 (84.7)
Exposed	1.646 (55.8)	1.303 (44.2)	1.177 (39.2)	1.823 (60.8)
Statistics	$\chi^2=397.82$	DF=1 p<0.05	$\chi^2=306.20$	DF=1 p<0.05
Distance to health facility				
Big problem	465 (26.8)	1.268 (73.2)	302 (17.3)	1.442 (82.7)
Not a big problem	1.687 (53.4)	1.470 (46.6)	1.186 (36.7)	2.042 (63.3)
Statistics	$\chi^2=306.50$	DF=1 p<0.05	$\chi^2=195.10$	DF=1 p<0.05

between exposure to mass media, distance to health facility and utilisation of antenatal care services. Women with access to mass media were almost twice more likely to attend antenatal care than other women (OR=1.48, $p<0.05$), likewise those who reported that distance to health facility was not a problem (OR=1.98, $p<0.05$). Model III examined the relationship between the principal variable; women's level of autonomy and antenatal care. Respondents' with low level of autonomy were 65% less likely to attend antenatal care compared to their

counterparts who had high level of autonomy (OR=0.35, $p<0.05$). The inclusion of intervening variables in model IV slightly changed the extent of relationship but women's autonomy still had significant influence on antenatal care with an increased odd ratio of 5% (OR=0.40, $p<0.05$).

Model V presents the relationship between respondents' socio-demographic determinants and facility delivery holding intervening variables constant. Result shows that respondents in the highest wealth index were 7 times more likely to deliver in facilities in comparison to

Table 5. Multivariate analysis of the selected independents, intervening and outcome variables.

Variable	Number of antenatal care visits				Place of delivery			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	OR	OR	OR	OR	OR	OR	OR	OR
Wealth index								
Poorest	1.00	1.00	-	-	1.00	1.00	-	-
Poorer	1.62*	1.45*	-	-	1.84*	1.81*	-	-
Middle	2.87*	2.28*	-	-	3.53*	3.30*	-	-
Richer	4.21*	3.20*	-	-	4.42*	4.10*	-	-
Richest	6.91*	5.16*	-	-	7.01*	6.44*	-	-
Employment status								
Not working	1.00	1.00	-	-	1.00	1.00	-	-
Working	1.3*	1.31*	-	-	1.29*	1.26*	-	-
Level of education								
No education	1.00*	1.00	-	-	1.00	1.00	-	-
Primary	2.15*	2.11*	-	-	1.92*	1.87*	-	-
Secondary	3.18*	2.88*	-	-	3.03*	2.88*	-	-
Higher	3.94*	3.28*	-	-	13.97*	12.63*	-	-
Religion								
Catholic	1.00	1.00	-	-	1.00	1.00	-	-
Other Christian	1.17**	1.22**	-	-	0.48*	0.46*	-	-
Islam	1.00**	0.97**	-	-	0.27*	0.25*	-	-
Traditional	1.00**	1.27**	-	-	0.28*	0.29*	-	-
Place of residence								
Urban	1.00	1.00	-	-	1.00	1.00	-	-
Rural	0.73**	0.81**	-	-	0.60*	0.63*	-	-
Marital status								
Married	1.00	1.00	-	-	1.00	1.00	-	-
Widowed	2.66**	2.55**	-	-	1.78**	1.68**	-	-
Divorced/Separated	0.97**	0.96**	-	-	1.33**	1.37**	-	-
Exposure to mass media								
Not exposed	-	1.00	-	-	-	1.00	-	-
Exposed	-	1.48*	-	-	-	1.62**	-	-
Distance to health facility								
Big problem	-	1.00	-	-	-	1.00	-	-
Not a problem	-	1.98*	-	-	-	0.62*	-	-

Table 5 Cont'd

Women's level of autonomy								
High autonomy	-	-	1.00	1.00	-	-	1.00	1.00
Low autonomy	-	-	0.35*	0.40*	-	-	0.32*	0.38*
Exposure to mass media								
Not exposed	-	-	-	1.00	-	-	-	1.00
Exposed	-	-	-	3.02*	-	-	-	2.95*
Distance to health facility								
Big problem	-	-	-	1.00	-	-	-	1.00
Not a problem	-	-	-	2.75*	-	-	-	2.31*

*p<0.05, **p>0.05.

women in other wealth quintile (OR=7.01, p<0.05). Being employed was another positive factor as women who were working were 29% more likely to deliver in facilities in comparison to the unemployed. Considering respondents' level of education, respondents' who had a higher level of education were more than 13 times likely to have health facility delivery compared to women who did not have formal education (OR=13.97, p<0.05), that is, the higher the respondents' level of education the higher the utilisation of facility delivery. Respondents' who reside in the rural area were 40% less likely to deliver in health facilities compared to urban residents. Introduction of intervening variables in model VI revealed that there is a significant relationship between wealth index, employment status, level of education, religion, place of residence, distance to health facility and place of delivery.

Results further showed that women who were in the richest category were more than 6 times likely to deliver at health facilities than women in the reference category (OR=6.44, p<0.05). Result pattern reveal an increasing proportion of facility delivery with increasing wealth quintile and occupation (OR=1.26, p<0.05).

In addition, holding intervening variables constant, a significant relationship was observed between women's level of autonomy and place of delivery. Women who reported low level of autonomy were 68% less likely to deliver at health facility compared to other women (OR=0.32, p<0.05). Introduction of the intervening variables revealed a significant relationship between women's level of autonomy, exposure to mass media, distance to health facility and place of delivery; with women who were exposed to mass media approximately

3 times more likely to deliver at health facility than other women (OR=2.95, p<0.05). With respect to distance to health facility, women who reported distant to health facility not being a problem are more than 2 times likely to deliver at health facility other women (OR=2.31, p<0.05) (Table 5).

DISCUSSION

The study objective was to examine the relationship between young women's socio-demographic characteristics, level of autonomy and maternal health care utilisation among young ever married women in Nigeria. It was found that more than half (56%) of young women had less than four antenatal visits while pregnant while the required standard by the World Health Organization (WHO) was a minimum of 4 antenatal visit and as much as 8 visits. It was also found that less than 40% women deliver at a health facility. This study found significant relationships between women autonomy, antenatal care visits and health facility delivery. The findings of this study are consistent with the findings of (Asweto et al., 2014; Baral et al., 2010; Bhandari et al., 2017; Deo et al., 2015; Fawole and Adeoye, 2015; Woldemicael, 2007b), who found that maternal healthcare utilisation is influenced by women autonomy. Also, the findings of this study are in agreement with the findings of Sharma et al., (2007) where it was stated that women with greater autonomy irrespective of physical and financial resources are able to manage their own children's health care and make fertility decisions too. Furthermore, other findings including those of Kamiya

(2010); Tarekegn et al., (2014); Teklehaymanot et al., (2017); Thapa, (2012); Workineh and Hailu, (2014) and Deo et al. (2015) found that significant associations between women autonomy and utilisations of maternal healthcare services and specifically stated that women with higher level of autonomy were nearly three times more likely to have at least 4 antenatal care visits. Speizer et al. (2014) highlighted the role of community norms in institutional delivery but stated that women autonomy played a major role in ensuring these deliveries are facility based. This was also the case in Ethiopia as found by Tiruneh et al. (2017)

Findings on the relationship between women autonomy and maternal healthcare utilisation is explained by the fact that younger women in marriages are not as educated as older women, don't have the financial wherewithal to make decisions that have financial implications and follow through, don't have adequate information to ensure evidence-based decision making and also perceive that they are inexperienced to make decisions on issues related to motherhood and pregnancy, hence the dependence of their mother in-laws but this is in contrast to the findings of Hagos et al. (2014) in Ethiopia and Lowe et al. (2016) in Gambia where it was found that women who had autonomy in decision making about place of delivery were less likely to deliver in a health facility and that at the time of delivery, the decision to receive care by trained personnel was often beyond the women's control, resulting in birth-related complications respectively.

Socio-demographic determinants strongly influencing maternal healthcare utilisation identified in this study include employment status, educational level, exposure to mass media and household wealth index. These has also been established in other studies as Okeshola and Sadiq (2013) stated that there is a close relationship between household wealth index and maternal healthcare utilisation among young women in Nigeria; that is, the richer the family, the higher the likelihood of a young woman using maternal healthcare services. Also, in Kenya, Ochako et al. (2011) established that household wealth is significantly associated with the use of maternal healthcare services among young women as also highlighted by the studies of Bhandari et al. (2017), Fawole and Adeoye (2015), Hagos et al. (2014) and Tarekegn et al. (2014) and summarised that households with more financial strength have more access to healthcare generally and not just maternal healthcare, hence, women in these households should ordinarily attend maternal healthcare services more than women from households in the lower wealth quintiles.

Education was also found to be significantly associated with the use of maternal healthcare services and this is consistent with the findings of Furuta and Salway (2006), Sipsma et al. (2014), Adeoye (2015), Bhandari et al. (2017), Fawole and Tiruneh et al. (2017), Duah and Adisah-Atta (2017). This finding can be explained by the

fact that better educated women have access to more information either through the mass media or social media compared to less educated women. Employment status or labour force participation was also found to have a significant association with maternal healthcare services and this is supported by the findings of Sebayang et al., (2017), where it was found in Myanmar that adolescent mothers with a high level of labour force participation had higher odds of attending ante-natal care services compared to older women. This might probably be due to the fact that women who are engaged in labour force are better exposed to information from colleagues at work on the importance of maternal healthcare services or that they have the financial capability to cater for financial costs associated with receipt of health services.

Conclusion

This study examined the relationship between women autonomy and utilization of maternal healthcare services (antenatal care and facility delivery) among young ever-married women in Nigeria. The findings of the study have revealed low level of maternal healthcare utilization among young ever-married women in Nigeria, with a high proportion of young women not attending antenatal visits while pregnant and not using the health facilities for delivery of their children. Women autonomy was found to be significantly associated with use of maternal healthcare services among young ever-married women in Nigeria. Other factors revealed that household wealth index, employment status, level of education, place of residence, distance to health facility and exposure to mass media also contributes to antenatal care use and facility delivery. Based on these findings, it is recommended that women should be empowered financially and educationally to ensure they possess the knowledge of the benefits of maternal healthcare and have the financial strongholds to back decisions to use such services. Also, sensitization programs should be targeted to household and community structures to enhance knowledge of the benefits of maternal healthcare and facility delivery as this will ensure household and community barriers such as permission from husband or mother in-laws and other community norms are addressed. Finally, government and programs should adopt strategies that encourage women to utilise maternal healthcare services; this could be in the form of active referrals using community resource persons, social protection schemes such as provision of transportation vouchers and integrated community outreaches by skilled health workers.

Ethical consideration

The Nigerian Demographic and Health Survey (DHS)

data used for the study was downloaded from the website of MEASURE DHS after a written request was submitted to the DHS ICF MACRO and permission was granted to use

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CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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