

## ORIGINAL RESEARCH ARTICLE

# Survival Analysis of Timing of First Marriage among Women of Reproductive age in Nigeria: Regional Differences

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## Abstract

Early marriage is common among women in developing countries. Age at first marriage (AFM) has health implication on women and their under-five children. In Nigeria, few studies have explored AFM; the current study was designed to fill the gap. Nigeria Demographic and Health Survey, 2008 dataset on married women aged 15-49(N=24,986) was used. Chi-square, OLS regression and Cox proportional hazard models were used in the analysis. The mean AFM was 17.8±4.8 years and significant difference existed between the mean AFM of women in the North (16.0±3.6) and South (20.4±5.0) (p<0.001). Region, education, religion, residence, nutritional status, age at first sexual intercourse and children ever born were significantly associated with timing of first marriage (p<0.001). Majority of the women married between ages 15-19 years (43.1%), while very few married late (2.3%) and about 27.0% married too early (less than 15years). Early marriage was more common in all the regions in the North than the South and the hazard was highest in the North West and North East. Women who reside in rural area (H.R=1.15; C.I=1.11—1.18) married early than their counterparts in the urban area. Age at first marriage was directly related to levels of education (p<0.001). Muslim women married early (H.R=1.34; C.I=1.29—1.39) than Christians. Three models were generated from the data. Women married too early in Nigeria with Teenage marriage more common in the North than the South. Education has influence on AFM; therefore, women should have at least secondary education before marriage in Nigeria. (*Afr J Reprod Health 2012; 16[4]: 95-107*).

## Résumé

Le mariage précoce est courant chez les femmes dans les pays en développement. L'âge au premier mariage (APM) a des répercussions sur la santé des femmes et de leurs enfants de moins de cinq ans. Au Nigéria, peu d'études ont exploré l'APM ; la présente étude a été conçue pour combler le vide. Nous nous sommes servis de l'Enquête Démographique de Santé du Nigeria de 2008, un ensemble de données sur les femmes mariées, âgées de 15-49 ans (N = 24 986). Pour l'analyse, nous avons utilisé les Chi-carré, les modèle de régression MCO, MCO et les risques proportionnels de Cox. La moyenne de l'APM était de 17,8 ± 4,8 ans et la différence significative entre la moyenne APM des femmes au Nord (16,0 ± 3,6) et du Sud (20,4 ± 5,0) (p <0,001). Le choix du temps du premier mariage (p<0,001) a été lié, de manière significative, à la région, à l'éducation, à la religion, au domicile, à l'état nutritionnel, au premier rapport sexuel et les enfants nés. La majorité des femmes se sont mariées entre l'âge de 15-19 ans (43,1%), alors que très peu se sont mariées tard (2,3%) et environ 27,0% des femmes se sont mariées trop tôt (moins de 15 ans). Le mariage précoce est plus fréquent dans toutes les régions du Nord qu'au Sud et le risque était le plus élevé au Nord-Ouest et Nord-est. Les femmes qui vivent en milieu rural (HR = 1,15, IC = 1,11 1,18) se marient plus tôt que leurs homologues du milieu urbain. L'âge au premier mariage était directement liée au niveau d'éducation (p <0,001). Les femmes musulmanes se marient plus tôt (HR = 1,34, IC = 1,29 1,39) que les femmes chrétiennes. Trois modèles ont été générées à partir des données. Les femmes se marient trop tôt au Nigéria, le mariage chez les adolescentes étant plus fréquent au Nord qu'au Sud. L'éducation a une influence sur l'APM ; par conséquent, les femmes doivent se scolariser au moins jusqu'à l'école secondaire avant le mariage au Nigéria (*Afr J Reprod Health 2012; 16[4]: 95-107*).

**Keywords:** Nigeria, Age at first Marriage, North-South Differential

## Introduction

Marriage is a legal indenture between two individuals to form a sexual, productive and

reproductive union. Through the marriage, this union is recognized by family, society, religious institutions and the legal system. Age at marriage is the exact age at which individual gets married

and this varies across communities and individuals. Marriage at times may be wanted or unwanted at a particular time. Socio-cultural demand and unwanted pregnancy can propel individuals particularly women to marry early. Early marriage can make the realization of millennium development goal on promoting gender equality and women empowerment, reducing child mortality, and improving maternal health unrealizable<sup>1</sup>.

Early marriage is a culturally and socially endorsed practice among people according to some traditional sets of values. Although several studies in Nigeria<sup>2-6</sup> have addressed differential in female's age at first marriage, few studies paid attention to the varying patterns of age at marriage across the six geopolitical zones in Nigeria. It is therefore imperative to gain more insights into the timing and patterns of marriage among females in Nigeria as evidenced in the current study. Studies on age at first marriage are important because of the close temporal link between marriage and the onset of childbearing. Thus, a number of studies over the years have documented the contribution of changes in the timing of marriage to fertility transitions, both historically in developed countries and currently in developing countries<sup>7-9</sup>.

In the past, the age at first marriage used to be influenced by social norms and parental factors. At the moment, the age at first marriage are now changing with globalization, urbanization, and rising educational attainment. Therefore, the timing of marriage should be of considerable relevance to researchers interested in the transition to adulthood in the developing world. For instance, men are now postponing marriage because of greater expectations about job status and employment stability and the material possessions needed to form a household, and women are delaying marriage because of shifting gender roles. It is important to document these patterns of behavior in order to understand their potential implications both for individuals and for the larger society<sup>10, 11, 12</sup>.

In any setting, marriage is regarded as a moment of celebration and a landmark in adult life. However, the practice of early marriage may not permit such celebration. The imposition of a marriage partner upon a female child means that

her childhood is cut short and her fundamental rights are compromised. While much of the impact remains hidden, it is absolutely clear that millions of young girls suffer negative consequences of early marriage. An underlying factor for the perpetuation of early marriage is poverty, with the marriage of children often seen as a strategy for economic survival. In situation of severe poverty, a young girl may be regarded as an economic burden and her marriage to a much older man as a means of survival<sup>13-15</sup>.

Nigeria, a poverty stricken nation is currently facing economic difficulties, as a result age at marriage has been on the increase, but the pace is slow due to high percentage of illiterate in the population. Men in Nigeria are postponing marriage because of unemployment, lack of resources, and parents have become apprehensive about the danger of their female children becoming pregnant outside marriage or not seen any man to ask for their hands in marriage. Thus any early opportunity for marriage may be held upon. The economic environment in developing countries is commonly invoked as the primary reason for men's delay in marrying. For example, a qualitative study of attitudes about marriage in the Philippines, Thailand, and Vietnam revealed that "poverty or lack of financial security, especially among men, was seen as a common (and sound) reason to postpone or avoid marriage"<sup>16</sup>.

The harmful impact of early marriage is enormous, among which are; pregnancy complications, maternal deaths, child wives working like slave in their in-laws homes, school dropout and several others. Early marriage has deep physical, intellectual, psychological and emotional consequences, truncates educational opportunity and chances of self development. It leads to premature pregnancy and childbearing, and is likely to discourage women empowerment because of lifetime domestic and sexual submission.

Early marriage extends a woman's childbearing life span as exposure to frequent sexual intercourse begin very early, thereby resulting to high fertility, particularly if contraceptive use is not supported by the spouse<sup>15</sup>. One important difference between marriage customs in many developing world

societies and those in the industrialized world today is that in the former, these customs tend to support high fertility even where overall fertility levels are falling. Pregnancies when a woman's body mechanism is not fully mature can constitute a major risk to the survival and future health of both mother and child<sup>15</sup>. Early pregnancy, when it happens within marriage, is rarely seen as a 'problem.' On the contrary, it is viewed as a blessing for the young married woman, no matter what her age, because it is proof of her fertility. Early marriage has been established as a primary contributory factor to early child-bearing<sup>10</sup>.

The traditional societies in Africa support the idea that girls should marry early either before or after puberty or at a specific age. The idea and function of 'family' varies across the world and is in a state of constant evolution<sup>17</sup>. Parents and family heads make marital choices for their daughters and sons without due consideration of the implications of such decisions on them. Somewhat, they see marriage as a family-building approach, an economic bargain or a way to protect girls from undesirable sexual move from the opposite sex. It prevents premarital sex, as some societies prize virginity before marriage and this manifests itself in a number of practices designed to 'protect' a girl from promiscuity.

The situation of children in need of special protection, notably girls vulnerable to sexual abuse and HIV/AIDS, suggests that early marriage is being used as a strategy to protect girls from sexual exposure, or to pass the economic burden for their care to others<sup>13</sup>. There are also reports from HIV/AIDS researchers in Eastern Africa that marriage is seen as one option for orphaned girls by caregivers who find it hard to provide for them<sup>18</sup>. Fear of HIV infection, for example, has encouraged men in some African countries including Nigeria to seek young virgin.

Globally, there has been an increasing concern on the special health needs of young girls which are sexually active. Age at first marriage which has impetus to influence these health needs viz unwanted pregnancy, risk of contacting STDs, fertility, pregnancy outcomes and child delivery is an important factor in this regard<sup>18</sup>. The motivation for this paper was to raise awareness of the situation on timing and patterns of age at first

marriage among women of reproductive age in Nigeria and where necessary, to arouse action.

## Methods

The study was retrospective cross-sectional in design, data were extracted from the record of survey conducted by ICF Macro Calverton, Maryland, USA in conjunction with National Population Commission (NPC), Nigeria (Nigeria Demographic and Health Survey, 2008). During the survey, a multi-stage probability sampling was adopted to select the respondents who were women of child-bearing age (15-49).

Administratively, Nigeria is divided into 36 states plus FCT-Abuja. Each state is subdivided into local government areas (LGAs), and each LGA is divided into localities. In addition to these administrative units, during the last 2006 Population Census, each locality was subdivided into convenient areas called census enumeration areas (EAs). The available cartographic material demarcated for each EA was useful in the EA location and its identification; hence the sample frame for this survey is the list of EAs used in the last census population. The primary sampling unit, a cluster, for the survey was defined on the basis of EAs census frame. A minimum requirement of 80 households for the cluster size was imposed in the design. The target of the 2008 NDHS sample was to obtain 36,800 completed interviews. Based on the level of non-response found in the 2003 Nigeria DHS, to achieve this target, approximately 36,800 households were selected, and all women age 15-49 were interviewed using a well designed questionnaire.

The current study focused on women aged 15-49 years. In the questionnaire designed for the survey, a question was asked from the respondents on age at first marriage (Quantitative). This was used as dependent variable while region, education, religion, residence and age at first sexual intercourse were independent variable. The region was re-categorized into North and South; this is to see if there is a gap in age at marriage between the two regions. This is because the regions in the North share similar characteristics and likewise in the South.

The analysis began with the use of Chi-square model. Thereafter, Cox-proportional Hazard model was used to predict the strength of the relationship between the selected independent variables and timing of marriage. The Cox model is usually written in terms of hazard model which gives an expression for the hazard at time  $t$  for an individual with a given specification of a set of explanatory variables (Region, Religion, Education and Residence) denoted by  $X$  which are predictor variables that is being modeled to predict an individual's hazard (Age at Marriage).

$$h_1(t, X) = h_0(t) \exp \left( \sum_{i=1}^n \beta_i X_i \right)$$

Where;  $X = X_1, X_2, X_3, \dots, X_n$

$$\log_e \left( \frac{h_1(t, X)}{h_0(t)} \right) = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$

The interaction between the selected variables was used to generate three Cox-proportional Hazard models. The variable region was analyzed with no interaction (**Model 1: Region**). Religion was added to this model as a covariate to generate (**Model 2: Region and Religion**). In Nigeria, the Northerners are predominantly Muslims, while the Southerners are mostly Christians. Due to strong influence of Education on every demographic variable, it was introduced into the model two to produce the third model (**Model 3: Region, Religion and Education**).

Marriage pattern was modeled using a discrete-time duration model. The survival time is assumed to begin at birth and ends when the individual gets married. It is censored for an individual still unmarried as at the time of the survey. The duration from birth to marriage,  $T$ , is assumed to be a discrete random variable that takes on only positive integer. The populations at risk are all women involved in the study. The observation continues until time  $t$ , at which an event marriage occurs or the observation is censored in 2008 (The year of the survey). The study ends for an individual at time  $T = t$  if married. Two quantitative terms were used in this study. These are; the survivor function  $S(t)$  and hazard function  $h(t)$ . The survivor function gives the probability that a person survives longer than some specified time  $t$  without married, while the hazard function gives the instantaneous potential per unit time for marriage to occur, given that the individual has

survived up to time  $t$ . Survival and hazard function are mathematically denoted by;

$$S(t_{(j-1)}) = \prod_{i=1}^{j-1} P(T > t_{(i)} | T \geq t_{(i)}) \text{ and } h(t) = \frac{P(t \leq T < t + \Delta t | T \geq t)}{\Delta t} \text{ respectively}$$

## Results

Table 1 shows the percentage distribution and Chi-square test of association between timing of first marriage in years by selected background characteristics. The data show that the mean age at first marriage was  $17.8 \pm 4.8$  years and variables such as region, education, religion and place of residence were found to be highly significantly related with timing of first marriage ( $p < 0.0001$ ). Majority of the women married between ages 15-19 years (43.1%) while, very few married late (2.3%) and about 27.0% married too early (10-14 years). Early marriage was more common in all the regions in the North than the South. Majority of the Northern women married at ages between 0 and 19 years, whereas, in the South majority married at age interval 15 to 24 years. Late marriage was mostly common among women in the South East (6.8%) than in any other region in Nigeria. Also, the highest mean age at marriage ( $20.9 \pm 5.4$ ) was recorded in this region, but the least was found in North West ( $15.3 \pm 3.1$ ).

The percentage of women who married at ages 10-14 and 15-19 in urban area were 15.9 and 38.2 respectively, whereas, in rural it was 31.7 and 45.5. The mean age at marriage was significantly higher in urban ( $19.6 \pm 5.1$ ) than rural area ( $17.0 \pm 4.3$ ). Majority of women who had no formal education married at age 0-14 (42.4%) and 15-19 (45.9%) years. Among women with higher level education, there was dominance of marriage at ages 20-24 (35.1%) and 25-29 (34.3%) years. Very few of women with no education married very late (at ages 30 years and above) (0.2%). The mean age at first marriage increases considerably with increasing level of education. It increases from  $15.7 \pm 3.5$  years among women with no education through  $23.6 \pm 4.9$  years for those with higher level of education.

Women who belong to Islamic religious sect married earlier than their counterparts who are Christians. At ages less than 15 and 15-19 years,

39.5% and 46.0% of Muslim women were already married, but as for Christians, 11.9% and 39.5% married at those ages respectively. Only 0.7% of Muslims married at ages 30 years and above. Early marriage was also common among traditional worshippers than late marriage. The mean age at marriage for Christians and Muslims were  $20.0 \pm 5.0$  and  $16.0 \pm 3.7$  respectively and the difference was statistically significant ( $p < 0.001$ ). When the regions in the North and South were collapsed into two categories; it became quite obvious that Northern women married early than their counterpart in the South. Evidence of postponement was seen in the South and there was a significant difference between the mean age at first marriage of women in the North ( $16.0 \pm 3.6$ ) and South ( $20.4 \pm 5.0$ ) ( $p < 0.001$ ). Significant

association was also found between women's nutritional status and timing of first marriage. Early marriage (under 15 years) was mostly common among undernourished women, but evidence of increasing age at marriage with increasing nutritional status was also revealed. However, across nutritional status categories, most women married between the ages of 15-19 years. Late marriage (30 years and above) was mostly pronounced among obese women (4.8%) and occur least among undernourished women (0.8%). Also, significant variation existed between the mean age at first marriage and nutritional status. It increases from  $16.10 \pm 3.8$  years among undernourished women through  $19.91 \pm 5.4$  among obese.

**Table 1:** Percentage Distribution and Chi-square test of Association between Timing of First Marriage in Years by Selected Background Characteristics

Background variables	TIMING OF FIRST MARRIAGE IN YEARS					TOTAL	$\bar{x} \pm \sigma$
	<15	15-19	20-24	25-29	30+		
Total	26.7(6683)	43.1(10769)	19.9(4984)	7.9(1986)	2.3(564)	100.0(24986)	17.8±4.8
<b>Region*</b>							
North Central	19.9(708)	50.5(1799)	21.5(767)	6.3(225)	1.7(61)	100.0(3560)	17.9±4.3
North East	42.8(1598)	45.4(1693)	9.5(356)	1.8(69)	0.5(17)	100.0(3733)	15.7±3.3
North West	45.3(3353)	46.3(3424)	6.4(470)	1.6(122)	0.4(28)	100.0(7397)	15.3±3.1
South East	9.9(239)	33.0(793)	32.6(783)	17.7(425)	6.8(164)	100.0(2404)	20.9±5.4
South West	13.6(453)	41.8(1389)	28.5(946)	12.1(402)	3.9(131)	100.0(3321)	19.5±5.0
South South	7.3(332)	36.6(1671)	36.4(1662)	16.3(743)	3.6(163)	100.0(4571)	20.7±4.7
<b>Residence*</b>							
Urban	15.9(1258)	38.2(3012)	27.9(2204)	14.2(1118)	3.8(300)	100.0(7892)	19.6±5.1
Rural	31.7(5426)	45.4(7758)	16.3(2781)	5.1(867)	1.5(264)	100.0(17096)	17.0±4.3
<b>Education*</b>							
No education	42.4(4904)	45.9(5313)	8.8(1024)	2.2(256)	0.7(82)	100.0(11579)	15.7±3.5
Primary	21.7(1223)	49.2(2767)	21.0(1181)	6.2(349)	1.8(103)	100.0(5623)	17.9±4.4
Secondary	8.3(499)	39.7(2374)	35.9(2147)	12.7(762)	3.4(201)	100.0(5983)	20.2±4.6
Higher	3.2(58)	17.5(316)	35.1(632)	34.3(618)	9.9(178)	100.0(1802)	23.6±4.9
<b>Religion*</b>							
Christianity	11.9(1344)	39.5(4453)	30.6(3449)	13.9(1572)	4.1(461)	100.0(11279)	20.0±5.0
Islam	39.5(5191)	46.0(6046)	10.9(1431)	2.9(378)	0.7(90)	100.0(13136)	16.0±3.7
Traditional	25.3(100)	48.6(192)	18.5(73)	5.8(23)	1.8(7)	100.0(395)	17.4±4.4
Others	28.2(51)	43.6(79)	17.7(32)	7.2(13)	3.3(6)	100.0(181)	17.6±4.8
<b>Nutritional Status* (Body Mass Index)</b>							
Under-nutrition	39.6(1069)	43.8(1181)	11.9(321)	3.9(104)	0.8(22)	100.0(2697)	16.10±3.8
Normal	27.5(4234)	45.2(6968)	18.7(2890)	6.8(1042)	1.9(286)	100.0(15420)	17.54±4.6
Overweight	20.7(294)	41.9(594)	24.1(342)	10.3(146)	2.9(41)	100.0(1417)	18.63±4.9
Obesity	16.4(300)	35.6(649)	27.8(508)	15.4(281)	4.8(87)	100.0(1825)	19.91±5.4
<b>Region (2)*</b>							
North	38.5(5660)	47.1(6917)	10.8(1593)	2.8(415)	0.7(105)	100.0(14690)	16.0±3.6
South	10.0(1025)	37.4(3853)	32.9(3392)	15.2(1570)	4.4(458)	100.0(10298)	20.4±5.0

\*Significant at 0.1%

Table 2 shows multiple Cox-proportional hazard model of association between timing of first marriage and background characteristics. The hazard of early marriage was highest in the North West and North East. In North West and North East, the hazards of early marriage were 1.5( $p<0.001$ ) and 1.4( $p<0.001$ ) respectively and significantly higher than that of their counterparts in the North central. In all the regions in the Southern part of Nigeria, the hazard of early marriage was lower than that of the North central. For instance, the hazard of marriage for women in the South East and South South were 0.792( $p<0.001$ ) and 0.788( $p<0.001$ ) respectively. However, no significant relationship existed between timing of marriage and women in South west Nigeria.

Hazard of early marriage also varied considerably among subgroup of women in terms of their place of residence, education and religion. Women who reside in rural area (H.R=1.15; C.I=1.11–1.18) married early than their counterparts in the urban area. The data further showed that the higher the level of education of the women, the lower the hazard of early marriage. Women who had primary, secondary and higher education were 0.88( $p<0.001$ ), 0.68( $p<0.001$ ) and 0.44( $p<0.001$ ) respectively less likely to marry early than those with no education. Also, the hazard of early marriage was more pronounced among Muslim women (H.R=1.34; C.I=1.29–1.39) than Christians.

**Table 2:** Multiple Cox Proportional Hazard Model of relationship between Timing of First Marriage and Background Characteristics

Background Variables	$\beta$	S.E	Wald	Sign.	Exp( $\beta$ )	95% C.I for Exp( $\beta$ )	
						Lower	Upper
<b>Region</b>							
North Central	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
North East	0.371	0.021	322.118	0.000	1.449*	1.391	1.508
North West	0.461	0.021	498.152	0.000	1.585*	1.522	1.651
South East	-0.233	0.027	72.520	0.000	0.792*	0.751	0.836
South West	-0.011	0.025	0.206	0.650	0.989	0.942	1.038
South South	-0.238	0.023	104.645	0.000	0.788*	0.753	0.825
<b>Place of Residence</b>							
Urban	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
Rural	0.137	0.015	81.223	0.000	1.147*	1.114	1.182
<b>Education</b>							
No education	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
Primary	-0.126	0.018	47.791	0.000	0.882*	0.851	0.914
Secondary	-0.392	0.020	380.826	0.000	0.676*	0.650	0.703
Higher	-0.831	0.030	765.091	0.000	0.436*	0.411	0.462
<b>Religion</b>							
Christianity	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
Islam	0.295	0.018	273.463	0.000	1.343*	1.297	1.391
Traditional	0.070	0.047	2.201	0.138	1.072	0.978	1.176
Others	0.121	0.074	2.640	0.104	1.128	0.975	1.305
<b>Nutritional Status</b>							
Under-nutrition	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
Normal	-0.257	0.020	160.746	0.000	0.773*	0.743	0.805
Overweight	-0.410	0.033	155.060	0.000	0.663*	0.622	0.708
Obesity	-0.586	0.031	354.614	0.000	0.556*	0.523	0.591

\*Significant at 0.1%; \*\*Significant at 1%

Table 3 depicts Cox proportional hazard model of relationship between timing of first marriage and region collapsed into North and South. Women in

the North (H.R=2.11; C.I=2.05–2.17) were significantly marrying very early than their counterparts in the South.

**Table 3:** Unadjusted Cox Proportional Hazard Model of relationship between Timing of First Marriage and Region (Collapsed into North and South)

Background Variables	$\beta$	S.E	Wald	Sign.	Exp( $\beta$ )	95% C.I for Exp( $\beta$ )	
						Lower	Upper
<b>Region (2)</b>							
North	0.746	0.014	2956.018	0.000	2.109*	2.053	2.166
South	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C

\*Significant at 0.1%; \*\*Significant at 1%

Table 4 is the result of multiple Cox-proportional hazard models of relationship between timing of first marriage and background characteristics. Three models were generated from the data. At first, the analysis was restricted to region (model 1). All regions in the southern Nigeria show a lower hazard of early marriage than the regions in the North. Introducing, religion into the analysis (model 2) reduces the risk of early marriage in the North, but increases hazard rate of early marriage in the south. However, the strength of hazard rate was reduced for women in the South West. When education was included to interact with region and religion, the hazard of early marriage diminishes across all the regions in the North, but increases, the hazard rate in the South. The relationship between timing of marriage and women in South

West region which was earlier significant in the previous models became insignificant.

Model 3 emerged as the best model, this is because it has the highest Chi square value and the least -2 Log Likelihood values. Therefore, the hazard of marrying early if compared with the North Central (Reference category) were 1.45(p<0.001), 1.60(p<0.001), 0.79(p<0.001) and 0.77(p<0.001) in the North East, North West, South East and South South respectively. Significantly, Muslims women also have higher hazard (HR=1.32; p=0.000) of early marriage than Christian. Also as obtained in model 3, the hazard of early marriage reduces with increasing level of education. Figure 6 is a display of differential in Hazard rate by region according to the three models.

**Table 4:** Multiple Cox Proportional Hazard Models of relationship between Timing of First Marriage and Background Characteristics (Interaction effects)

Background Variables	Model 1			Model 2			Model 3		
	$\beta$	S.E	HR	$\beta$	S.E	HR	$\beta$	S.E	HR
<b>Region</b>									
North Central	Ref.C	Ref.C	1.000	Ref.C	Ref.C	1.000	Ref.C	Ref.C	1.000
North East	0.549	0.020	1.731*	0.439	0.021	1.552*	0.370	0.021	1.448*
North West	0.713	0.019	2.040*	0.525	0.020	1.691*	0.467	0.021	1.596*
South East	-0.444	0.026	0.642*	-0.277	0.027	0.758*	-0.242	0.027	0.785*
South West	-0.228	0.023	0.796*	-0.062	0.025	0.940***	-0.005	0.025	0.995
South South	-0.404	0.023	0.668*	-0.375	0.023	0.687*	-0.262	0.023	0.769*
<b>Religion</b>									
Christianity				Ref.C	Ref.C	1.000	Ref.C	Ref.C	1.000
Islam				0.437	0.017	1.548*	0.277	0.018	1.319*
Traditional				0.305	0.046	1.356*	0.071	0.047	1.073
Others				0.194	0.074	1.214**	0.100	0.074	1.105
<b>Education</b>									
No education							Ref.C	Ref.C	1.000
Primary							-0.145	0.018	0.865*
Secondary							-0.436	0.019	0.647*
Higher							-0.901	0.029	0.406*
-2 Log L			463576.6*			462883.4*			461590.3*
Chi-square			5008.018			5674.845			6827.939

\*Significant at 0.1%; \*\*Significant at 1%;HR: Hazard Rate

Figures 1-5 show clearly the pattern of timing of marriage among different categories of women with respect to their region, place of residence, education and religion. The pattern in figure 1 for instance is an indication that urban women (represented with blue curve) survived more without marriage at all ages than rural women. The

graph in figure 2 shows that the survivor function for South South consistently lies above that for the other regions in Nigeria. The gap between each of the graphs suggests that those above married at latter age than those below.

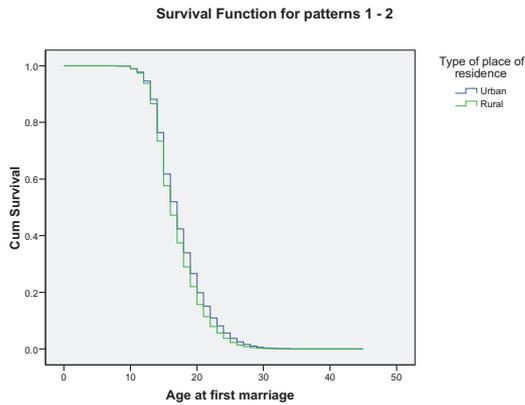


Figure 1: Survival function for patterns of marriage by women's type of place of residence

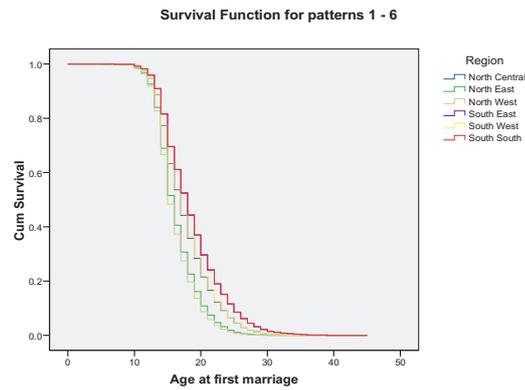


Figure 2: Survival function for patterns of marriage by all Regions in Nigeria

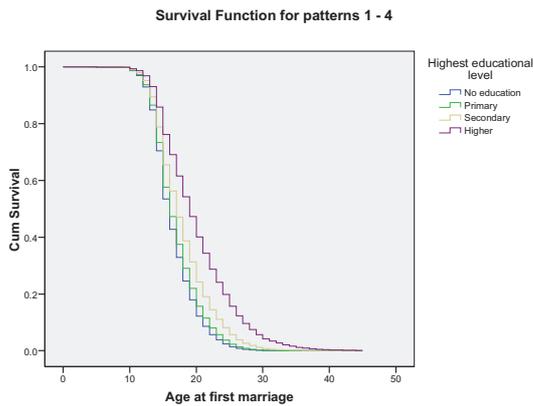


Figure 3: Survival function for patterns of marriage by women's Highest level of Education

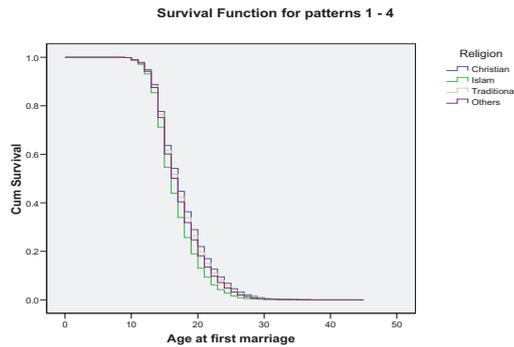


Figure 4: Survival function for patterns of marriage by women's Religious affiliation

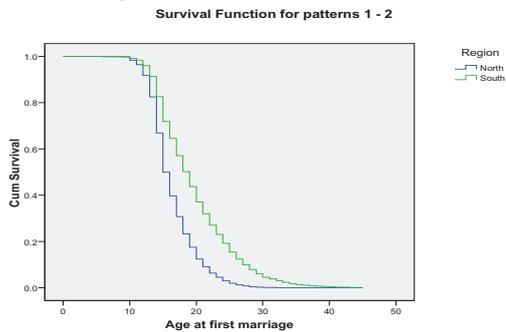


Figure: 5 Survival function for patterns of marriage by all region collapsed into North and South

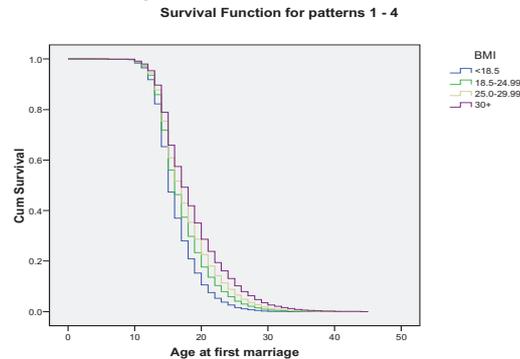


Figure: 6 Survival function for patterns of marriage by women's Nutritional Status according to Body Mass Index

Table 5 is the result of Cox Proportional Hazard Model of the relationship between Timing of First Marriage and Region with restricted to those that have attained at least secondary level of education. The patterns of age at first marriage remain as they were when all levels of education were involved in the analysis. However, the strength of the hazard rates reduced considerably across all the region with disappearance of the association between timing of marriage and South west region. Meanwhile, all the regions in the North show higher marriage hazard rates than the Southern part of Nigeria. The regions were further collapsed into two categories with all the regions in the North merged as one group and that of the South as another group. The data then revealed that the strength of the hazard rate of the age at first marriage in the North using South as reference category which was formerly 2.11( $p<0.001$ ) (Table 3) when all the educational categories were considered in the analysis dropped to 1.44( $p<0.001$ ) (Table 5).

Figures 7 and 8 represent graphs of survival function for patterns of marriage by all regions and region collapsed with restriction to women with at least secondary education. The figures also exhibit the same pattern of survival in age at first marriage as when all levels of education were used in the analysis, but the category graphs move closer to one another (see figures [2, 5] and [7,8]).

Table 6 depicts the ordinary linear regression (OLR) of the relationship between age at first marriage and selected quantitative variables. These are education in single years, age at first intercourse (AFI), total children ever born and body mass index. When age at first marriage was used as a dependent variable, education and age at first sexual intercourse show a positive ( $\beta = 0.456$ ; C.I = 0.446-0.466) and negative ( $\beta=-0.005$ ; C.I = -0.007- -0.004) relationship with age at first marriage respectively. This implies that having one additional year of schooling will increase the age at first marriage by 0.456 year (Approximately 6 months). But an increase by a year of age at first sexual intercourse will reduce the age at first marriage by 0.005 year (Approximately 2 days).

The result from OLR was also supported by Pearson correlation coefficient; Education (0.515,  $p<0.001$ ) and Age at first sexual intercourse (-0.127,  $p<0.001$ ) were positively and negatively correlated with Age at first marriage respectively. This means, the higher the level of education, the higher the age at first marriage. Further result from Table 6 show that the total children ever born and body mass index were negatively and positively related to age at first marriage. For instance, an increase age at first marriage by one year will reduce the total children ever born by 0.155 unit ( $p<0.001$ ) and increase the body mass index by 0.213kg/m<sup>2</sup> ( $p<0.001$ ). This finding conforms to the result from Pearson correlation coefficient.

**Table 5:** Cox Proportional Hazard Model of relationship between Timing of First Marriage and Region with full control for Education (Restricted to those that have attained at least secondary level of Education)

Background Variables	$\beta$	S.E	Wald	Sign.	Exp( $\beta$ )	95% C.I for $\beta$	
						Lower	Upper
<b>Region</b>							
North Central	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C
North East	0.358	0.050	50.825	0.000	1.431*	1.296	1.579
North West	0.469	0.051	83.577	0.000	1.599*	1.446	1.768
South East	-0.329	0.041	64.352	0.000	0.720*	0.664	0.780
South West	-0.037	0.037	0.991	0.320	0.964	0.896	1.037
South South	-0.246	0.036	46.754	0.000	0.782*	0.728	0.839
<b>Region 2</b>							
North	0.362	0.025	204.558	0.000	1.436*	1.367	1.509
South	Ref.C	Ref.C	Ref.C	Ref.C	1.000	Ref.C	Ref.C

\*Significant at 0.1%

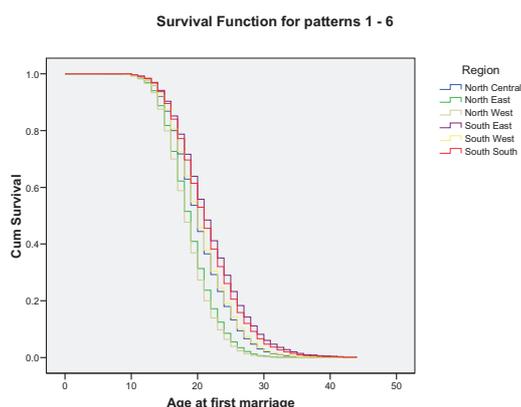


FIGURE 7: Survival function for patterns of marriage by all regions with restriction to women with at least secondary education

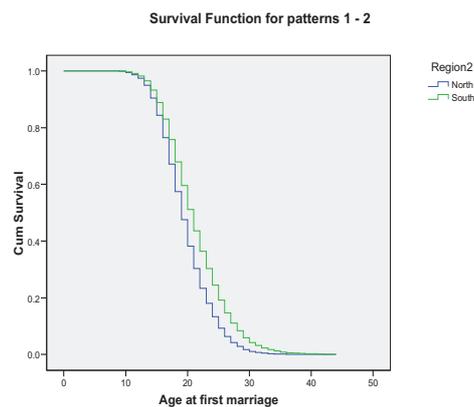


FIGURE 8: Survival function for patterns of marriage by region collapsed with restriction to women with at least secondary education

**Table 6:** Ordinary Linear Regression and Pearson’s correlation of the relationship between Age at first marriage and selected Variables

VARIABLES	β	S.E	t	95% C.I for β		PC(r)
				Lower	Upper	
<b>Age at first marriage</b> (Dependent); R <sup>2</sup> =0.267*						
Education in single years	0.456*	0.005	92.325	0.446	0.466	0.515*
Age at first intercourse	-0.005*	0.001	-7.611	-0.007	-0.004	-0.127*
(Constant)	15.841*	0.049	321.620	15.744	15.937	
<b>Total children ever born</b> (Dependent); R <sup>2</sup> =0.064						
Age at first marriage	-0.155	0.004	-41.304	-0.162	-0.147	-0.253*
(Constant)	6.804	0.069	98.590	6.669	6.939	
<b>Body Mass Index</b> (Dependent); R <sup>2</sup> =0.03*						
Age at first marriage	0.213	0.008	27.382	0.198	0.228	0.173*
(Constant)	19.377	0.144	135.022	19.095	19.658	

\* Significant at 0.01%; PC(r): Pearson Correlation

## Discussion

In the past, most of the family unit in Nigeria was essentially a patriarchal with all important decisions including when and who their children particularly females should marry taken by the male head. But nowadays things have changed and children in most cases decide on whom to marry and women now participate in decision making. The age at marriage is generally on the increase at a low pace; early marriage is still widely practiced in Nigeria. The current study explores regional differences in age at marriage among women in Nigeria. Broadly, the findings confirm prior works

on patterns of age at first marriage in other settings<sup>19, 20-21</sup>.

Findings from the current study reveal that the mean age at first marriage (17.8±4.8 years) is low and majority of women in Nigeria married between ages 15-19 years, while very few married late (30 years and above) and about 27.0% married too early (under 15 years). This could be a result of poverty and illiteracy which affect higher proportion of the inhabitants in Nigeria. This outcome is consistent with the research on timing of marriage by Lesthaeghe and colleagues<sup>22</sup>. They found that poverty has serious influence on timing of marriage. Other studies have also found that under stressful family life, female children are

given out early for marriage<sup>11, 23-25</sup>. There is evidence in Bangladesh that girls are married soon after puberty, partly to free their parents from an economic burden and partly to protect the girls' sexual purity<sup>26, 14</sup>.

Early marriage was more common in all the regions in the North than the South and majority married at age interval 15 to 24 years in the South. Late marriage was mostly common among women in the South East than in any other region in Nigeria. The possible explanation for early marriage in the North is the need to follow tradition, reinforce ties among or between communities, and protect girls from out-of-wedlock pregnancy. However, marriage requirements such as bride price and inability to take up financial challenges in marriage have great influence on decision to marry among men in the South particularly in South East. The cultural and religious demands of Northerners which allows parents to give out their daughters in marriage as a gift to benevolent personality in the community can also explain the difference. This has been documented in existing research<sup>2</sup>.

Early marriage was also found to be widespread in rural area and the mean age at marriage was significantly higher in urban than rural area. The residents of rural part of Nigeria are predominantly illiterates and value culture than those in urban. A more plausible explanation for this finding is that social amenities such as recreation centres, radio, television where information on consequence of early marriage can be obtained are found mostly in urban areas. Similar finding in Albania show that families in rural areas encourage their daughters to marry early in order to catch potential husbands before they migrate to the cities in search of work, and to avoid the threat of kidnapping on the way to school<sup>27</sup>. However, further research will be required to uncover complex relationship between factors influencing early marriage in rural Nigeria.

The study further revealed that majority of women who had no formal education married at age under 20 years and that age at first marriage increased with an increasing level of education. Lack of education is an obstacle to accessing tools that could improve people lives. For instance, unequal access to schooling perpetuates high

adolescent health rates, jeopardizing the health of girls and diminishing their opportunities for social and economic advancement. Also, education as recorded in single year shows a positive relationship with age at first marriage. The implication of this finding is that if the number of year of schooling is increased by a year, the age at first marriage will be possibly increased by approximately 6 months. The finding is consistent with the result of the study conducted by Ikamari<sup>28</sup> and with usual hypothesis that the number of years of schooling reduces the chances of early marriage. The implication is that teenage pregnancy is imminent among women with no education. The World Health Organization estimates that the risk of death following pregnancy is twice as great for women between 15 and 19 years than for those between the ages of 20 and 24<sup>29</sup>.

Christianity and Islam, the two major world religions present in Nigeria and have sunk deep roots at the expense of traditional animist religions. However, vestiges of traditional religion sometimes coexist with adherence one or other of the major religions. In this study, women who belong to Islamic religious sect married earlier than their counterparts who are Christians. This is consistent with the findings from the study by Islam and Ahmed<sup>30</sup>. The reason might be because Muslims still perceive early marriage as part of their religion. They believe that giving out daughters in marriage to a friend or an Islamic scholar signifies a sign of love, respect and a bond between their associates. The current study also showed that early marriage was common among traditional worshippers than late marriage. The explanation for this finding is that most modern socioeconomic part of life does not appeal to people who are traditional worshippers, even among highly educated members. The religion itself is part of traditional culture which they embrace in their daily life.

Age at first sexual intercourse was inversely related to age at first marriage. This means an increase in age at first sexual intercourse would lead to reduction in age at first marriage. This finding is a bit complex to interpret as this was a clear deviation from what have emerged from prior studies. For instance, in the study by Miller

and Heaton conducted in 1991, it was found that early initiation of sexual activity was associated with a relatively slow pace of family formation<sup>31</sup>. The total child ever born was negatively related to age at first marriage, this result also emerged from the previous work done by Adhikari, 2010<sup>32</sup>. The direction is expected since early marriage will result to wider childbearing interval than late marriage. Exposure to the risk of childbearing will also begin earlier among married women than their unmarried counterparts. Age at first marriage was positively related to body mass index, this finding is supported by the result from Grant et al., 2009 and Mensch 1998 studies<sup>33, 34</sup>. They found that increasing age at first marriage cause a proportional increase in nutritional status as measured by body mass index.

## Conclusion

This study has demonstrated that women married too early in Nigeria with teenage marriage more common in the North than the South. In addition, it has pointed to important of education and region as fundamental factors influencing age at marriage. Therefore, women should have at least secondary education before marriage and campaign aimed at discouraging early marriage should be spread across regions in Nigeria.

## Contribution of Authors

Dr. A.S, Adebowale conceived the idea and designed the study. Dr. A.S, Adebowale and Dr. A.F, Fagbamigbe extracted, analysed the data and wrote the results of the analyses. Dr. O.T, Okareh and G.O, Lawal reviewed relevant literatures. All the authors wrote the discussion and references sections. The paper was reviewed by the authors.

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