RESEARCH

Determinants of early marriage among married women in nine high fertility sub-Saharan African countries: a multilevel analysis of recent demographic and health surveys

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Abstract

Background: Early marriage is global issue that seriously harms women's personal development and rights. Regarding this, information about married women's early marriage is inadequate in the world, including sub-Saharan Africa; therefore, this study aimed to assess the early marriage of women in the top nine highly fertile SSA countries.

Methods: Data for this study was obtained from the most recent Demographic and Health Surveys. A total weighted sample of 121,077 married reproductive-age women was included. A multilevel mixed-effect binary logistic regression model was fitted to identify the significant associated factors of early marriage. As a final step, the Adjusted Odds Ratio (AOR) was used with a confidence interval of 95% in determining statistical significance.

Results: Overall prevalence of early marriage was 55.11% (95% CI: 54.8, 55.4) and ranged from 28.11% in Burundi to 80.77% in Niger. The factors significantly associated with early marriage were women's educational status; primary education (AOR = 0.39; 95% CI: 0.38, 0.41), secondary and higher (AOR = 0.1; 95% CI: 0.09, 0.11), employed (AOR = 0.73; 95% CI: 0.71, 0 .75), classified as rich wealth index level (AOR = 0.87; 95% CI: 0.85, 0.91), a number of family size $\geq$ 7 (AOR = 1.28; 95% CI: 1.23, 1.33), community-level poverty, (AOR = 1.28; 95% CI: 1.23, 1.33) and rural residency (AOR = 1.16;95% CI: 1.12, 1.21).

Conclusion: Marriage before the age of 18 is moderately high in high-fertility countries. Therefore, the respective countries government should give due attention to access to education, and encourage the participation of women in making marriage-related decisions, especially those residing in rural areas.

Keywords: Early marriage, Female, Multilevel, Factors, Sub-Saharan Africa

Background

Early marriage refers to a marriage that occurs before the age of 18, and in which the girl is not prepared for marriage and childbirth [1, 2]. In the world, over 700 million women are married before they are 18 years old [3]. There is a wide variation in the number of early marriages between countries and regions. According to the

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World Bank, the highest rates of early marriage have been reported in South Asia [4] and sub-Saharan Africa [5], where 44 and 39% of girls, respectively, were married before turning 18. Statistical data from 33 countries show that marriage trends haven't changed much since the International Conference on Population and Development [4]. More over 19% were in East Asia and Pacific and 18% in Middle East and North Africa [5].

Early marriage has several negative consequences for women and their children in terms of health and social outcomes. These risks include depression and suicidality; compromised sexual, reproductive, and maternal health [6–10]; A higher risk of intimate partner violence [8, 11, 12]. In addition, early marriage compromises girls' ability to attend school, leading to school withdrawals [7, 13–16]. As such, it is a public health concern that violates international human rights laws and seriously impairs the health and development of women and children [5, 9, 17–20].

Many factors contribute to the increase in early marriage, including incentives to marry young women out to relieve the economic burden on disadvantaged families [18]. Furthermore, some parents believe that marrying off their daughters to well-off families will improve their social status and protect their daughters from sexual adversity [9, 21]. Moreover, many studies in the world have identified the factors contributing to early marriage. These factors include family income, family size, educational level of the respondents, first sexual encounters by young women before 16 years old, residence, wealth status, perceived marriage age, and exposure to the media [22–28].

The issue of early marriage has been addressed in a variety of ways on a global and regional level over the past decade's [2, 10, 29, 30]. With the prevalence of child marriage, the UN formulated Sustainable Development Goal-3 (SDG-3) aimed at contributing significantly to the health and well-being of many countries [31]. Developing young women's potential as productive and healthy individuals is a critical part of SDG-3 [32]. Even though the above strategies have been implemented, however, the prevalence of early marriage in sub-Saharan African countries consistently high [32–35]. Although studies were conducted in specific countries like Nigeria [33] Democratic republic Congo [25] and Mali [36]. A study combining these high fertility countries (Nigeria, Gambia, Burkina Faso, Niger, Democratic Republic Congo, Mali, Chad, Angola, and Burundi) has not been conducted.

In addition the issue has not been adequately explored, and the lack of literature on it may hinder effective efforts, policies and interventions, particularly in sub-Saharan African countries. Hence, this study aimed to determine the prevalence of early marriage, as well as its determinants (both individual and community-level factors) in the top nine highly fertile sub-Saharan African countries.

Methods

Study settings and data source

This study utilized pooled data from the latest Demographic and Health Surveys (DHS) conducted between January 2010 and December 2018 of nine countries in SSA. Niger, Democratic Republic of Congo, Mali, Chad, Angola, Burundi, Nigeria, Gambia, and Burkina Faso were included in this study. These countries were selected because they are the top ten countries with high fertility rates in SSA with fertility rates above 5.0, a higher value than the rate of 4.44 in SSA and 2.47 worldwide [37]. One country (Somalia) with no DHS data was excluded from the analysis. The data for these countries were obtained from the official database of the DHS program, www.measuredhs.com after authorization was granted via online request by explaining the purpose of our study. We used the women record (IR file) data set and extracted the dependent and independent variables. The DHS is a nationally representative household survey that uses face-to-face interviews on a wide range of population, health, nutrition tracking, and effect assessment measures. Study participants were selected using a two-stage stratified sampling technique. Enumeration Areas (EAs) were randomly selected in the first stage, while households were selected in the second stage [38]. A total weighted sample of 121,077 reproductive-age women was included in the study (Table 1).

Outcome variable (v511)

The outcome variable for this study was early marriage, defined as young girls married before their 18th birthday

Table 1 Description of Surveys and sample size characteristics in highly fertile countries in SSA ($n = 121,077$)

Countries	Survey year	Weighted sample(n)	Weighted percentage (%)
Angola	2015	9313	7.69
Burkina Faso	2010	14,095	11.64
Burundi	2016	11,302	9.33
Chad	2014	14,779	12.21
DR Congo	2013	13,928	11.50
Gambia	2013	7270	6.00
Mali	2018	8841	7.30
Nigeria	2018	31,270	25.83
Niger	2012	10,277	8.49

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[36, 39, 40]. It was dichotomized and coded as "yes" =1 if the age at first cohabitation among the women occurred before their 18th birthday and "no" =0 if the first marriage was at 18 years and above.

Explanatory variables

Individual and community level independent variables were included in this study.

Individual level variables; Educational status of respondents, husband education, occupation of respondents, husband occupation, wealth status, media exposure, number of living children.

Community level variables; Community level variables included residences and some were derived from the individual level data of all community members in the primary sampling unit (PSU), which includes the community level poverty, community education, community employment and community level media exposure.

Data analysis

For data analysis Stata version 16 software was used. To ensure the representativeness of the DHS sample and obtain reliable estimations and standard errors, data were weighted (v005/1000000) before analyzing it.

The study fitted four models: the null model with no explanatory variables, model I with individual factors, model II with community factors, and model III with both individual and community factors. As the models were nested, the Intra class Correlation Coefficient (ICC), Median Odds Ratio (MOR) and, deviance (−2LLR) values were used for model comparison and fitness, respectively. Model III was the best-fitting model due to its low deviance. In the multivariable analysis, variables with a *p*-value less than 0.2 in bivariable analysis were used. Finally, in the multivariable analysis, adjusted odds ratios with 95% confidence intervals and *p*-values less than 0.05 were utilized to identify factors of early marriage.

Results

Individual level factors

Out of the total respondents, 53.85% women were not attended formal education, 67.62% had no work, and 60.62% had media exposure towards early marriage. Among the participants, 44.54% had seven and above family size. With regard to their economic status, 40.42% women were from the poor wealth quintiles and 39.51% were from the rich wealth quintiles (Table 2).

Community level factors

Of the respondents, 68.20% were rural dwellers. More than half (51.56%) of the respondents were from communities with low proportion of poverty level. Half (50.41%) of women had media exposure. Above 50% (50.64%) of participants were from communities having high proportion of community level education (Table 3).

Table 2 Individual characteristics of respondents in high fertility countries in sub-Saharan Africa (*n* = 121,076)

Variables	Categories	Frequency	Percentage (%)
Educational status of respondents	No formal education	65,201	53.85
	Primary education	27,036	22.33
	Secondary and higher	28,840	23.82
Husband education	No formal education	54,003	44.60
	Primary education	20,315	16.78
	Secondary and higher	46,758	38.62
Occupation of respondents	Employed	39,201	32.38
	Unemployed	81,876	67.62
Husband occupation	Employed	109,336	90.30
	Not employed	11,741	9.70
Wealth index	Poor	48,936	40.42
	Middle	24,307	20.08
	Rich	47,833	39.51
Media exposure	Yes	73,393	60.62
	No	47,683	39.38
Number of household members	1–3	19,177	15.84
	4–6	47,967	39.62
	≥7	53,932	44.54

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Table 3 Community level characteristics of respondents in high fertility countries in sub-Saharan Africa ($n = 121,076$)

Variables	Categories	Frequency	Percentage (%)
Residence	Urban	38,498	31.80
	Rural	82,579	68.20
Community-level poverty	Low	62,428	51.56
	High	58,648	48.44
Community media exposure	Low	60,040	49.59
	High	61,036	50.41
Community employment	Low	61,903	51.13
	High	59,174	48.87
Community education	Low	56,094	49.36
	High	57,540	50.64

Prevalence of early marriage in top nine highly fertile sub-Saharan African countries

Overall, the prevalence of early marriage in top nine highly fertile sub-Saharan African countries was 55.11% (54.8, 55.4). The prevalence of early marriage ranged from 28.11% in Burundi to 80.77% in Niger (Fig. 1).

Factors associated with early marriage practice

Regarding individual level factors, the study found that women with a secondary or higher education were 90% less likely to be married below the age of 18 years than those who had no formal education (AOR = 0.1; 95% CI: 0.09, 0.11) and those women with primary education were 61% less likely to be married below the age of 18 years compared to women who have never had formal education (AOR = 0.39; 95% CI: 0.38, 0.41). Women who were working were 27% less likely to be married below the age of 18 years compared to those who had

no working (AOR = 0.73; 95% CI: 0.71, 0 .75). The odds of being married below at 18 years in the rich level were 13% less likely compared to women who live in poverty (AOR = 0.87; 95% CI: 0.85, 0.91). The likelihood of women's early marriage was high among women who had ≥7 families size (AOR = 1.28; 95% CI: 1.23, 1.33) compared to 1–3 families size.

About the community level factors, married women classified as high Community level poverty were more likely to have early marriage (AOR = 1.09; 95% CI: 1.01, 1.17) than low Community level poverty. In addition the odds of being married below the age of 18 in rural area were 1.16 more likely than living in an urban area (AOR = 1.16; 95% CI: 1.12, 1.21) (Table 4).

Discussion

This study revealed the prevalence of early marriage in the top nine highly fertile sub-Saharan African countries was 55.11% (95% CI: 54.8, 55.4). This finding is in line with previous studies in Sub-Saharan Africa [32]. This finding is higher than a study conducted in Injibara, Ethiopia [24]. Moreover, the finding is also higher than in studies conducted in Sudan [41], India [26], and Roma of Serbia [42]. This prevalence, however, is lower than that study conducted in east Gojjam, Ethiopia [43], Amhara Regional State, Ethiopia [44], Ethiopia [44], and a study conducted in Bangladesh [45]. This discrepancy may result from the smaller sample size in the previous studies than in the current study.

The study revealed that women with primary education and secondary and above education were 61 and 90% less likely to be married below the age of 18 years compared to those with no formal education respectively. This
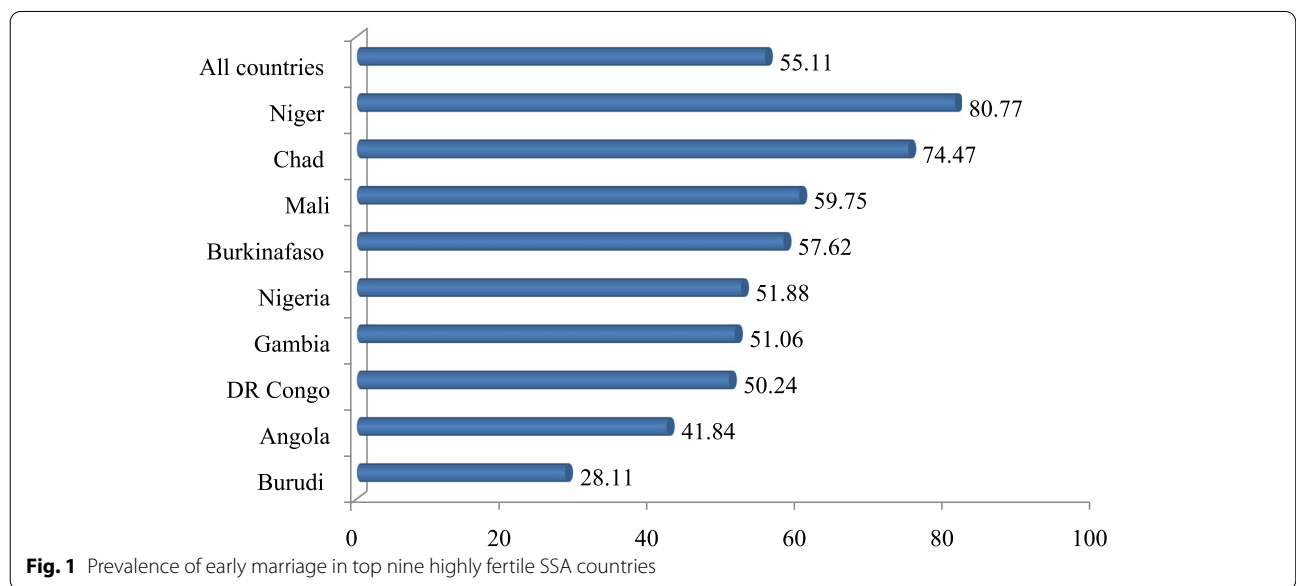

Fig. 1 Prevalence of early marriage in top nine highly fertile SSA countries

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Table 4 Multivariable analyses for factors affecting early marriage practice ($n = 121,076$)

Variables	Model 0	Model 1 AOR (95% CI)	Model 2 AOR (95%CI)	Model 3 AOR (95%CI)
Individual level Characteristics				
Educational status of the respondents				
No formal education		1		1
Primary education		0.09 (0.08,0.10)		**0.39 (0.38, 0.41)**
Secondary and higher		0.37 (0.356, 0.39)		**0.01 (0.09,0.11)**
Husband education				
No formal education		1		1
Primary education		0.84 (0.81, 0.87)		0.86 (0.83, 1.10)
Secondary and higher		0.80 (0.76, 0.84)		0.85 (0.80, 1.89)
Occupation of respondents				
Had not work		1		1
Had Work		0.74 (0.72, 0 .76)		**0.73 (0.71, 0 .75)**
Husband Occupation				
Had not work		1		1
Had Work		1.09 (1.05, 1.14)		1.08 (0.75, 1.13)
Wealth index				
Poor		1		1
Middle		0.95 (0.92, 0 .99)		0.97 (0.94, 1.01)
Rich		0.81 (0.78, 0.83)		**0.87 (0.85, 0.91)**
Media exposure				
No		1		1
Yes		0.91 (0.88, 0.93)		0.93 (0.91, 1 .08)
Family size				
1–3		1		1
4–6		1.05 (1.01, 1.09)		1.03 (0.99, 1.07)
≥ 7		1.32 (1.27, 1.37)		**1.28 (1.23, 1.33)**
Community level variables				
Community level poverty				
Low			1	1
High			1.22 (1.10, 1.34)	**1.09 (1.01, 1.17)**
Community level media exposure				
Low			1	1
High			0.76 (0.69, 0 .84)	0.85 (0.79, 1.19)
Residency				
Urban			1	1
Rural			1.81 (1.75, 1.86)	**1.16 (1.12, 1.21)**
Community level education				
Low			1	1
High			0.63 (0.57, 0 .70)	0.83 (0.77, 1.09)
Community level employment				
Low			1	1
High			1.04 (0.96, 1.13)	1.21 (0.98, 1.29)
Random effect results				
Variance (%)	52.5	31.6	27.95	16.3
ICC (%)	24.4	17.8	18.8	14.7
MOR	18.7	14.5	13.67	10.4
PCV	Ref	39	46.76	68.95
Deviance(−2LLR)	159,670	143,448	149,568	136,512

*Statistically significant at *p*-value< 0.05,

AOR Adjusted Odds Ratio, COR Crude Odds Ratio

Table 4 (continued)

Null model: adjusted for individual-level characteristics,

Model 2: Adjusted for community-level characteristics,

Model 3: adjusted for both individual and community-level characteristics

study backs up research from Ethiopia that found that a woman's educational degree is a strong predictor of early marriage [46, 47]. Moreover, other studies conducted in Malawi [42] and Western Uganda [42] revealed that women's education level was an independent predictor of early marriage [20, 48]. This might be due to the fact that education helps people to know about their rights and enables them to make informed decisions when it comes to marriage [3, 49, 50].

Moreover, this study found that early marriage was lower among women who had work compared to women who had no work. Comparable findings were found in a study conducted in Gambia [51]. Additionally, Singh and Vennam [52] reported that girls who were unemployed or working in their families were more likely to marry at a younger age than those who were working, particularly those in the service industries. The odds of being married below the age of 18 in the rich level were 13% less likely compared to those women in the poor level. This result is consistent with two studies conducted in Ethiopia [47, 53] and a study done in India [54]. This might be justified by the poorest families preferring early marriage to generate more income from male family [43]. This is also supported by another study conducted in Ethiopia revealed that low economic status is one of the predisposing factors for early marriage [46, 55, 56].

Our study found that women from large-sized families were more likely to marry than women from small families. This finding is consistent with studies conducted in Sudan [41] and Ethiopia [24]. The reason could be that parents with large families use child marriage as a means of receiving bride costs, reduce their family size, and improve their financial resources [24]. According to research conducted in West and Central Africa, some rural families consider girls not only a source of wealth, but also a way to increase the family's social status and prestige [57, 58].

In this study, the odds of early marriage among rural women were 1.16 higher compared to that of urban women. The findings of this study are similar to those from Sudan [41], Bangladesh [59], and Serbia [42]. It may be because women in rural areas may not be aware of the health, educational, and economic consequences of early marriage [55, 60]. Furthermore, they are unsure of what to do when their parents or guardians violate their human rights [55, 60, 61]. Therefore, women living in

rural areas have a higher risk of early marriage than those living in urban areas.

Teenagers who live in communities with a higher proportion of poor were more likely to marry early than teenagers who live in communities with a lower proportion of poverty. This is consistent with other studies in SSA [62] and Philippines [63]. This might be due to teenagers who live in communities with poor wealth status having poor access to education and are faced with the problem of early marriage.

The study's strength was the use of nationally representative survey data sets from large countries. Due to the cross-sectional nature of the data, this study may not demonstrate a causality and effect relationship. In addition, the dataset lacks variables such as cultural norms, behavioral patterns and social norms, which have a significant impact early marriage.

Conclusion

The overall prevalence of early marriage among married reproductive-age women in the top nine highly fertile sub-Saharan African countries is high. Rural residence, non-formal education, wealth index, large family size, and high community-level poverty, were the independent predictors of early marriage in the top nine highly fertile sub-Saharan African countries.

Therefore, the respective countries governments should give due attention to access to education and encourage women's decision-making power at the age of marriage particularly in rural areas of the region. Moreover, each country government should encourage women to participate in small-scale entrepreneurship to maximize their economic status.

Availability of data and materials

Data for this study were sourced from Demographic and Health surveys (DHS), which are freely available online at (https://dhsprogram.com).

Declarations

Ethics approval and consent to participate
The study does not involve participants to provide information. Consent to participants is not applicable since the data is secondary and is available in the public domain. All the methods were conducted according to the Helsinki declarations. More details regarding DHS data and ethical standards are available online at (http://www.dhsprogram.com).

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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References
1. Ray K, Hendrix S, Cat LA. Living Standards of Communities Worldwide: Available at: https://www.researchgate.net.
2. Malhotra A, Warner A, McGonagle A, Lee-Rife S. Solutions to end child marriage. Washington, DC: International Center for Research on Women; 2011.
3. Raj A, Jackson E, Dunham S. Girl child marriage: a persistent global women's health and human rights violation. In: Global perspectives on women's sexual and reproductive health across the lifecourse: Springer; 2018. p. 3–19.
4. Myers J, Harvey R. Breaking vows: early and forced marriage and girls' education. London; 2011.
5. Myers J, Rowan H. Breaking vows: early and forced marriage and girls: Education', Plan; 2011.
6. Clark S, Bruce J, Dude A. Protecting young women from HIV/AIDS: the case against child and adolescent marriage. Int Fam Plan Perspect. 2006:79–88.
7. Delprato M, Akyeampong K, Sabates R, Hernandez-Fernandez J. On the impact of early marriage on schooling outcomes in sub-Saharan Africa and south West Asia. Int J Educ Dev. 2015;44:42–55.
8. Gage AJ. Association of child marriage with suicidal thoughts and attempts among adolescent girls in Ethiopia. J Adolesc Health. 2013;52(5):654–6.
9. Nour NM. Child marriage: a silent health and human rights issue. Rev Obstet Gynecol. 2009;2(1):51.
10. Raj A, Saggurti N, Lawrence D, Balaiah D, Silverman JG. Association between adolescent marriage and marital violence among young adult women in India. Int J Gynecol Obstet. 2010;110(1):35–9.
11. Raj A, Gomez C, Silverman JG. Driven to a fiery death—the tragedy of self-immolation in Afghanistan. N Engl J Med. 2008;358(21):2201–3.
12. Raj A. When the mother is a child: the impact of child marriage on the health and human rights of girls. Arch Dis Child. 2010;95(11):931–5.
13. Kyari GV, Ayodele J. The socio-economic effect of early marriage in North Western Nigeria. Mediterr J Soc Sci. 2014;5(14):582.
14. Delprato M, Akyeampong K, Dunne M. Intergenerational education effects of early marriage in sub-Saharan Africa. World Dev. 2017;91:173–92.
15. Field E, Ambrus A. Early marriage, age of menarche, and female schooling attainment in Bangladesh. J Polit Econ. 2008;116(5):881–930.
16. Nguyen MC, Wodon Q. Impact of child marriage on literacy and education attainment in Africa. Washington, DC: UNICEF and UNESCO Statistics; 2014.
17. Muthengi EN, Erulkar A. Delaying early marriage among disadvantaged rural girls in Amhara, Ethiopia, through social support, education, and community awareness; 2011.
18. Parsons J, Edmeades J, Kes A, Petroni S, Sexton M, Wodon Q. Economic impacts of child marriage: a review of the literature. Rev Faith Int Aff. 2015;13(3):12–22.
19. Mahato SK. Causes and consequences of child marriage: a perspective. Int J Sci Eng Res. 2016;7(7):697–702.
20. Agaba P, Atuhaire LK, Rutaremwa G, editors. Determinants of age at first marriage among women in Western Uganda. European population conference; 2010.
21. Nasrullah M, Zakar R, Zakar MZ, Abbas S, Safdar R, Shaukat M, et al. Knowledge and attitude towards child marriage practice among women married as children-a qualitative study in urban slums of Lahore, Pakistan. BMC Public Health. 2014;14(1):1–7.
22. Workineh S, Kibretb GD, Degu G. Determinants of early marriage among female children in Sinan district, Northwest Ethiopia. Health Sci J. 2015;9(6):1.
23. Basazinewu ZD. An assessment study on the prevalence and causes of early marriage and its associated problems on socio-economic and health of women in Gozamine Woreda east Gojjame zone Amhara region. Int J Soc Sci Perspect. 2018;2(1):1–37.
24. Bezie M, Addisu D. Determinants of early marriage among married women in Injibara town, north West Ethiopia: community-based cross-sectional study. BMC Womens Health. 2019;19(1):1–6.
25. Mpilambo JE, Appunni SS, Kanayo O, Stiegler N. Determinants of early marriage among young women in Democratic Republic of Congo. J Soc Sci. 2017;52(1–3):82–91.
26. Rumble L, Peterman A, Irdiana N, Triyana M, Minnick E. An empirical exploration of female child marriage determinants in Indonesia. BMC Public Health. 2018;18(1):1–13.
27. Sandhu N, Geethalakshmi R. Determinants and impact of early marriage on mother and her newborn in an urban area of Davangere: a cross-sectional study. Int J Commun Med Public Health. 2017;4(4):1278–83.
28. Gage AJ. Child marriage prevention in Amhara region, Ethiopia: association of communication exposure and social influence with parents/guardians' knowledge and attitudes. Soc Sci Med. 2013;97:124–33.
29. Sibanda M. Married too soon: child marriage in Zimbabwe. Res Advocate Unit. 2011:1–22.
30. Phiri FK. The crisis of child marriage: engaging local leaders to end child marriage using a girl-centered advocacy approach. 이화여자대학교 아시아여성학센터 학술대회자료집. 2014:18–23.
31. Rutstein SO, Staveteig S. Making the demographic and health surveys wealth index comparable. Rockville: ICF international; 2014.
32. Yaya S, Odusina EK, Bishwajit G. Prevalence of child marriage and its impact on fertility outcomes in 34 sub-Saharan African countries. BMC Int Health Hum Rights. 2019;19(1):1–11.
33. Bolarinwa OA, Ahinkorah BO, Okyere J, Seidu A-A, Olagunju OS. A multi-level analysis of prevalence and factors associated with female child marriage in Nigeria using the 2018 Nigeria demographic and health survey data. BMC Womens Health. 2022;22(1):1–11.
34. Koski A, Clark S, Nandi A. Has child marriage declined in sub-Saharan Africa? An analysis of trends in 31 countries. Popul Dev Rev. 2017;7–29.
35. Budu E, Ahinkorah BO, Seidu A-A, Hagan JE Jr, Agbemavi W, Frimpong JB, et al. Child marriage and sexual autonomy among women in sub-Saharan Africa: evidence from 31 demographic and health surveys. Int J Environ Res Public Health. 2021;18(7):3754.
36. Zegeye B, Olorunsaiye CZ, Ahinkorah BO, Ameyaw EK, Budu E, Seidu AA, Yaya S. Individual/household and community-level factors associated with child marriage in mali: evidence from demographic and health survey. Biomed Res Int. 2021;2021.
37. African countries with the highest fertility rate | Statista https://worldpopulationreview.com/countries/total-fertility-rate. Cited 8 Dec 2021.
38. Corsi DJ, Neuman M, Finlay JE, Subramanian S. Demographic and health surveys: a profile. Int J Epidemiol. 2012;41(6):1602–13.
39. Unicef. Child marriage is a violation of human rights, but is all too common. available at: https://datauniceforg/topic/child-protection/child-marriage. 2018.
40. Efevbera Y, Bhabha J. Defining and deconstructing girl child marriage and applications to global public health. BMC Public Health. 2020;20(1):1–11.

41. Ali A, Ibrahim I, Abdelgbar S, Elgessim M. Socio-demographic factors affecting child marriage in Sudan. J Women's Health Care. 2014;3(04):2167–0420.1000163.
42. Hotchkiss DR, Godha D, Gage AJ, Cappa C. Risk factors associated with the practice of child marriage among Roma girls in Serbia. BMC Int Health Hum Rights. 2016;16(1):1–10.
43. Asrese K, Abebe M. Early marriage in south Wollo and east Gojjam zones of the Amhara region, Ethiopia. Human Soc Sci. 2014;2(2):11–6.
44. Aychiluhm SB, Tesema AK, Tadesse AW. Early marriage and its determinants among married reproductive age group women in Amhara regional state, Ethiopia: a multilevel analysis. Biomed Res Int. 2021;2021.
45. Talukder A, Hasan MM, Razu SR, Hossain Z. Early marriage in Bangladesh: a cross-sectional study exploring the associated factors. J Int Women's Stud. 2020;21(1):68–78.
46. Mengistu MM. Early marriage in Ethiopia: so little done but so much to do. Bus Manag. 2017;9(3):1.
47. Mitiku Y, Kiffle D, Siyoum D, Birlie B. Determinants of time to first marriage among rural women in Ethiopia. Biomed Stat Inform. 2018;3(1):1.
48. Dake F, Natali L, Angeles G, de Hoop J, Handa S, Peterman A, et al. Cash transfers, early marriage, and fertility in Malawi and Zambia. Stud Fam Plan. 2018;49(4):295–317.
49. Ashiq U, Abbas N, Asad AZ. Early marriage in Pakistan: so little done, but so much to do. J Business Soc Rev Emerg Econ. 2020;6(4):1449–56.
50. Paulos M. Early marriage in Ethiopia. Addis Ababa: Ethiopian Women Lawyers Association; 2006.
51. Lowe M, Joof M, Rojas BM. Social and cultural factors perpetuating early marriage in rural Gambia: an exploratory mixed methods study. F1000Research. 2019:8.
52. Singh R, Vennam U. Factors shaping trajectories to child and early marriage: evidence from young lives in India; 2016.
53. Kebede G, Asnake M, Alemu B, Deneke K. Causes and consequences of early marriage in Amhara region of Ethiopia. Watertown: Pathfinder International/Ethiopia; 2007.
54. Raj A, Saggurti N, Balaiah D, Silverman JG. Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: a cross-sectional, observational study. Lancet. 2009;373(9678):1883–9.
55. Wodon Q, Male C, Nayihouba A, Onagoruwa A, Savadogo A, Yedan A, et al. Economic impacts of child marriage: global synthesis report. 2017.
56. Jones N, Tefera B, Stephenson J, Gupta T, Pereznieto P, Emire G, et al. Early marriage and education: the complex role of social norms in shaping Ethiopian adolescent girls' lives. In: Country Report: Shaping policy for development; 2014. p. 1–103.
57. Musa SS, Odey GO, Musa MK, Alhaj SM, Sunday BA, Muhammad SM, et al. Early marriage and teenage pregnancy: the unspoken consequences of COVID-19 pandemic in Nigeria. Public Health Pract. 2021;2:100152.
58. Birechi J. Child marriage; a cultural health phenomenon; 2013.
59. Haq I. Relationship between age at marriage, education and fertility among residence of Bangladesh. Am J Soc Sci Res. 2018;4(2):33–9.
60. Pankhurst A. Child marriage and female circumcision (FGM/C): evidence from Ethiopia; 2014.
61. Hidayana IM, Noor IR, Benedicta GD, Prahara H, Zahro FA, Kartikawati R, et al. Factors influencing child marriage, teenage pregnancy and female genital mutilation/circumcision in Lombok Barat and Sukabumi districts, Indonesia: Indonesia Res Yes I Do Programme; 2016.
62. Odimegwu C, Mkwananzi S. Factors associated with teen pregnancy in sub-Saharan Africa: a multi-country cross-sectional study. Afr J Reprod Health. 2016;20(3):94–107.
63. Habito CM, Vaughan C, Morgan A. Adolescent sexual initiation and pregnancy: what more can be learned through further analysis of the demographic and health surveys in the Philippines? BMC Public Health. 2019;19(1):1–13.

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