Women Household Decision Making Power and Maternal Mortality

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Abstract: High maternal mortality in the developing countries, particularly in Nigeria, poses serious challenge to achieving the maternal mortality target of the Sustainable Development Goals (SDGs) in the countries. Hence, there is need for multifaceted approach to curtailing the scourge. Women being the victims of maternal mortality, this study finds the effect of their household decision making power in reducing maternal mortality. The study used data from the 2013 Nigeria Health and Demographic Survey (NDHS) and logistic regression model to explore the relationship between women household decision making power and maternal mortality in Nigeria. The finding shows that women who decide and participate in household decision on own health, major purchases and visit to family and relatives were 35% (OR = 0.65, 95% CI: 0.52, 0.83), 27% (OR = 0.73, 95% CI: 0.57, 0.92), and 37% (OR = 0.63, 95% CI: 0.50, 0.80) less likely to experience maternal mortality, respectively, compared to those whose husbands alone decide. Women household decision making power is therefore instrumental to reducing maternal mortality. It is thus important for policy makers, particularly in Nigeria, to pay more attention to social and cultural factors that surround women household decision making ability for speedy reduction in maternal deaths.

Keywords: Women Household Decision Making; Maternal Mortality; Sustainable Development Goals; Developing countries; Nigeria

1   Introduction

Reducing maternal mortality appears to be one of the major issues in world development agenda. The recently concluded Millennium Development Goals (MDGs) in 2015, and the current Sustainable Development Goals (SDGs) have reduction in Maternal Mortality Ratio (MMR) as one of their major targets. Maternal mortality is more prevalent in the developing countries. These countries are host to 99% of global maternal mortality [1,2]. In 2015, developing countries accounted for 99% (302,000) of the world total maternal mortality (303,000). Nigeria as a developing country and one the sub-Saharan African countries had the highest number of maternal deaths in the world in 2015 [1] and ranked third among the 18 countries with very high MMR in the world as shown in figure 1. With such a high MMR, achieving the SDGs' target for MMR in Nigeria becomes a herculean task. Nigeria requires annual MMR reduction of 7.5% to achieve the SDGs' target of reducing MMR to at least 70 per 100,000 live birth by 2030. However, the current annual MMR reduction in Nigeria is 2.0% [1]. Achieving the MMR target in the SDGs for Nigeria therefore requires the synergy of various factors to expedite the annual reduction in the MMR.
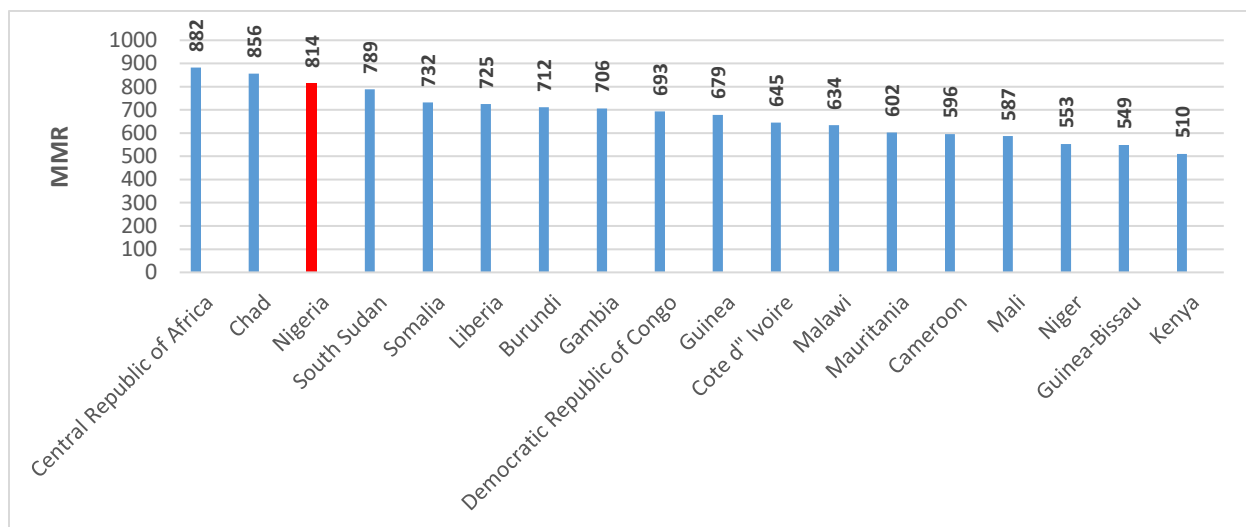
Figure 1: Countries with very high maternal mortality ratio (MMR) in the world in 2015

Source: [1]

Nigeria is a country in the sub-Saharan African region. Being the most populous country in Africa and the 7th in the world, Nigeria is estimated in 2017 to have population of 190,886000 people [3]. The population is almost equally divided across gender, 50.6% and 49.4% of the population are males and females, respectively [4]. As obtains in the African continent at large, women in Nigeria suffer low status and autonomy vis-à-vis their male counterparts. Africa and Nigeria in particular are patriarchal settings where males are assumed to have the natural right of dominance over the females [5,6]. Such patriarchal belief imposes restrictions on the control and participation of women in matters that affect them and the society [7]. Hence, African and Nigerian women suffer low status and denial of household decision autonomy, particularly on their health, freedom of movement to seek for health and control of resources to purchase health services. Naturally, women are the victims of maternal mortality; denial of their participation in decisions that affect them could contribute to the high maternal mortality.

Women household decision making power is measured by the ability of women to take and participate in three major household's decision dimensions – decision on own health, decision on major household purchases and decision on visits to family and relatives [8–11][1]. The ability of women to take and participate in any or all of these decisions making dimensions has been empirically revealed to improve maternal health care service utilization [10,12–16]. However, the direct effect of women household decision making in reducing maternal mortality has not been given attention in literature. This study extend this effect to the ultimate goal of maternal health care service utilization, which is reducing maternal deaths. Thus, this study investigate the effect of the three household decision making dimensions in reducing maternal mortality in Nigeria.

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[1] Participation of women in household decision-making index, **MEASURE** Evaluation
https://www.measureevaluation.org/prh/rh_indicators/gender/wgse/participation-of-women-in-household-decision

Women household decision making plays essential role in women utilization of maternal healthcare services, which could reduce their risk of maternal death. Figure 2 depicts the processes through which women decision autonomy in the household could reduce the risk of maternal death. Women are considered as 'gold standard' with regard to maternal health knowledge and practices [17], and if their health is solely left in the hands of men, it gets less priority [16]. Mobility restriction and not having money deter women from accessing antenatal care and delivery in health facility, respectively [16,18]. Therefore, women's ability to participate in decision on their own health helps them prioritize their health and enables them to act promptly in seeking for health without necessarily being permitted by anyone. Taking part in decision on major household purchases avails them access to resources with which they can pay for timely healthcare such as delivery in health facility and postnatal care. Participating in decision on visit to family and relatives gives them liberty to move freely with no or limited restriction, and this could give them access to health such as antenatal care at the time of need. Hence, women household decision making ability can reduce the first, second and third delay in the three delays model for accessing maternal healthcare[2], thereby facilitate maternal healthcare utilization in the form of accessing antenatal, delivering at health facility, getting the services of skilled birth attendant during birth and accessing postnatal care after birth. It is therefore presumable that women who participate in any or all the household decision making dimensions could have less risk of maternal mortality.

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[2] The three delays in the model are: delay in decision to seek healthcare, delay in reaching the healthcare and delay in receiving healthcare [34–36].
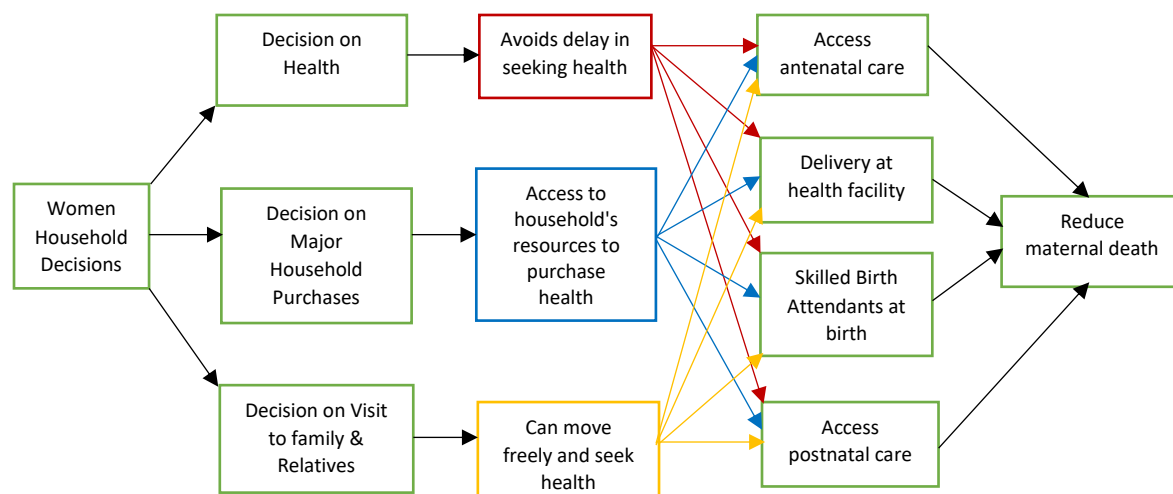
Figure 2: Conceptual framework for the relationship between women household decision making and maternal mortality
Source: Author

2   Methods and Materials

The study employs the national representative cross sectional data from the 2013 Nigeria Demographic and Health Survey (NDHS). The 2013 NDHS is the current and the fifth wave of the national survey, undertaken every five years. The NDHS provides current information on population health and socioeconomic situation in Nigeria, particularly in the area of fertility preference, fertility rate, use of contraceptives, women and children nutritional status, adult, maternal and childhood mortality, educational levels, wealth, and other population characteristics. In the 2013 NDHS, a sample of 39,902 women, aged 15-49, were identified as eligible for interview. Ninety eight percent (98%) of the women were successfully interviewed [19]. However, only 3,302 responses were recorded for maternal mortality. Maternal mortality questions usually experience high non-response rate of 10% - 40% in the Demographic and Health Survey (DHS) across many countries, and this could underestimate maternal mortality incidence [20]. Nevertheless, the DHS has importantly becomes source of data for maternal mortality, particularly in the developing world [21].

The outcome variable in the study is maternal mortality. Maternal mortality refers to the death of a woman associated with pregnancy, that occur within the period of pregnancy, child birth and postpartum period of 42 days after delivery or termination of the pregnancy [1]. In the 2013 NDHS, data on maternal mortality were collected through verbal autopsy, where surviving siblings were asked of the histories of their death sisters [20,21]. Series of questions were asked to ascertain whether a death was maternal death. Six basic responses were determined from the questions: she was never pregnant, her death not related to pregnancy, died after delivery, died since delivery, died six weeks after delivery, and died two months after delivery. The first two responses does not indicate maternal mortality while the remaining four responses revealed the occurrence of maternal mortality. In this study, the first two responses were coded "0" (not maternal mortality) and the remaining four responses were coded "1" (maternal mortality).

The main explanatory variable in the study is women household decision making power. Three indicators of household decision making were used – decision on health, major household purchases and visit to relatives and family. In the 2013 NDHS, women were asked on who take these decisions. The responses for each of the decisions were coded as "Respondent alone" = 1, "Respondent and Husband/partner" = 2, "Husband/partner alone" = 3, "Someone else" = 4, and "Others" = 5. For convenience, this study recoded the responses as "Husband/partner alone" = 1, "Respondent (wife) decide and participate" (1 and 2) = 2, and "Others" (4 and 5) = 3. Other explanatory variables used as controlled variables were household and individual's characteristics: wife's education, husband/partner's education, parity, maternal age at birth, access to electricity, source of drinking water, sanitation, type of cooking fuels, frequency of reading newspaper and magazines, frequency of listening to radio, frequency of watching television, wealth, ethnicity and region. Since the victims of maternal mortality were 'non-existence' at the time of the survey, using the familial assumption, the household and individual

characteristics of the surviving siblings were assumed to be that of the sisters [22,23]. The familial assumption or sisterhood assumption considers the socioeconomic characteristics to be the same for sisters of the same household.

The outcome (dependent) variable of the study is a dichotomous variable, which takes the value of either 1 or 0 – 1 for maternal mortality and 0 for no maternal mortality.

$$Maternal\ Mortality_i = \begin{cases} 1 - \text{if there is maternal mortality} \\ 0 - \text{if otherwise} \end{cases}$$

One of the suitable methods for analyzing such data is the logistic regression model [24–26]. Though there are other methods that are used in analyzing data with dichotomous dependent variable, logistic regression has become the commonly used because its function is designed to produce probability range between 0 and 1, which is the range of the dependent variable values [26]. The model for estimation establishes the logit functional relationship between the dependent variable, which is maternal mortality, and the covariates. Equation 1 modelled logistic function of the occurrence of maternal mortality and women household decision making.

$$logit[p(MM_i = 1/X_i) = \alpha + \beta_1 WDH_i + \beta_2 WDP_i + \beta_3 WDV_i + \beta_4 CV_i + \varepsilon_i \ldots\ldots\ldots\ldots\ldots..(1)$$

Where,

$X =$ Vector of covariates of maternal mortality
$\alpha =$ Constant
$\varepsilon =$ Error term
$i = 1, 2, 3, \ldots\ldots\ldots\ldots k\ number\ of\ observations$

$\beta_1, \beta_2, \beta_3, \beta_4 =$ Corresponding coefficients (odds ratios) of the explanatory variables

$MM =$ Maternal Mortality
$WDH =$ Women Household Decision on Health
$WDP =$ Women Household Decision on Major Purchases
$WDV =$ Women Household Decision on Visit to Relatives and Family
$CV =$ Control Variables

3   Results

Table 1 presents the summary statistics of the women's household decision making indices, other socioeconomic variables and maternal mortality. In the household decision on women's health, 55.78% of the women had their health exclusively decided by their husbands, 43.90% either decided or participated in the decision, while 0.32% had their health decided by others. Maternal mortality was higher among women whose health was decided by their husbands alone than among women who decided and participated in their health decision (23.69% versus 10.07%). Similarly, 56.57% of the women had their husbands deciding alone in decision on household major purchases while 43.90% of the women either decided or participated in the decision. More than one-third of women whose husbands exclusively decided on this decision experienced maternal death while only about one-fourth of women who decided and participated in the decision experienced maternal death. Contrarily, in the decision on visit to relatives and family, 53.87% of the women decided and participated while 45.95% had their husbands decided alone and 0.18% decided by others. Though percentage of women who decided and participated in this decision was higher than those whose husbands decided alone, percentage of maternal mortality was however higher among women whose husbands decided alone (20.49% versus 13.29%).

Table 1: Summary statistics of the explanatory variables and maternal mortality

Variable	Category	N	Maternal Mortality (MM) (%)		
			MM = 0	MM = 1	Total
Decision on own health		2672			
	Husband alone decides		32.09	23.69	55.78
	Wife decides and participate		33.83	10.07	43.90
	Others decides		0.23	0.09	0.32
	Total		**66.15**	**33.85**	**100.00**
Decision on major purchases		2670			
	Husband alone decides		32.90	23.67	56.57
	Wife decides and participate		32.73	10.10	42.83
	Others decides		.50	.10	.60
	Total		**66.13**	**33.87**	**100.00**

Decision on visit to relatives & family		2669			
	Husband alone decides		25.46	20.49	45.95
	Wife decides and participate		40.58	13.29	53.87
	Others decides		.12	.06	.18
	Total		**66.16**	**33.84**	**100.00**
Wife's education		3302			
	No education		20.69	18.11	38.80
	Primary		17.13	5.97	23.10
	Secondary		22.46	6.89	29.35
	Higher		6.86	1.89	8.75
	Total		**67.14**	**32.86**	**100.00**
Husband/Partner's education		2914			
	No education		18.92	16.16	35.08
	Primary		16.06	5.90	21.96
	Secondary		21.18	7.52	28.70
	Higher		10.56	3.70	14.26
	Total		**66.72**	**33.28**	**100.00**
Parity		3244			
	Nulliparous		30.87	8.37	39.24
	1 – 5		30.56	21.52	52.08
	6 – 10		5.14	3.24	8.38
	> 10		.08	.22	.30
	Total		**66.65**	**33.35**	**100.00**
Maternal age at marriage		2936			
	10 – 19		43.97	25.66	69.63
	20 – 29		21.23	6.971	28.20
	≥30		1.41	.76	2.17
	Total		**66.61**	**33.39**	**100.00**
Access to electricity		3267			
	Access		38.03	14.56	52.59
	No access		28.99	18.42	47.41
	Total		**67.02**	**32.98**	**100.00**
Source of drinking water		3262			
	Improved sources		39.72	19.07	58.79
	Unimproved sources		27.27	13.94	41.21
	Total		**66.99**	**33.01**	**100.00**
Sanitation		3267			
	Improved		38.03	16.94	54.97
	Unimproved		28.97	16.06	45.03
	Total		**67.00**	**33.00**	**100.00**
Type of cooking fuels		3263			
	Non-solid fuels		1.52	.24	1.76
	Solid fuels		65.51	32.73	98.24
	Total		**67.03**	**32.97**	**100.00**
Frequency of reading newspaper & magazine		3288			
	Not at all		50.97	28.03	79.00
	Less than once in a week		9.66	2.73	12.39
	Once in a week		6.66	1.95	8.61
	Total		**67.29**	**32.71**	**100.00**
Frequency of listening to radio		3299			
	Not at all		20.93	12.15	33.08

			MM = 0	MM = 1	Total
	Less than once in a week		16.68	8.17	24.85
	Once in a week		29.53	12.54	42.07
	Total		**67.14**	**32.86**	**100.00**
Frequency of watching television		3293			
	Not at all		26.80	18.48	45.28
	Less than once in a week		13.02	5.25	18.27
	Once in a week		27.39	9.06	36.45
	Total		**67.21**	**32.79**	**100.00**
Wealth		3302			
	Richest		16.80	4.32	21.12
	Rich		15.02	5.83	20.85
	Middle		14.21	6.47	20.68
	Poor		12.07	7.43	19.50
	Poorest		9.04	8.81	17.85
	Total		**67.14**	**32.86**	**100.00**
Ethnicity		3298			
	Hausa/Fulani		15.12	15.57	30.69
	Yoruba		10.60	2.75	13.35
	Igbo		11.26	3.24	14.50
	Others		30.18	11.28	41.46
	Total		**67.16**	**32.84**	**100.00**
Region		3302			
	Southern region		33.23	8.18	41.41
	Northern region		33.92	24.67	58.59
	Total		**67.15**	**32.85**	**100.00**

Note: MM = 0 and MM = 1 refer to no maternal death and maternal death respectively

3.1   Bivariate Analysis

Table 2 presents the bivariate analysis of the association between women's household decision making, other explanatory variables, and maternal mortality. It shows the independent association between women's household decision making and maternal mortality. The result revealed that categories of women's household decision on health, major household purchases and visit to relatives and family were significantly different in women who did and did not experience maternal mortality at p<0.001. With the significant independent association in the bivariate regression, women's household decision making is expected to have effect on maternal mortality even in the presence of other covariates. The controlled variables were also included in the bivariate regression in order to determine the variables to be included in the multivariate logistic regression. Only significant variables in the bivariate analysis are included in the multivariate analysis. The conservative significance level is p<0.05, however, this study set the

threshold for significance in the bivariate regression to be p<0.1 in order to avoid the possibility of dropping any potential covariate from the multivariate analysis. Any variable not significant at p<0.1 in table 2 was therefore dropped in the multivariate analysis.

Table 2: Bivariate logistic regression of the association between women household decision making, other explanatory variables, and maternal mortality

Variable	N	Percentage (95% C. I)	P-value
Decision on own health			< 0.001
Husband alone decides	1,460	55.78 (52.93, 58.6)	
Wife decides and participate	1,203	43.9 (41.08, 46.76)	
Others decides	9	0.319 (0.162, 0.626)	
Decision on major purchases			< 0.001
Husband alone decides	1,480	56.57 (53.64, 59.45)	
Wife decides and participate	1,173	42.83 (39.96, 45.74)	
Others decides	17	0.609 (0.327, 1.133)	
Decision on visit to relatives & family			< 0.001
Husband alone decides	1,192	45.95 (42.88, 49.06)	
Wife decides and participate	1,470	53.87 (50.76, 56.95)	
Others decides	7	0.18 (0.075, 0.431)	
Wife's education			< 0.001
No education	1,213	38.8 (35.94, 41.74)	
Primary	785	23.1 (20.98, 25.37)	
Secondary	982	29.35 (27.05, 31.77)	
Higher	322	8.743 (7.394, 10.31)	
Husband/Partner's education			< 0.001
No education	984	35.07 (32.18, 38.08)	
Primary	652	21.96 (19.75, 24.35)	
Secondary	820	28.7 (26.34, 31.17)	
Higher	458	14.27 (12.41, 16.35)	
Parity			< 0.001
Nulliparous	1,295	39.24 (37.22, 41.31)	
1 – 5	1,675	52.08 (50.07, 54.08)	
6 – 10	268	8.373 (7.262, 9.636)	
> 10	9	.302 (.139, .655)	
Maternal age at marriage			< 0.001
10 – 19	2,040	69.63 (67.39, 71.78)	
20 – 29	827	28.2 (26.13, 30.36)	
≥30	69	2.17 (1.62, 2.902)	
Access to electricity			< 0.001
Access	1,678	52.59 (49.09, 56.08)	
No access	1,589	47.41 (43.92, 50.91)	
Source of drinking water			0.5541
Improved sources	1,853	58.79 (55.28, 62.21)	
Unimproved sources	1,409	41.21 (37.79, 44.72)	
Sanitation			0.0330
Improved	1,758	54.97 (51.7, 58.19)	
Unimproved	1,509	45.03 (41.81, 48.3)	

Type of cooking fuels			0. 0089
Non-solid fuels	61	1.761 (1.137, 2.718)	
Solid fuels	3,202	98.24 (97.28, 98.86)	
Frequency of reading newspaper and magazines			< 0.001
Not at all	2,593	79.0 (76.67, 81.15)	
Less than once in a week	410	12.39 (10.86, 14.1)	
Once in a week	285	8.607 (7.192, 10.27)	
Frequency of Listening to radio			0. 0210
Not at all	1,159	33.08 (30.7, 35.55)	
Less than once in a week	821	24.85 (22.77, 27.04)	
Once in a week	1,319	42.07 (39.54, 44.65)	
Frequency of watching television			< 0.001
Not at all	1,507	42.29 (42.42, 48,18)	
Less than once in a week	633	18.27 (16.37, 20.34)	
Once in a week	1,153	36.45 (33.74, 39.24)	
Wealth			< 0.001
Richest	634	21.12 (18.73, 23.73)	
Rich	731	20.85 (18.76, 23.11)	
Middle	712	20.68 (18.52, 23.02)	
Poor	667	19.5 (17.33, 21.86)	
Poorest	558	17.85 (15.46, 20.51)	
Ethnicity			< 0.001
Hausa/Fulani	906	30.69 (27.74, 33.82)	
Yoruba	392	13.35 (11.37, 15.61)	
Igbo	486	14.5 (12.51, 16.74)	
Others	1,514	41.46 (38.44, 44.55)	
Region			< 0.001
Southern part	1,318	41.41 (38.47, 44.42)	
Northern part	1,984	58.59 (55.58, 61.53)	

3.2 Multivariate Analysis

Table 3 presents the results for the multivariate logistic regression for the association between women's household decision making power and maternal mortality. To ensure reliable coefficients in the multivariate regression, collinearity test among the potential covariates was conducted using the Pearson's (r) Correlation test ($p<0.05$). Correlation was detected among the three indices of women household decision making, between wife's and husband's education, and between wife's education and frequency of watching television. Wife's education was thus dropped from the multivariate regression for husband's education despite its significance in the bivariate regression because husband's education plays more role in women's decision making autonomy [27]. To

avoid having the correlated variables in the same model, three models were developed to capture all the three indices of women household decision making in the multivariate analysis.

Table 3: Multivariate logistic regression of the association between women household decision making power and maternal mortality

Variable	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Decision on own health			
Husband alone decides	1.00		
Wife decides and participate	0.65 (0.52, 0.83)***		
Others decides	0.94 (0.17, 5.15)		
Decision on major purchases			
Husband alone decides		1.00	
Wife decides and participate		0.73 (0.57, 0.92)**	
Others decides		0.47 (0.15, 1.51)	
Decision on visit to relatives & family			
Husband alone decides			1.00
Wife decides and participate			0.63 (0.50, 0.80)***
Others decides			1.13 (0.29, 4.40)
Husband/Partner's education			
No education	1.00	1.00	1.00
Primary	0.78 (0.56, 1.08)	0.77 (0.55, 1.06)	0.78 (0.56, 1.08)
Secondary	0.95 (0.65, 1.39)	0.94 (0.64, 1.37)	0.95 (0.65, 1.39)
Higher	0.83 (0.53, 1.31)	0.83 (0.53, 1.30)	0.83 (0.53, 1.32)
Frequency of reading newspaper and magazines			
Not at all	1.00	1.00	1.00
Less than once in a week	0.92 (0.62, 1.36)	0.90 (0.61, 1.33)	0.90 (0.61, 1.34)
Once in a week	0.60 (0.33, 1.11)	0.57 (0.31, 1.05)	0.60 (0.32, 1.10)
Frequency of Listening to radio			
Not at all	1.00	1.00	1.00
Less than once in a week	1.12 (0.82, 1.53)	1.10 (0.81, 1.50)	1.12 (0.82, 1.52)
Once in a week	1.08 (0.79, 1.48)	1.07 (0.78, 1.46)	1.06 (0.78, 1.45)
Frequency of watching television			
Not at all	1.00	1.00	1.00
Less than once in a week	0.77 (0.55, 1.10)	0.78 (0.55, 1.11)	0.76 (0.53, 1.08)
Once in a week	0.89 (0.62, 1.28)	0.92 (0.64, 1.33)	0.90 (0.62, 1.31)
Parity			
No children	1.00	1.00	1.00
1 – 5	2.43 (1.93, 3.05)***	2.40 (1.91, 3.02)***	2.42 (1.93, 3.04)***
6 – 10	1.66 (1.15, 2.39)**	1.65 (1.14, 2.39)**	1.65 (1.14, 2.38)**
> 10	7.69 (1.90, 31.07)**	7.37 (1.79, 30.35)**	7.18 (1.72, 29.92)**
Maternal age at marriage			
20 – 29	1.00	1.00	1.00
10 – 19	0.99 (.76, 1.31)	0.99 (0.75, 1.31)	0.98 (0.74, 1.28)
≥30	1.85 (0.96, 3.56)	1.89 (0.98, 3.65)	1.83 (0.95, 3.53)
Access to electricity			
Access	1.00	1.00	1.00

No access	1.09 (0.83, 1.43)	1.10 (0.84, 1.44)	1.09 (.83, 1.42)
Sanitation			
Improved	1.00	1.00	1.00
Unimproved	1.02 (0.80, 1.31)	1.03 (0.80, 1.32)	1.05 (0.82, 1.34)
Type of cooking fuels			
Non-solid fuels	1.00	1.00	1.00
Solid fuels	1.46 (0.47, 4.54)	1.58 (0.49, 5.08)	1.56 (0.49, 4.94)
Ethnicity			
Others	1.00	1.00	1.00
Hausa/Fulani	1.77 (1.27, 2.47)**	1.79 (1.29, 2.50)**	1.81 (1.30, 2.51)***
Yoruba	1.18 (0.76, 1.84)	1.16 (0.74, 1.80)	1.22 (0.79, 1.90)
Igbo	1.49 (0.95, 2.33)	1.47 (0.94, 2.30)	1.49 (0.94, 2.34)
Region			
Southern parts	1.00	1.00	1.00
Northern parts	1.98 (1.37, 2.88)***	2.01 (1.39, 2.90)***	1.90 (1.32, 2.75)**

Model Specification Error Test

Linktest	Coefficient (95% CI)	Coefficient (95% CI)	Coefficient (95% CI)
_hat	0.86 (0.63, 1.09)***	0.87 (0.64, 1.10)***	0.86 (0.65, 1.08)***
_hatsq	-0.11 (-0.25, 0.04)	-0.10 (-0.26, -0.05)	-0.11 (-0.25, 0.31)

Note: *, **, and *** denote significance at p < 0.05, p < 0.01, and p < 0.001 respectively

Results of the multivariate regression in table 3 showed that, after controlling for household and individuals characteristics, women who had say in the decision that affects their health, either by deciding or participating in the decision, were 35% (OR=0.65; 95% CI: 0.52, 0.83, p<0.001) less likely to experience maternal mortality compared to their counterparts who had this decision taken exclusively by their husbands/partners. Compared to women whose husband alone decided on major household purchases, women who decided and participated in this decision had 27% (OR=0.73; 95% CI: 0.57, 0.92, p<0.01) higher protection against maternal death. Similarly, the likelihood of maternal death among women who decided and participated in decision on visit to relatives and family was 37% (OR=0.63; 95% CI: 0.50, 0.80, p<0.001) less compared to women whose only husbands decided. In addition to the significance of the main explanatory, other explanatory variables such as parity, being a Hausa/Fulani ethnic tribe and of northern region extraction were also significant and positively associated with maternal mortality in the multivariate analysis. All the three models were

well specified as indicated by the post estimation test, the linktest, in table 3, the _hat was significance at p < 0.001 in all the models [28].

4   Discussion

The study gives empirical insight on the influence of women household decision making power in reducing maternal mortality. The findings revealed that indices of women household decision making, measured by decision on health, decision on household's purchase and decision on visit to family and relatives, were consistently significant and protective against maternal mortality. Previous studies mostly focused on association of women household decision making and the use of maternal health care services [9–11,15,16,29–32]. Best to the knowledge of this study, no prior empirical study on the association of women household decision making and maternal mortality, particularly in Nigeria, exists. This study therefore, extended the effect of women household decision making beyond maternal healthcare utilization to the ultimate health outcome, maternal mortality. From the multivariate result in table 3, women who decided and participated in household decision on health and visit to relatives and family were more protective against maternal mortality than those who decided and participated in decision on major household purchases (35% and 37%, respectively, compared to 27% protection). Though all the three decision indices are important to the prevention of maternal death, the implication of this difference is that, decision that is directly health and which affects mobility are more important and protective.

 A woman is a gold standard for her health, the knowledge and practice, particularly as it relates to maternal health, is best known to her [17]. Hence, allowing her to take and partake in decision that affects her health gives her opportunity to take prompt action and makes her health a priority. Contrary to this, her health might suffer set-back. In a patriarchal setting where men exercise influential decision power, women suffer denial of permission to seek health during pregnancy which had led to maternal death as found

in Costal Miskito, Honduras [33]. Similarly, women's mobility autonomy is also instrumental as it allows access to antenatal care, which gives room for preventive measures against any foreseen possible complication during delivery. If a woman decides and partakes in decision on visit to her relatives and family, it assumes that she has freedom of movement to access antenatal care. In the case of decision on major household purchases, though deciding and participating in it is equally important in the prevention against maternal death, it might not be as important as decision on health and visit to relatives and family. Taking and participating in this decision is assume to give the woman access to resources with which she can pay for maternal healthcare services or use for transportation to health facility. Maternal healthcare in public health facilities, particularly in developing countries are becoming free and primary healthcare centers are becoming closer to communities. Hence, decision on major household purchases might not be as important as decision on health and visit to relatives and family. With this finding, it is important that policy makers re-strategize their intervention on population health. Health policies and interventions should not only concentrate on health system, social factors such as the women's household decision making ability should also be given serious attention. To improve the women's household decision making power, factors that influence their decision making power in the household need to be identified for strategic policy action. This study thus recommend further study on factors that influence women household decision making power, particularly in Nigeria.

5   Conclusion

This study empirically examined the relationship between women household decision making power and maternal mortality. Three indices of household decision were used – decision on health, household purchase and visit to relatives and family. The findings show that women household decision making power, in all its three dimensions, has significant influence in reducing maternal mortality in Nigeria. In the other words,

maternal mortality can be reduced with improvement in women household decision making power. This finding is phenomenal, particularly with the SDGs in place and the challenges of developing countries such as Nigeria in achieving the maternal mortality target of the SDGs. Achieving the SDGs' target of maternal mortality requires expedient action through the synergy of different sectors and factors. Hence, in addition to other interventions, policy makers in Nigeria and other developing countries alike should leverage on women household decision making power to facilitate action towards achieving the SDGs' target.

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