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Child marriage and teenage pregnancies in Africa: a multivariate analysis

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Abstract

Teenage pregnancies and childbirth are severe medical and public health problems for developed and developing countries. Although legislative, institutional, and policy measures should implement, girls still face early pregnancies and child marriage in Sub-Saharan Africa. This study aimed to examine child marriage and teenage pregnancies in three selected sub-Saharan African countries, specifically Malawi, Mali, and Niger. Descriptive and multivariate analyses indicated a significant decline in the prevalence of early childbearing in all three countries between 2006 and 2016, along with variability in determinants of age at first childbearing across countries. However, the study found that respondents who married in their early and middle adolescence are 20.53, 10.27, and 6.19 times (in Malawi, Niger, and Mali, respectively) more at risk of early childbearing than those who married in their emerging adulthood. There is an urgent need to introduce programs that promote delaying the age of first sexual debut and equip adolescent women with knowledge about responsible and safer sex and motherhood. In addition, government authorities (policymakers) must promote prolonged enrolment in schools for teenage girls and enforce a law that criminalizes child marriages.

Introduction

Adolescence is a vulnerable phase in human development as it represents a transition from childhood to physical and psychological maturity (UNICEF, 2019). Pregnancy before a girl is physically, developmentally and socially ready jeopardizes her right to a safe, successful transition into adulthood (UNFPA, 2015). Adolescent pregnancies, known also as early pregnancies, defined as the pregnancies under age 20 (WHO, 2011a), effectively derail girl's childhood. Research stressed that adolescent pregnancy and child birth is a serious medical and public health problem for both developed and developing countries as it may affect the health; social and economic well-being of society at large (Chemuru & Srinivas, 2015; Franjić, 2018). Age at first childbearing, therefore, is an important factor related to public health.

Adolescent pregnancy remains a major challenge occurring world over. Statistics indicated that approximately 21 million girls under the aged 15-19 give birth each year (Darroch *et.al*, 2016), and at least 777,000 births occur to adolescent girls younger than 15 years in developing countries (Woog and Kågesten, 2017). Between 2015 to 2020, an estimated 62 million babies will be born to mothers aged 15 to 19 years worldwide, 46 per cent of them in Sub-Saharan Africa (UN DESA, 2019). There have been substantial improvements in adolescent pregnancy and early motherhood in the world over the past twenty years but rates remain high in Sub-Sahara Africa. In 2015-2020, the adolescent birth rate was highest in Sub-Saharan Africa, at 103 per 1000 women aged 15 to 19, down from 126 births in 2000-2005 (UNICEF, 2019). Unsurprisingly, the countries with the highest rates of adolescent fertility are found in this region (ibid).

Numerous scholars revealed that early childbearing is associated with a number of negative health, educational, social and economic outcomes (Casterline & Lazarus, 2010; Kara & Maharaj, 2015; Loaiza &Liang, 2013). There has always been, for that reason, particular interest to investigate different factors impacting woman's early age at first childbearing. Findings from developing countries exposed that early childbearing is associated with higher risk of maternal and neonate deaths as well as higher overall fertility rate (Casterline & Lazarus, 2010; Kara & Maharaj, 2015; WHO, 2011b). Globally, complications from pregnancy and childbirth are the leading cause of death among adolescent girls aged 15-19 (UNICEF, 2019).

Several studies have examined factors associated with early pregnancy and motherhood in developing countries. In the context of Sub-Saharan Africa, a wide range of factors contribute

to the high rates of pregnancies and childbirths among adolescents; poverty, educational status, religion, early marriage, early sexual debut, unequal gender power relations, lack of comprehensive sexuality education, poor knowledge of sexual and reproductive health services and legal barriers to accessing services (Kassa *et al*., 2018; Wado *et al*., 2019; Yakubu & Salisu, 2018). The education of women has been considered as a major protective factor for early pregnancy; the more years of schooling, the fewer early pregnancies (Kassa *et al*., 2018; Wado *et al*., 2019; WHO, 2011a). Likewise, it has been found that material living conditions impact girls' reproductive behaviour. Scholars have stressed that adolescents and young people's attitudes towards sexuality, marriage, early motherhood, are largely shaped by the parent or husband's financial capability to meet their basic needs (Kamal *et al.*, 2015; Kara & Maharaj, 2015; Wado *et al*., 2019; Yakubu & Salisu, 2018). Indeed, early childbearing is dangerous; girls from low-wealth households are most likely to become pregnant during adolescence (Kara & Maharaj, 2015; Wado *et al*., 2019; Yakubu & Salisu, 2018). Researchers have identified place of residence associated with reproductive behaviour; given that it is an important element of social identification and, it affects economic opportunities. Findings from Sub-Saharan Africa underlined that a rural environment is favourable for early sexual debut, early marriage and early motherhood (Kara & Maharaj, 2015; Kassa *et al*., 2018; UNFPA, 2005). The broader cultural milieu and social institutions always impact on young women's reproductive behaviour. Researchers found that in Sub-Saharan Africa and South Asia, motherhood is often simply seen as what girls are "for"; their social value is firmly rooted in their capacity for reproduction (Hindin & Fatusi, 2009; Rossier, 2007). Scholars have shown that early sexual activity is most often unprotected, and induces a high prevalence of early and unwanted pregnancies or early motherhood (Iklaki *et al.*, 2012; UNFPA, 2005; Yakubu & Salisu, 2018). Early sexual activity therefore, is an exposure factor in the risk of early motherhood and the sooner this initiation, the longer would be the exposure time. Child marriage, however, is identified as one of the key drivers of teenage pregnancies, especially in South Asia and Sub-Saharan Africa (Raj *et al*., 2009; UNFPA, 2012; WHO, 2011a). Girls who tie the knot early, habitually have their experience of pregnancy and childbirth at a young age due to their higher frequency of sexual activity. UNFPA (2015) stressed that nine out of ten births to girls to girls aged 15-19 in developing countries occur within early marriage where there is often an imbalance of power, no access to contraception and pressure on girls to prove their fertility.

There is a need for a context-specific understanding of the factors that affect early childbearing of adolescent women, since Sub-Saharan Africa is not homogeneous and determining factors of teenage pregnancy and motherhood might differ sizeably across countries. The present paper, therefore, focuses on the socio economic, demographic and behavioural determinants of young women's age at first childbearing with special respect to the situation of Niger, Mali and Malawi.

Methods

Data sources

Data used for the analyses come from the Malawi Standard Demographic and Health Survey (2010) and 2015–2016 (2017), Mali Standard Demographic and Health Survey (2006) and 2012–2013 (2014), and Niger Standard Demographic and Health Survey (2006) and (2012). sub-samples of young women aged 15–24, currently pregnant, or already given used birth.

Conceptual framework

The conceptual framework for this study an updated by Adamchak *et al*. This model was helpful in the factors that influence youth reproductive health (Adamchak *et al.*, 2000). This model explains the important social-cultural/cognitive variables and their interrelationships underlying the behaviours used in predicting reproductive health. Consistent with this model, individual characteristics such as demographic, socioeconomic and cultural, family planning, and behavioural characteristics may be conceptualized as factors that model fertility amongst young women in Sub-Saharan Africa (Figure 1). Demographic factors involve the woman's age, marital status, and age of husband/partner. Socioeconomic and cultural factors consist of women's educational level and literacy, household wealth quintile index, woman's employment status, exposure to media, husband/partner's education, region, place of residence, religion, and ethnicity. Regarding family planning factors, variables, such as knowledge of ovulatory cycles, contraceptive methods, and ever used the processor to delay pregnancy, were thought about carefully. Finally, behavioural characteristics are the most immediate cause of reproductive health outcomes, such as age at first marriage and age at first intercourse.
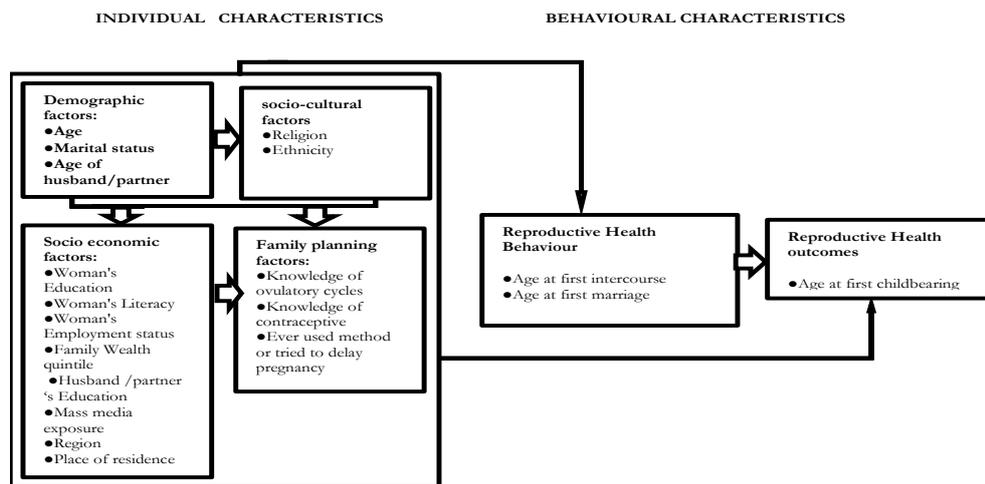
Figure 1. *Conceptual Framework of the study (Jacques Elengemoke and S.Susuman, 2020)*

Study setting

This research had chosen three Sub-Saharan African (SSA) countries, namely Malawi, Mali, and Niger.

Malawi is a landlocked country in Southern Africa, has an estimated population of 19.1 million, with around 83% living in rural areas in 2020 and 44% aged under 15 years (Population Reference Bureau, 2020). The country had the Human Development Index (HDI) of 0.485 in 2018 (Conceição, 2019). The Total Fertility Rate (TFR) was 4.2 per woman in 2018 (Population Reference Bureau, 2020), along with Adolescent Birth Rate (ABR) of 137.6 per 1000 (World Health Organisation, 2020) and child marriage prevalence of 42% (United Nations Children's Fund, 2018). Under the Constitution, the minimum legal age of marriage is 18 years, with no exceptions (African Child Policy Forum, 2018). Malawi's National Youth Policy 2013 (Ministry of Youth and Sports, 2013) is protective against teenage pregnancies. Furthermore, the National Sexual and Reproductive Health and Rights (SRHR) Policy (2017–2022) commits to positioning adolescent sexual and reproductive health as a strategy for empowerment, development, and social wellbeing (Ministry of Health, 2016).

Concerning Mali, this is a landlocked country in the Western Africa region with an estimated population of 20.3 million in 2020 (Population Reference Bureau, 2020). Forty-three percent of the population live in urban areas, and 48% are younger than 15 (Population Reference Bureau, 2020). Mali is predominantly (94%) Muslim (Central Intelligence Agency, 2020). The HDI for 2018 was 0.427 (Conceição, 2019). The country had the worst ABR at 164 per 1000 during the period 2010-2018 (World Health Organisation, 2020) and one of the worst TFRs at 6.3 births per woman in 2018 (Population Reference Bureau, 2020), the child marriage

prevalence stood at about 52% (United Nations Children's Fund, 2018). The Code of Persons and the Family 2011(Assemblée Nationale du Mali, 2011) provides 18 years as the minimum legal age for civil marriage. The "Plan d'Action National Budgétisé de Planification Familiale du Mali 2019-2023" (Ministère de la Santé et des Affaires Sociales, 2019) and "Plan d'action multisectoriel de la santé des adolescents et des jeunes (2017-2021)" ensure to increase the use of family planning services and reduce the incidence of early and / or unwanted pregnancies among adolescent girls and young people in Mali.

Likewise, Niger is a landlocked country located in Western Africa, home to 24.2 million inhabitants, youthful with 51% under age 15 and predominantly rural (84%) (Population Reference Bureau, 2020). The population is primarily Muslim (99%) (Central Intelligence Agency, 2020). The country had the world's lowest HDI (0.377) in 2018 (Conceição, 2019). With an ABR of 154.0 per 1000 (World Health Organisation, 2020), a TFR of 7,1 per woman (Population Reference Bureau, 2020), and a child marriage prevalence of 76% in 2018 (United Nations Children's Fund, 2018), Niger still exhibits the highest fertility rate and child marriage prevalence in the world. The legal minimum age of marriage for women is observed at 15. The Niger Government has implemented several initiatives and projects to promote adolescents' reproductive health and reduce pregnancy and motherhood. In 2015, the Niger Government developed and adopted the National Strategic Plan for preventing Adolescent Pregnancy (United Nations Population Fund West and Central Africa Regional Office, 2017).

Statistical analyses

Descriptive and multivariate analyses were used, at the descriptive level of research, the characteristics of the sample and the prevalence and trends of early childbearing were analyzed. The Pearson Chi-square test was used to examine the association between independents and outcome variables. Moreover, the Pearson product-moment correlation was achieved between independent variables to check for high intercorrelations among independent variables. A generalized linear model specifying binomial distribution and negative log-log link further established the determinants of age at first childbearing. The Statistical Packages for Social Sciences version used 25.0 for estimations. All analyses were weighted to account for survey design. To consider the country aspect of analysis, descriptive and multivariate analyses were performed independently for each country.

Selected study variables

Dependent variable

Young women's age at first childbearing was employed as the dependent variable of the study. Age at first childbearing determines the mother's age at the time of the first pregnancy or first birth. Therefore, age at first childbearing is dichotomized by assigning the value of 0 for the period being 20 and above, and the importance of 1 for generation at first childbearing birth is less than 20; based on 20 years as the advocated age at first pregnancy.

Independent variables

There were eighteen independent variables grouped into socio-economic characteristics. In addition, several demographic, Planning, Family, and behavioral factors were used in the analyses. For example, explicitly, education, literacy, wealth index, employment status, mass media exposure, religion, ethnicity, current age, marital status, knowledge of ovulatory cycles, knowledge of contraceptive methods, ever used method or tried to delay pregnancy, husbands/partners education, age of husband/partners, region, place of residence, age at first sexual intercourse and age at first marriage/cohabitation.

Results

Trends and distribution of age group, behavioural and family planning characteristics

Table 1 reveals significant increases in the age at first intercourse in Niger and Mali during the study period. The percentage of young women who faced early sexual intercourse (by 16 years) in Niger significantly decreased from 67.9% to 62.2% between 2006 and 2012. Similarly, early sexual activity in Mali declined from 63.7% in 2006 to 59.2% in 2013. In reverse, no significant variations were detected in age at first sexual activity in Malawi. Regarding the age at first marriage, findings show 87.9%, 78.8%, and 59.4% of adolescents (in Niger, Mali, and Malawi, respectively) have experienced early marriage (by 18) at the latest DHS surveys. However, a significant decline in the proportion of early marriage was observed in all target countries between 2006 and 2016 (1.7%, 6%, and 5% in Niger, Mali, and Malawi, respectively). Overall,

the three countries experienced an increase in adolescents' knowledge of the ovulatory cycle and contraceptive methods.

Table 1. Trends and distribution of age group, behavioural and family planning characteristics in Niger, Mali and Malawi.

Behavioural and Family planning characteristics	2006	2012	2006	2012-13	2010	2015-16
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Age at first pregnancy / first birth						
< 15	244(11.8)	287(11.5)	427(12.8)	403(17.7)	283(5.4)	299(5.2)
15 to 19	1623(78.2)	1924(76.8)	2532(75.8)	1597(70.0)	4034(77.0)	4348(75.2)
20 and+	207(10.0)	294(11.7)	382(11.4)	281(12.3)	919(17.6)	1131(19.6)
Total	2074(100)	2505(100)	3341(100)	2281(100)	5236(100)	5778(100)
Mean(SD)	16.7(2.0)	16.9(2.1)	16.9(2.2)	16.8(2.4)	17.7(2.1)	17.8(2.0)
X²(p-value)	3.60(.166)		28.98(.000)		7.47(.024)	
Age at first marriage/cohabitation						
< 15	926(44.9)	850(34.1)	1137(34.7)	727(34.4)	690(14.1)	625(12.1)
15 to 17	921(44.7)	1338(53.8)	1643(50.1)	940(44.4)	2467(50.3)	2446(47.3)
18 and+	214(10.4)	301(12.1)	500(15.2)	449(21.2)	1745(35.6)	2095(40.6)
Total	2061(100)	2489(100)	3280(100)	2116(100)	4902(100)	5166(100)
Mean(SD)	14.9(2.0)	15.2(1.9)	15.4(2.1)	15.5(2.5)	16.7(2.2)	17.0(2.2)
X²(p-value)	55.1(.000)		34.78(.000)		28.30(.000)	
Age at first intercourse						
< 16	1410(67.9)	1557(62.2)	2129(63.7)	1351(59.2)	2102(40.1)	2344(40.6)
16 to 17	460(22.2)	649(25.9)	858(25.7)	615(27.0)	1812(34.6)	1921(33.2)
18 and+	205(9.9)	298(11.9)	354(10.6)	315(13.8)	1323(25.3)	1512(26.2)
Total	2075(100)	2504(100)	3341(100)	2281(100)	5237(100)	5777(100)
Mean(SD)	14.9(2.0)	15.2(1.9)	15.1(1.9)	15.1(2.2)	16.1(2.1)	16.1(2.1)
X²(p-value)	16.64(.000)		17.04(.000)		2.49(.289)	
Current Age						
15-19	675(32.5)	739(29.5)	1100(32.9)	741(32.5)	1281(24.5)	1528(26.4)
20-24	1399(67.5)	1765(70.5)	2241(67.1)	1540(67.5)	3955(75.5)	4249(73.6)
Total	2074(100)	2504(100)	3341(100)	2281(100)	5236(100)	5777(100)
Mean(SD)	20.4(2.3)	20.5(2.2)	20.4(2.4)	20.4(2.3)	21.1(2.2)	20.9(2.2)
X²(p-value)	4.89(.03)		.12(.731)		5.69(.017)	
Knowledge of ovulatory cycles						
No	1789(86.3)	2085(83.2)	2792(83.5)	1607(70.5)	4383(83.7)	4816(83.4)
Yes	285(13.7)	420(16.8)	550(16.5)	674(29.5)	854(16.3)	961(16.6)
Total	2074(100)	2505(100)	3342(100)	2281(100)	5237(100)	5777(100)
X²(p-value)	7.97(.005)		136.43(.000)		.22(.643)	
Knowledge of any method						
No method	600(28.9)	286(11.4)	716(21.4)	341(14.9)	26(0.5)	30(0.5)
Folkloric & Traditional method	85(4.1)	41(1.6)	31(0.9)	4(0.2)	1(0.0)	2(0.0)
Modern method	1390(67.0)	2179(87.0)	2594(77.7)	1935(84.9)	5209(99.5)	5745(99.4)
Total	2075(100)	2506(100)	3341(100)	2280(100)	5236(100)	5777(100)
X²(p-value)	262.85(.000)		51.32(.000)		.27(.873)	

Source: DHS-Niger 2006. 2012. DHS-Mali 2006. 2013. DHS-Malawi 2010. 2015-16; computed by authors

Trends in early childbearing

Table 1 shows that the majority of young women experienced early childbearing (by 20) in all the three countries (88.3%, 87.7% and 80.4% in Niger, Mali, and Malawi, respectively), few (11.5%, 17.7%, 7.4%, and 5.2% in that order) experienced it in their early adolescence (by 15 years) at the latest DHS surveys. It transpires that early childbearing remains a crucial issue in the three countries. Over time, the prevalence of early childbirth in Malawi significantly dropped at 80.4% in 2016, down from 82.4% in 2010. Likewise, early childbearing declined

from 88.6% to 87.7% between 2006 and 2013 in Mali. In Niger, however, the study noticed no significant change in the prevalence of early delivery between 2006 and 2012.

Age at first childbearing by background characteristics

Women's education and literacy were significantly related to the age at first childbearing in Niger, Mali, and Malawi. As shown in Appendix Table A1, the prevalence of early labor was higher among women with no education (89.9%, 89.0% and 86.1% in Niger, Mali, and Malawi, respectively) than those with secondary and tertiary education (70.4%, 81.6% and 63.3% in the same order). This suggests that women's age at first childbearing varied with mothers' level of education. In addition, Appendix Table A1 highlights that the age at first childbearing significantly changed whether women lived in rural or urban areas in the three countries investigated. On average, young women who resided in rural areas were more likely to enter motherhood early than those in urban. Likewise, other socio-economic variables, family wealth index, husbands'/partners' education, and region, were associated with age at first childbearing in all three target countries. Besides, mass media exposure was associated with age at first childbearing in Niger and Malawi. In turn, women's religious beliefs and ethnicity were found significantly associated with the age at entry into motherhood in Malawi. In light of this, early motherhood increases from Christian mothers (79.6%) to Muslim mothers (85.6%).The results from Appendix Table A1 indicate that women's age and husband's/partner's age were associated with the age at first childbearing in all the three countries. In contrast, marital status was associated in Mali and Malawi.

Regarding the mothers' family planning characteristics, Appendix Table A1 displays significant associations with the knowledge of ovulatory cycles and contraceptive methods. It surfaces a higher prevalence of early childbearing (88,7%, 89.1%, and 80.7% in Niger, Mali, and Malawi, respectively) among women who do not know ovulatory cycles than those who know ovulatory processes (86.1%, 84.3% and 79.0% in that order). Behavioural characteristics, that is to say, age at first marriage/cohabitation and age at first intercourse, emerges to be significantly associated with age at first childbearing in all three countries. Regarding age at first cohabitation, Appendix Table A1 reveals that young women who married in early adolescence (by 15) are more likely to face early motherhood (97.4%, 99.1%, and 98.7% in Niger, Mali, and Malawi, respectively) in comparison with 42.2%, 57.0% and 53.7% (in the same order) of those who married in emerging adulthood (18-24). This implies that the age at

first marriage positively induced early motherhood differential behaviour. Also, the proportion of respondents who faced early motherhood was more significant among women who experienced sexual intercourse by 16 (96.3%, 96.6%, and 94% in Niger, Mali, and Malawi, respectively), which decreased among those who experienced it at the age 18-24 (40.7%, 45.1% and 44.6% in that order). The age of entry into motherhood essentially changed with sexual activity initiation.

Multivariate Analysis

Negative log-log regression analyses were performed to determine the risk factors of early childbearing. In these models, age at first childbearing was used as a dependent variable. Moreover, age at first childbearing was dichotomized by assessing the value of 0 for age at first marriage being 20 years and above, and the importance of 1 for age is less than 20 years. Appendix Table A2 presents the results based on the Negative log-log regression analyses for early childbearing. The results of the study have highlighted nine factors that significantly predict young women's risk of premature labour at ninety-five percent in at least one of the three countries, namely age at first marriage/cohabitation, age at first intercourse, women's education, husband's / partner's education and age, mass media exposure, region of residence, knowledge of contraceptive methods and understanding of ovulatory cycles. In addition, findings show that age at first marriage/cohabitation is the most vital positive factor related to the postponement of childbearing in all the three countries of the study.

Young women who got married in their early and middle adolescence (by 18) are 20.53, 10.27, and 6.19 times (95% CI, 15.44 - 27.29; 95% CI, 15.03 – 27.02 and 95% CI, 4.58 - 8.37 in Malawi, Niger, and Mali respectively) more prone to experience early motherhood than those who got married at 18 and above. Furthermore, facing early childbearing decreases with age at first intercourse in Mali and Malawi. Participants who have engaged in sexual activity by 16 (OR=4.12 in Mali) and (OR=1.70 in Malawi), have a higher risk of early childbearing than those who initiated it at age 16 and above.

Indeed, women's and /partners' educational levels significantly affect the likelihood of early childbearing in Niger and Malawi. Women with primary education in Niger and Malawi are 2.54 and 1.56 times (95% CI, 1.34 – 3.06 and 95% CI, 1.32 – 1.86 respectively) more likely to undergo early childbearing than their secondary higher-educated counterparts. About

husbands'/partners' education, findings revealed that young women whose husbands' have primary education in Niger (OR=0.56) are less likely to challenge early motherhood than those whose husbands' have secondary and tertiary education. Women whose husbands had no education in Malawi (OR=1.56) are more likely to challenge early motherhood than those whose husbands had secondary and tertiary education. Region of residence is also a determinant of variation for age at first birth in Malawi. Respondents from the Central region in Malawi are 30% (95% CI, 0.57 - 0.87) less likely to give birth by 20 than those from the Southern region. Finally, researchers findings reveal the likelihood of confronting early childbearing increases with the knowledge of contraceptive methods. Participants who do not know contraceptive methods in Niger and Malawi are 52% and 63% (respectively) less likely to confront early childbearing than those who know about contraceptive methods.

Furthermore, results indicate that the probability of facing early childbearing decreases with the knowledge of ovulatory cycles in Mali. Young women who have no understanding of ovulatory cycles (OR=1.34; 95% CI, 1.02 - 1.7) are more at risk of early childbearing when compared to those who know ovulatory cycles. Other predictors of age at first childbearing are women's exposure to media and husband's / partner's age. Respondents who are less than weekly exposed to media (OR=1.38) have more risk of early childbearing than those exposed weekly and daily in Malawi. Furthermore, respondents whose husbands are aged 15-24 are 8.16 times (95% CI, 2.15 - 31.04) more likely to undergo early motherhood than their counterparts whose husbands are aged 55 and above in Mali.

DISCUSSION

Key Findings

The trend in early childbearing

One of the main aims of this study was to examine the trends of early childbearing among young women aged 15-24 in three Sub-Saharan African countries using data from the DHS between 2006 and 2016. The findings show that early delivery remains common in these countries ranging from 80.4% in Malawi to 88.3% in Niger. Recent trends, however show a significant decline in Malawi and Mali while no significant change was observed in Niger. In addition, there was a substantial reduction in the percentage of early marriage in Niger, Mali,

and Malawi from 2006 to 2016. However, there were significant increases in the age at sexual debut, knowledge of the ovulatory cycle, and contraceptive methods in Niger and Mali.

Factors associated with early childbearing

The aim of this study was to examine the socio-economic and demographic determinants of early childbearing among young mothers in the sub-Saharan African countries using the Malawi Standard Demographic and Health Survey 2015–2016 (2017), Mali Standard Demographic and Health Survey 2012–2013 (2014) and Niger Standard Demographic and Health Survey (2012) data.

Our findings revealed that the risk of early childbearing was strongly associated with age at first marriage/cohabitation in all three study countries. Young women who confronted early marriage (by 18) are more at risk of early childbearing than those who married at 18 and above. This implies that the earlier the wedding, the higher the probability of facing early motherhood. Similarly, the likelihood of confronting early childbearing was strongly associated with age at first sexual intercourse. Participants who challenged early sexual activity (by 16) in Mali and Malawi are more at risk of early childbearing than those who initiated it at 16 and above. This suggests that the sooner the sexual intercourse initiation, the higher the odds of premature delivery.

Moreover, the risk of early childbearing has been found to decrease with women's education educational level across two of the study countries, to be precise Niger and Malawi. The findings indicated that women without formal education and those with primary education have a higher risk of early childbearing than their secondary or higher educated counterparts.

This insinuates that the lower the level of education, the higher the chance of confronting early delivery. Our study uncovered that women's knowledge of ovulatory cycles and contraceptive methods were determinants of early childbearing. Young women who do not know ovulatory processes are more likely to go through premature birth when compared to those who have knowledge of ovulatory cycles in Mali.

Furthermore, the likelihood of facing early birth increases with the knowledge of contraceptive methods in Niger and Malawi. Concerning women's media exposure, the results underlined

that participants less than weekly exposed to media in Malawi are more likely to confront early childbearing than those exposed weekly and daily. Other factors associated with age at first childbearing in this study were a region of residence, husband's/Partner's education, and age.

Study findings concerning other studies

The findings of our research display that a woman's reproductive health behaviour, such as age at first marriage/cohabitation and age at first intercourse, are critical factors associated with age at first childbearing and motherhood. The multivariate analysis reveals that, in all the three countries of the study, respondents who married in their early and middle adolescence are more at risk of early childbearing than those who married in their emerging adulthood (18-24). These results show that early marriage leads to early pregnancy and childbirth; several previous studies suggested the same (Kassa *et al*., 2018; Yakubu & Salisu, 2018; UNFPA, 2012). One possible reason might be culture. Indeed, in most Sub-Saharan African countries, girls' social value is firmly rooted in their capacity for reproduction (Hindin & Fatusi, 2009; Rossier, 2007; Presler-Marshall & Jones, 2012). Women's primary role is to provide children for their husband's families (Rossier, 2007). Child marriage and rapid conception are therefore encouraged. In this context, marriage and pregnancy are "socially accepted, found identity, are sources of status, and reaffirm entry into adulthood" (Goicolea, 2009). There is an urgent need to change societal attitudes towards early marriage and motherhood.

Also, young mothers who challenged early sexual activity (by 16) in Mali and Malawi are more at risk of early childbearing than those who faced first sexual activity at the age of 16 and above. This corroborates the results from prior research and systematic reviews (Iyanda et *al*., 2020; Yakubu & Salisu, 2018; Wado *et al*., 2019). A possible explanation could be that in many African societies, large proportions of adolescent girls initiate sexual activity with older partners, which might lead to many births among adolescent girls occurring outside of, or shortly after, marriage. Moreover, our study exposes that socio-economic factors, namely woman's education, mass media exposure, and region of residence, are important determinants of age at first childbearing. Findings uncover that in Niger and Malawi, young mothers with no education and primary education are more likely to undergo early childbearing than their counterparts with secondary or tertiary education. However, there was no significant influence of mothers' educational level on the age at first childbearing was found in Mali. It was suggested that higher education is protective against early motherhood. Several previous studies have revealed maternal education as a solid and negative predictor of early childbearing

(Iyanda et *al*., 2020; Kassa *et al*., 2018; Yakubu & Salisu, 2018; Wado *et al*., 2019). It could potentially be because educated women are considered to have a greater awareness of the existence of family planning services and may benefit from using such services. Other scholars found that incorrect knowledge of ovulation and contraceptive methods were significant predictors of unintentional child and pregnancy among young women in Sub-Saharan Africa (Iyanda et *al*., 2020). Our analyses show that the probability of facing early birth decreases with the knowledge of ovulatory cycles in Mali only. This may result from the fact that many adolescents-frequently do not discover how their bodies work, how pregnancy occurs, and how to prevent pregnancy. Mastering the cycle can help the adolescent negotiate the most suitable time for her to have sex and abstain during the ovulation period. This study also found an increase in the likelihood of confronting early childbearing with increasing knowledge of contraceptive methods in Niger and Malawi. Various researchers have shown the impact of knowledge of contraceptive methods on fertility behaviour (Bankole & Malarcher 2010; Ayuba *et al*., 2012; Malarcher, 2010; Wado *et al*., 2019). While most adolescents are aware of modern family planning methods, they are often misinformed about how they work.

Limit of the study

The present study has some significant limitations. Given the cross-sectional nature of our data, the direction of causal associations cannot always be ascertained. Moreover, nearly all information collected in DHS is subject to reporting and recall biases. More changes in the news, such as the initiation to sexuality, age at marriage, and period at childbearing, refer to events in the past. This inevitably causes biases. Despite all these limitations, this study adds a wealth of knowledge on the determining factors of early childbearing in Sub-Saharan African countries, that is to say, Malawi, Mali, and Niger, by investigating the impacts of several socio-economic, demographic and behavioural characteristics.

CONCLUSION

This study has reinforced the state of knowledge of the factors determining youth early entry into motherhood in three Sub-Saharan African countries, to be precise; Niger, Mali, and Malawi. Results indicate that early childbearing remains common among young women in the three target countries despite being likely to decrease over time. Also, the highest proportion of early delivery was noticed amongst participants who married in early adolescence (by 15). Findings of this study painted that age at first childbearing among Sub-Saharan African young

women is determined by a range of individual and behavioural characteristics. Several issues were influenced with early pregnancy, such as age at first intercourse, women's education, husband's/partner's education, mass media exposure, age of husband/partner, region of residence. Furthermore, knowledge of contraceptive methods and understanding of ovulatory cycles significantly determine young women's risk of early childbearing in at least one of the three target countries. Additionally, the current study highlighted the similarity and variability in risk and protective factors that affect early entry into motherhood across countries. This stresses the need for a context-specific understanding of the factors that influence the reproductive behaviour of adolescents and young adult women.

RECOMMENDATIONS

This study granted excellent results that add to calls for empowering and protecting adolescent girls across Sub-Saharan African countries. There is an urgent need to introduce programs that promote delaying the age at first sexual debut and equip immature women with responsible and safer sex and motherhood knowledge. Besides, Government authorities (policymakers) have to promote prolonged school enrolment and enforce a law that criminalizes child marriages.

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Appendix

Table A1. Distribution of age at first childbearing by individual characteristics in Niger, Mali and Malawi.

Independent variables	Niger					Mali				
	< 15	15 to 19	20 and+	Total	Mean	< 15	15 to 19	20 and+	Total	Mean
Socio economic										
Education	χ2(0.95)=86.41***					χ2(0.95)= 24.93***				
No Education	264(13.3)	1524(76.6)	202(10.1)	1990(100.0)	16.7	318(19.4)	1139(69.6)	179(11.0)	1637(100)	16.6
Primary	22(6.6)	274(81.8)	39(11.6)	335(100.0)	17.2	43(14.9)	208(72.8)	35(12.3)	286(100)	16.8
Secondary/Higher	1(0.5)	125(69.9)	53(29.6)	179(100.0)	18.3	42(11.8)	250(69.8)	66(18.4)	358(100)	17.4
Literacy	χ2(0.95)=71.78***					χ2(0.95)=16.93***				
Illiterate	280(12.7)	1700(77.2)	221(10.1)	2201(100.0)	16.8	337(19.1)	1234(69.8)	197(11.2)	1768(100)	16.6
Literate	7(2.4)	218(73.1)	73(24.5)	299(100.0)	18.0	66(12.9)	363(70.8)	83(16.3)	512(100)	17.2
Husbands education	χ2(0.95)=36.00***					χ2(0.95)=17.47**				
No Education	252(12.8)	1515(76.8)	206(10.4)	1973(100.0)	16.8	334(19.8)	1164(68.8)	193(11.4)	1691(100)	16.6
Primary	24(7.6)	251(78)	47(14.5)	323(100.0)	17.2	29(17.5)	117(70.7)	20(11.8)	166(100)	16.7
Secondary/Higher	9(4.6)	139(73.6)	41(21.7)	188(100.0)	17.9	28(10.8)	185(71.5)	46(17.7)	259(100)	17.4
Wealth index	χ2(0.95)=71.78***					χ2(0.95)=54.16***				
Poorest	64(14.1)	348(77.4)	38(8.4)	450(100.0)	16.7	74(17.1)	317(72.7)	45(10.2)	436(100)	16.6
Poorer	57(11.4)	400(79.8)	44(8.8)	501(100.0)	16.7	82(18.2)	314(69.9)	53(11.9)	449(100)	16.7
Middle	76(14.7)	393(75.9)	49(9.4)	517(100.0)	16.7	111(25.6)	273(63.1)	49(11.3)	432(100)	16.4
Richer	58(10.4)	439(78.9)	59(10.6)	556(100.0)	16.9	79(15.4)	390(75.6)	47(9)	516(100)	16.7
Richest	32(6.7)	343(71.5)	104(21.7)	480(100.0)	17.6	57(12.7)	304(67.8)	87(19.5)	448(100)	17.4
Employment status	χ2(0.95)=4.09					χ2(0.95)=0.73				
No	254(11.1)	1669(78)	245(10.9)	2168(100)	16.9	264(18.1)	1010(69.5)	180(12.4)	1454(100)	16.7
Yes	32(12.3)	251(78.2)	49(9.5)	332(100)	17.1	139(16.8)	587(71)	101(12.2)	827(100)	16.8
mass media exposure	χ2(0.95)=10.24*					χ2(0.95)=5.56				
Not at all	98(11.1)	693(78)	97(10.9)	888(100.0)	16.9	111(20.5)	367(67.8)	63(11.7)	542(100)	16.6
Less than weekly	87(12.3)	553(78.2)	67(9.5)	706(100.0)	16.8	71(15.1)	338(71.5)	63(13.4)	473(100)	16.9
Weekly and daily	102(11.2)	678(74.5)	130(14.3)	910(100.0)	17.1	221(17.4)	892(70.4)	154(12.2)	1266(100)	16.8
Region	χ2(0.95)=98.69***					χ2(0.95)=22.86*				
Agadez	5(12)	27(65.3)	9(22.7)	41(100.0)	17.3					
Diffa	14(18)	58(74.6)	6(7.3)	78(100.0)	16.3					
Dosso	13(5)	209(79.8)	40(15.2)	262(100.0)	17.4					
Maradi	78(14.5)	414(77)	46(8.5)	538(100.0)	16.5					
Tahoua	68(11.1)	475(77.4)	71(11.5)	613(100.0)	17.0					
Tillaberi	15(5.7)	208(80.4)	36(14)	258(100.0)	17.4					
Zinder	89(15.5)	437(76.4)	46(8)	571(100.0)	16.5					
Niamey	5(3.7)	96(67.4)	41(28.8)	143(100.0)	18.2					
Kayes						70(19.7)	258(72.8)	27(7.5)	354(100)	16.4
Koulikoro						77(15.9)	351(72.4)	56(11.6)	485(100)	16.8
Sikasso						106(20.7)	338(66.3)	66(13)	510(100)	16.7
Segou						77(18.9)	276(68.2)	52(12.9)	404(100)	16.7
Mopti						42(16.2)	180(70)	36(13.8)	257(100)	17.0
Bamako						32(11.9)	195(72)	43(16.1)	270(100)	17.3
Type of place of residence	χ2(0.95)=62.50***					χ2(0.95)=15.89***				
Urban	20(5.6)	250(70.8)	83(23.5)	353(100.0)	17.8	69(13.8)	347(69.4)	84(16.8)	500(100)	17.2
Rural	267(12.4)	1674(77.8)	211(9.8)	2152(100.0)	16.8	334(18.8)	1250(70.2)	197(11.0)	1781(100)	16.6
Socio cultural										
Religion						χ2(0.95)=7.18				
Christian						13(16.2)	54(69.7)	11(14.2)	78(100)	16.9
Muslim						373(17.6)	1479(69.9)	264(12.5)	2116(100)	16.8

Animist						1(6)	14(86)	1(8)	17(100)	17.0
No religion						16(24.2)	47(69.9)	4(5.8)	68(100)	16.2
Other						0(0)	2(100)	0(0)	2(100)	17.8
Ethnicity						χ2(0.95)=25.71				
Bambara						130(17.1)	542(71.2)	89(11.6)	762(100)	16.7
Malinke						34(16.7)	145(71.2)	25(12.1)	204(100)	16.7
Peulh						65(19.6)	222(66.8)	45(13.6)	332(100)	16.7
Sarakole/soninke/marka						55(21.1)	181(68.8)	26(10.1)	263(100)	16.5
Sonraï						7(23.3)	20(68.9)	2(7.8)	29(100)	16.3
Dogon						31(14.8)	151(73.2)	25(12)	206(100)	1.0
Tamachek/bélla						6(20.6)	19(67)	3(12.4)	28(100)	16.6
Sénoufo/minianka						37(15.9)	168(71.5)	30(12.6)	236(100)	16.9
Bobo						8(12.7)	42(70.6)	10(16.7)	60(100)	17.3
CDEAO / ECOWAS Countries						0(0)	8(70.9)	3(29.1)	11(100)	18.6
Other African Country						0(0)	5(66.7)	3(33.3)	8(100)	17.9
Other nationalities						2(78.1)	1(21.9)	0(0)	3(100)	14.2
Other						27(19.6)	92(66.3)	20(14.1)	139(100)	16.8
Demographic										
Age group	χ2(0.95)=140.16***					χ2(0.95)=154.4***				
15-19	90(12.2)	649(87.8)	0(0)	739(100.0)	16.2	153(20.6)	588(79.4)	0(0)	741(100)	16.0
20-24	197(11.2)	1274(72.2)	294(16.7)	1765(100)	17.2	250(16.3)	1009(65.5)	281(18.2)	1540(100)	17.1
Marital status	χ2(0.95)=6.16					χ2(0.95)=25.89***				
Never in union	0(1.8)	14(93.7)	1(4.6)	15(100.0)	16.9	12(7.1)	131(79.5)	22(13.4)	165(100)	17.2
Married/Living with partner	279(11.5)	1867(76.9)	282(11.6)	2428(100.0)	16.9	377(18.1)	1447(69.6)	255(12.3)	2079(100)	16.7
Widowed/Divorced/separated	8(12.3)	43(68.8)	12(18.9)	62(100)	17.2	15(39.1)	19(51.7)	3(9.2)	37(100)	15.5
Age of husband/Partner	χ2(0.95)=38.32***					χ2(0.95)=25.70***				
15-24	18(6.9)	231(90.5)	7(2.7)	255(100)	16.5	30(19.4)	121(78.7)	3(1.9)	154(100)	16.4
25-34	181(11.6)	1193(76.4)	186(11.9)	1560(100)	17.0	220(17.4)	898(70.9)	149(11.8)	1268(100)	16.7
35- 54	76(13.5)	402(71.9)	82(14.6)	559(100)	16.9	115(18.9)	396(65.4)	95(15.7)	606(100)	16.9
55+	2(5.2)	25(76.2)	6(18.5)	33(100)	18.1	12(23.8)	31(60.8)	8(15.4)	51(100)	16.7
Family planning **Knowledge of ovulatory cycles**	χ2(0.95)=7.71*					χ2(0.95)=14.33**				
No	254(12.2)	1595(76.5)	236(11.3)	2085(100)	16.9	305(19)	1127(70.2)	175(10.9)	1607(100)	16.7
Yes	33(7.8)	329(78.3)	58(13.9)	420(100)	17.2	98(14.6)	470(69.7)	106(15.7)	674(100)	17.0
Knowledge of contraceptive	χ2(0.95)=25.22***					χ2(0.95)=13.55**				
No Method	46(15.9)	204(71.6)	36(12.5)	286(100)	16.7	79(23.1)	224(65.8)	38(11.2)	341(100)	16.6
Folkloric/ Traditional method	13(31.1)	25(62)	3(6.9)	41(100)	15.7	2(53.9)	1(36.1)	0(10)	4(100)	15.3
Modern method	229(10.5)	1694(77.7)	256(11.8)	2179(100)	17.0	322(16.6)	1371(70.9)	242(12.5)	1935(100)	16.9
Ever used method or tried to delay pregnancy	χ2(0.95)=1.93					χ2(0.95)=0.27				
No	217(11.8)	1408(76.8)	208(11.3)	1833(100)	16.9	321(17.5)	1288(70.1)	227(12.4)	1836(100)	16.8
Yes	70(10.4)	516(76.7)	87(12.9)	672(100)	17.0	82(18.5)	309(69.5)	53(12)	444(100)	16.7
Behavioural										
Age at first intercourse	χ2(0.95)=905.44***					χ2(0.95)=898.56***				
< 16	287(18.4)	1212(77.9)	58(3.7)	1557(100)	15.9	403(29.8)	903(66.8)	45(3.4)	1351(100)	15.5
16 to 17	0(0.0)	590(90.8)	60(9.2)	649(100)	17.9	0(0.0)	552(89.8)	62(10.2)	615(100)	17.8
18 and+	0(0.0)	121(40.7)	177(59.3)	298(100)	19.9	0(0.0)	142(45.1)	173(54.9)	315(100)	20.0
Age at first cohabitation	χ2(0.95)=1128.70***					χ2(0.95)=1004.90***				
< 15	260(30.6)	568(66.8)	22(2.6)	850(100)	15.4	334(45.9)	387(53.2)	7(0.9)	727(100)	14.7
15 to 17	23(1.7)	1217(91)	98(7.3)	1338(100)	17.3	36(3.9)	845(89.9)	59(6.3)	940(100)	17.1
18 and+	3(1.2)	124(41.0)	174(57.8)	301(100)	19.8	21(4.7)	235(52.3)	193(43)	449(100)	19.1

Table A1. (Continued)

Independent variables	Malawi				
	< 15	15 to 19	20 and+	Total	
Socio economic					
Education	χ2(0.95)=390.99***				
No Education	50(13.5)	270(72.6)	52(13.9)	372(100.0)	17.1
Primary	206(5.1)	3240(80.7)	570(14.2)	4016(100.0)	17.6
Secondary/Higher	42(3.0)	838(60.3)	509(36.7)	1389(100.0)	18.8
Literacy	χ2(0.95)=82.25***				
Illiterate	128(9.0)	1093(76.8)	202(14.2)	1424(100.0)	17.3
Literate	170(3.9)	3255(74.8)	928(21.3)	4353(100.0)	18.0
Husbands education	χ2(0.95)=131.85***				
No Education	37(10.5)	272(78)	40(11.5)	349(100.0)	17.3
Primary	121(5)	1899(78.1)	412(17)	2433(100.0)	17.7
Secondary/Higher	44(2.6)	1194(69.3)	484(28.1)	1722(100.0)	18.4
Wealth index	χ2(0.95)=58.08***				
Poorest	88(6)	1139(77.5)	242(16.5)	1470(100.0)	17.6
Poorer	80(5.8)	1041(75.8)	254(18.5)	1375(100.0)	17.8
Middle	60(5.6)	835(76.8)	192(17.6)	1088(100.0)	17.7
Richer	33(3.4)	741(75.8)	203(20.8)	978(100.0)	18.0
Richest	37(4.3)	590(68)	240(27.7)	867(100.0)	18.2
Employment status	χ2(0.95)=0.43				
No	127(5.3)	1812(75.5)	461(19.2)	2400(100.0)	17.8
Yes	172(5.1)	2535(75.1)	670(19.8)	3377(100.0)	17.8
mass media exposure	χ2(0.95)=63.35***				
Not at all	186(6.8)	2079(76.6)	448(16.5)	2714(100.0)	17.6
Less than weekly	46(4.2)	844(76.5)	213(19.3)	1104(100.0)	17.9
Weekly and daily	67(3.4)	1424(72.6)	469(23.9)	1960(100.0)	18.1
Region	χ2(0.95)=100.88***				
Northern region	30(4.5)	519(77.4)	121(18.1)	671(100.0)	17.8
Central region	87(3.6)	1696(71.1)	601(25.2)	2384(100.0)	18.2
Southern region	181(6.7)	2133(78.3)	408(15)	2722(100.0)	17.5
Type of place of residence	χ2(0.95)=28.76***				
Urban	42(5.1)	563(68.5)	217(26.4)	822(100.0)	18.2
Rural	257(5.2)	3785(76.4)	913(18.4)	4955(100.0)	17.8
Socio cultural					
Religion	χ2(0.95)=24.79***				
Christian	241(4.9)	3651(74.7)	995(20.4)	4887(100.0)	17.9
Muslim	55(6.3)	678(78.3)	133(15.4)	866(100.0)	17.6
Animist	-	-	-	-	-
No religion	1(6.1)	15(84.4)	2(9.5)	17(100.0)	17.3
Other	2(29.7)	4(66.6)	0(3.7)	6(100.0)	16.7
Ethnicity	χ2(0.95)=92.35***				
Chewa	67(3.4)	1435(72.1)	489(24.6)	1992(100.0)	18.2
Tumbuka	24(4.6)	388(75.5)	102(19.9)	514(100.0)	17.8
Lomwe	83(7.6)	852(78)	157(14.4)	1092(100.0)	17.4
Tonga	5(4.8)	78(73.8)	23(21.3)	106(100.0)	18.1
Yao	57(6.5)	669(76.8)	145(16.7)	871(100.0)	17.7
Sena	15(7.2)	156(74.8)	37(17.9)	209(100.0)	17.8
Nkhonde	2(5.1)	29(74.2)	8(20.7)	39(100.0)	17.8
Ngoni	29(4.3)	525(77.3)	125(18.4)	680(100.0)	17.8
Mang'anja	2(1.7)	103(82.9)	19(15.4)	124(100.0)	17.8
Nyanga	6(9.5)	49(77)	9(13.6)	64(100.0)	17.5
Other	8(9.7)	63(72.1)	16(18.2)	87(100.0)	17.4
Demographic					
Age group	χ2(0.95)=519.31***				
15-19	71(4.6)	1457(95.4)	0(0)	1528(100.0)	17.0
20-24	228(5.4)	2891(68)	1131(26.6)	4249(100.0)	18.1
Marital status	χ2(0.95)=41.17***				

Never in union	37(6.1)	479(78.4)	95(15.5)	611(100.0)	17.5
Married/Living with partner	202(4.5)	3366(74.7)	937(20.8)	4504(100.0)	17.9
Widowed/Divorced/separated	60(9)	503(76)	99(15)	662(100.0)	17.4
Age of husband/Partner	χ2(0.95)=103.27***				
15-24	47(2.7)	1427(80.4)	301(16.9)	1775(100.0)	17.9
25-34	124(5)	1786(71.1)	603(24.0)	2513(100.0)	18.0
35- 54	27(13.2)	143(70.5)	33(16.3)	204(100.0)	17.2
55+	3(23.8)	9(73.9)	0(2.3)	12(100.0)	16.5
Family planning **Knowledge of ovulatory cycles**	χ2(0.95)=7.10*				
No	264(5.5)	3623(75.2)	929(19.3)	4816(100.0)	17.8
Yes	34(3.6)	725(75.4)	202(21.0)	961(100.0)	18.0
Knowledge of contraceptive	χ2(0.95)=3.36				
No Method	3(9.2)	19(63.7)	8(27.1)	30(100.0)	17.7
Folkloric/ Traditional method	0(0)	2(100)	0(0)	2(100.0)	18.2
Modern method	296(5.2)	4327(75.3)	1123(19.5)	5745(100.0)	17.8
Ever used method or tried to delay pregnancy	χ2(0.95)=21.85***				
No	61(4.3)	1032(72.1)	339(23.7)	1433(100.0)	18.1
Yes	237(5.5)	3315(76.3)	792(18.2)	4344(100.0)	17.7
Behavioural					
Age at first intercourse	χ2(0.95)=2054.57***				
< 16	299(12.8)	1904(81.2)	141(6.0)	2344(100.0)	16.5
16 to 17	0(0.0)	1769(92.1)	152(7.9)	1921(100.0)	17.8
18 and+	0(0.0)	674(44.6)	837(55.4)	1512(100.0)	19.9
Age at first cohabitation	χ2(0.95)=2478.00***				
< 15	197(31.5)	420(67.2)	8(1.3)	625(100.0)	15.2
15 to 17	45(1.8)	2342(95.8)	59(2.4)	2446(100.0)	17.2
18 and+	19(0.9)	1106(52.8)	969(46.3)	2095(100.0)	19.4

Table A2. Multivariable analysis results of age at first childbearing in Niger, Mali and Malawi.

Characteristics	Niger (Model I) Odds ratio (OR) (95% confidence interval (C.I))	Mali (Model II) Odds ratio (OR) (95% confidence interval (C.I))	Malawi (Model III) Odds ratio (OR) (95% confidence interval (C.I))
Socio economic			
Education	***		***
No Education	2.03**(1.34 , 3.06)	0.88(0.58 , 1.34)	1.25(0.87 , 1.80)
Primary	2.54***(1.58 , 4.07)	0.97(0.6 , 1.57)	1.56***(1.32 , 1.85)
Secondary/Higher RC			
mass media exposure			**
Not at all	0.87(0.63 , 1.21)	-	1.12(0.95 , 1.31)
Less than weekly	1.08(0.78 , 1.49)	-	1.38*(1.14 , 1.67)
Weekly and daily RC			
Wealth index			
Poor	1.31(0.93 , 1.84)	0.91(0.63 , 1.32)	0.93(0.76 , 1.13)
Middle	1.10(0.76 , 1.59)	0.93(0.61 , 1.42)	1.00(0.8 , 1.26)
Rich RC			
Employment status			
No	-	-	-
Yes RC			
Husbands education	*		*
No Education	0.87(0.55 , 1.36)	1.23(0.81 , 1.88)	1.56*(1.09 , 2.23)
Primary	0.56*(0.36 , 0.93)	1.27(0.72 , 2.21)	1.04(0.88 , 1.23)
Secondary/Higher RC			
Region			***
Agadez	1.66(0.37 , 7.49)	-	-
Diffa	0.85(0.11 , 6.52)	-	-
Dosso	0.86(0.49 , 1.51)	-	-
Maradi	1.3(0.76 , 2.19)	-	-
Tahoua	0.95(0.58 , 1.57)	-	-
Tillaberi	1.16(0.64 , 2.08)	-	-
Zinder	1.28(0.75 , 2.18)	-	-
Niamey	RC		
Kayes	-	1.15(0.64 , 2.05)	-
Koulikoro	-	0.97(0.55 , 1.71)	-
Sikasso	-	0.8(0.47 , 1.36)	-
Segou	-	1.06(0.61 , 1.83)	-
Mopti	-	0.99(0.54 , 1.81)	-
Bamako		RC	
Northern region	-	-	0.76(0.52 , 1.09)
Central region	-	-	0.70**(0.57 , 0.87)
Southern region	-	-	RC
Type of place of residence			
Urban	1.18(0.76 , 1.84)	0.84(0.54 , 1.32)	0.82(0.65 , 1.02)
Rural RC			
Socio cultural			
Religion			
Muslim	-	-	1.20(0.89 , 1.61)
No religion and Other	-	-	3.34(0.46 , 24.32)
Christian RC			
Ethnicity			
Tumbuka	-	-	1.17(0.84 , 1.63)
Lomwe	-	-	1.06(0.81 , 1.39)
Tonga	-	-	1.32(0.76 , 2.27)
Yao	-	-	0.94(0.69 , 1.29)
Sena	-	-	1.13(0.75 , 1.7)
Nkhonde	-	-	2.1(0.83 , 5.34)
Ngoni	-	-	1.5(1.17 , 1.92)
Mang'anja	-	-	1.21(0.6 , 2.41)
Nyanga	-	-	1.28(0.51 , 3.2)
Other	-	-	1.08(0.48 , 2.42)
Chewa			RC
Planning family			
Knowledge of contraceptive method	**		*
No Method	0.48***(0.32 , 0.72)	-	0.37*(0.16 , 0.84)
Folkloric/ Traditional method	0.91(0.22 , 3.74)	-	-
Modern method RC			
Knowledge of ovulatory cycles		*	
No	1.09(0.79 , 1.49)	1.34*(1.02 , 1.75)	-
Yes RC			
Demographics			
Age			
15-19	1723 (0 , 0)	1050.00 (0,0)	-
20-24 RC			
Age of husband/Partner		*	
15-24	-	8.16**(2.15 , 31.04)	-
25-34	-	1.93(0.94 , 3.96)	-
35- 54	-	1.77(0.85 , 3.66)	-

55+ RC			
Behavioural			
Age at first intercourse		***	***
< 16		4.12***(2.85 , 5.97)	1.70***(1.38 , 2.09)
16 and+ RC			
Age at first cohabitation	***	***	***
< 18	10.27***(7.92 , 13.31)	6.19***(4.58 , 8.37)	20.53***(15.44 , 27.29)
18 and+ RC			

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