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Research Article

Spatial Distributions of Female Child Marriage and Associated Factors in Ethiopia: Evidence from Demographic and Health Survey

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Abstract

Background: In Ethiopia, around million girls were exposed to the risk of child marriage in the country according to previous study report. But this report was not clearly identified and documented the potential local clusters of prevalence of child marriage and associated factors in the country.

Objective: This study was aimed to assess spatial distributions of female child marriage and associated factors in Ethiopia using the 2016 Ethiopian demographic and health survey data.

Method: The study was conducted based on the 2016 Ethiopian demographic and health survey. Data analyzed were taken from 2903 women aged 20-24 years. Local Anselin Moran's I was used to identify potential local clusters of high prevalence of child marriage. Generalized estimating equations for binary outcome was used to identify associated factors of child marriage. Adjusted odds ratio (AOR) with its respective 95% confidence interval was reported to show the strength of association.

Results: The finding of this study showed that prevalence of child marriage in Ethiopia was 40.2% [95%CI: 38.4, 42.0]. In this study also, potential local clusters of high prevalence of child marriage were identified. Local region and educational status were determinant factors of child marriage in the country at 5% level of significance.

Conclusion: In this study, local region and educational status were determinant factors of child marriage in the country. To address the problems of child marriage concerned government bodies in collaboration with partners should provide massive awareness creation about child marriage and its effects in the country for the local communities.

Keywords: *Child Marriage; Female; Spatial Distribution; Associated Factors; 20 - 24 Years; Ethiopia*

Abbreviations

AOR: adjusted odds ratio; CI: confidence intervals; COR: crude odds ratio; EDHS: Ethiopia demographic and health survey; GEE: Generalized estimating equations; GPS: Global Positioning System; and SNNP: Southern Nations Nationalities and Peoples

Introduction

Child marriage is any union of couples before the age of 18 [1]. It is a violation of children and women rights in particular and human rights in general [2]. Although child marriage affects both sexes, girls are more victims [3,4]. It exposes girls to risk of early pregnancy,

HIV/AIDS, cervical cancer and obstetric fistulas [5]. It has also the potential adverse consequences for women's mental, emotional and physical development and well-being [6-8].

Despite majority of countries in the world adopted different International Conventions and Agreements and made domestic laws regarding age at marriage, their implementations are hardly on the ground in developing regions [2,9,10]. Sub-Saharan Africa and South Asia were good examples of developing regions that child marriage is highly practiced at this contemporary period [3,9,11].

In Ethiopia, even though the government outlined 18 years old as a legal age of marriage, around million girls were exposed to the risk of early marriage in the country [10]. The prevalence of child marriage in Ethiopia was reported as 41% with an average age at first marriage 16.5 years in 2011 [12].

A few previous studies had been conducted on child marriage and its associated factors in Amhara region, Ethiopia. For instance, earlier studies conducted in Sinan District, South Wollo and East Gojjam Zones reports indicated that education, residence [6,13], media exposure [6] and wealth status [13] were associated factors of child marriage. However, these studies were small coverage area in Amhara region. In addition, prior studies were not documented the potential local clusters of prevalence of child marriage and associated factors in Ethiopia in general and local regions in particular using evidence from 2016 Ethiopian demographic and health survey till then.

Therefore, this study was aimed to assess spatial distributions of female child marriage and associated factors in Ethiopia using the 2016 Ethiopian demographic and health survey data. To achieve target of elimination of prevalence of child marriage in the country this research is used to the policy makers, partners and concerned government bodies to formulate appropriate strategies and interventions programme.

Methods

Study setting

The 2016 Ethiopian Demographic and Health Survey (EDHS) was conducted in nine regional states of Ethiopia and two city administrations. These are: Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Southern Nations Nationalities and Peoples (SNNP), Gambela Harari, Addis Ababa and Dire Dawa. Ethiopia is one of the Sub-Saharan African countries found in the Horn of Africa with a population of 73.5 million according to 2007 national housing and population census [14]. It is one of the countries which have the highest burden of child marriage in the world. In Ethiopia also, child marriage involves either one or two spouses being children and may take place under civil, religious or customary laws with or without formal registration.

Sample and sampling techniques

The sample for the survey was designed to represent national, urban-rural, and regional estimates of health and demographic outcomes. The EDHS 2016 samples were also selected using a stratified and two-stage cluster sampling methods. Sketch maps were drawn for each of the clusters, and all conventional households were listed. A total of 15,683 women in the age group 15 - 49 years were interviewed with a response rate of 95%. Among those women interviewed, 2903 were aged 20 - 24 years [14]. However, this study used sample for data analyzed was taken from 2903 women aged 20 - 24 years.

Data extraction, processing and analysis

The 2016 EDHS survey data sets and the Global Positioning System (GPS) points were downloaded and processed with permission from the Measure DHS (http://www.dhsprogram.com). Then, social determinants and child marriage prevalence indicator variables were

extracted from female data sets. ArcGIS version 10.1 was used for spatial analysis and Stata version 14.0 for the remaining analyses. After understanding the detailed data sets and coding, further data recoding was carried out. Further, the GPS points were merged with the prevalence of child marriage in each EDHS study clusters. The prevalence of child marriage was exported into ArcGIS to visualize clusters of hot and cold spots.

Descriptive statistics were used to determine the prevalence of child marriage across social determinant variables. Spatial analysis was applied to detect geographic variation of prevalence of child marriage among EDHS clusters. Geographic variation of significant high prevalence or low prevalence of child marriage were computed for each cluster using the Moran's I statistic. Maps to show the distribution and variations of child marriage throughout the country were constructed. Further, interpolation was used to supplement Moran's I statistic.

Generalized estimating equations (GEE) for binomial family were used to determine associated factors of child marriage. GEE adjusts the standard errors by accounting clustered observations. Accordingly, the bi-variable GEE of factors on child marriage were fitted. All variables with p-value ≤ 0.25 in the bi-variable were fitted in multivariable GEE. Both crude odds ratio (COR) and adjusted odds ratio (AOR) with the corresponding 95% confidence intervals (95% CI) were reported to show the strength of association.

Results

From a total of 2903 women interviewed, 41.5%, 39.1% and 18% of respondents were Orthodox Christian, Muslim and Protestant respectively (Table 1). The study also shows majority (62.3%) of respondents were living in rural areas. Concerning marital status, about 61.4% of respondents were cohabiting with partners. However, 38.7% of respondents were non-cohabiting with partners. Regarding educational status, the study also shows 37.1%, 19.4 % and 14.6% of respondents were at primary, secondary and higher levels respectively, while the remaining 28.9 % of respondents were uneducated. In addition, majority (52.8%) of respondents had high wealth status.

Variables	Frequency	Percent
Religion		
Orthodox	1204	41.5
Protestant	523	18.0
Muslim	1134	39.1
Other (catholic, traditional and other)	42	1.4
Marital status		
Cohabiting[@]	1783	61.4
Non-cohabiting[@@]	1120	38.6
Residence		
Rural	1809	62.3
Urban	1094	37.7
Educational level		
Uneducated	838	28.9
Primary	1077	37.1
Secondary	563	19.4
Higher	425	14.6
Wealth status		
Low	1046	36.0
Medium	329	11.3
High	1528	52.7

Table 1: *Socio-economic and demographic characteristics of women aged 20 - 24 years in Ethiopia, 2016-DHS (n = 2903).*

[@]-Married/living together; [@@]-Widowed/divorced/single.

Out of the total of 2903 interviewed women, 40.2 % (95% CI: 38.4 - 42.0) of respondents experienced child marriage in Ethiopia (Table 2). The average age at marriage was 15.02 (s.d = 1.65) years, and the median age was 15 (IQR: 14 - 16) years among those who married. The average age at first birth was 17.2 (s.d = 1.98) years, and the median age at first birth was also 17 (IQR: 16 - 18). About 60.5% of respondents, among who married in their childhood, were not attending school whereas 39.5% of respondents were attending school before their first marriage. In this study also, majority (68.3%) of those who were attending school did not continue to attend school after their marriage. Furthermore, among those married in their childhood, 634 (54.3%), 501 (42.9%) and 21 (1.8%) of respondents said that their first marriage decided by parents, themselves and relatives respectively.

Variable	Frequency	Percent
Child marriage		
No	1,736	59.8
Yes	1,167	40.2
Total	2,903	100.0
Who decided on the first marriage?		
Parents	634	54.3
Herself	501	42.9
Other family/ relatives	21	1.8
Others	11	0.9
Total	1,167	100.0
Attending school before first marriage?		
No	706	60.5
Yes	461	39.5
Total	1,167	100.0
Stopped attending school after first marriage?		
No	315	68.3
Yes	146	31.7
Total	461	100.0
Reason to stop attending school after first marriage?		
Too busy with family life	205	65.1
Husband did not want me to go	70	22.2
Graduated from school	8	2.5
Other	32	10.2
Total	315	100.0

Table 2: *Child marriage, marriage arrangement and attending school among women aged 20 - 24 years in Ethiopia, 2016-DHS (n = 2903).*

The result of global pattern analysis showed that there was apparent clustering of child marriage in Ethiopia (Moran's I = 0.35, z-score = 11.68, p-value < 0.0001). Hence, from the Anselin's Local Index (Figure 1), this study identified local geographical variability of prevalence of child marriage at community level in Ethiopia which was supported by the result of interpolation (Figure 2).

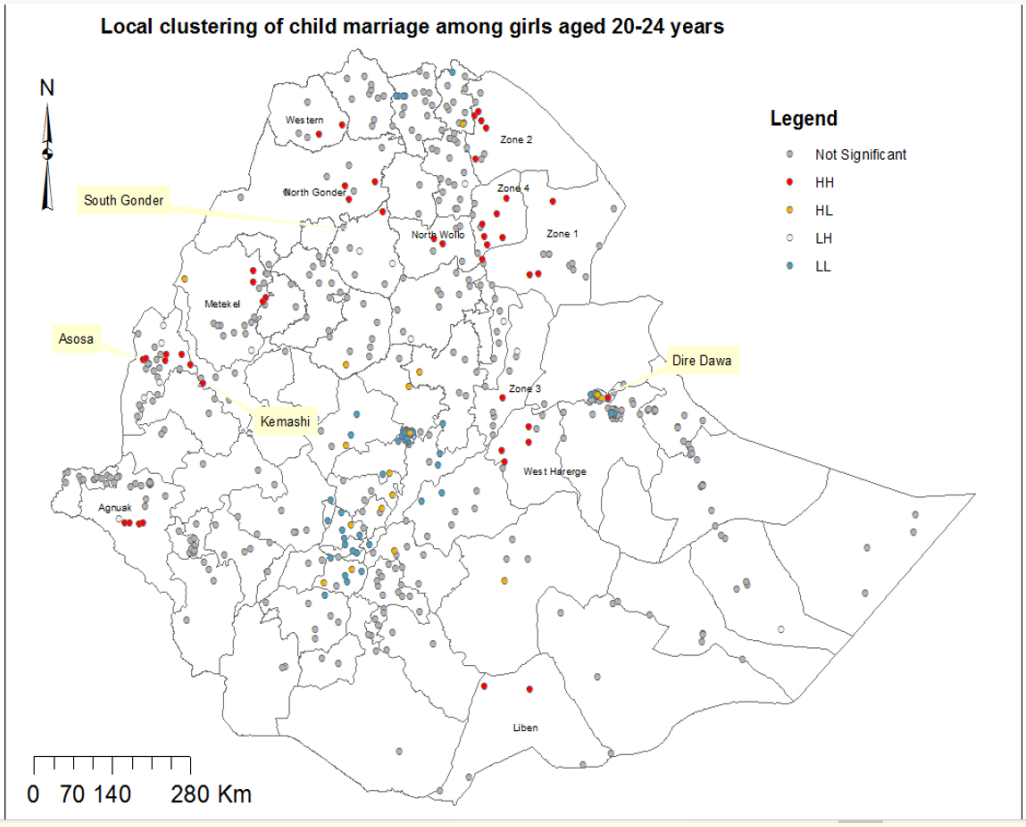

Figure 1: *Local clustering of child marriage among girls aged 20-24 years in Ethiopia, 2016.*

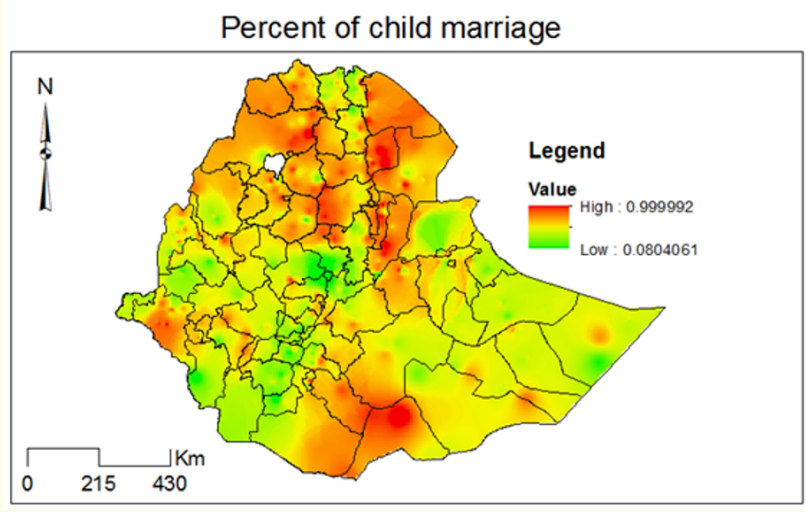

Figure 2: *Interpolation of prevalence of child marriage in Ethiopia, 2016.*

Accordingly, this study identified different local clusters which were detected by high prevalence of child marriage within country. These were: all zones of Afar region; all zones of Amhara region, except Awi zone; three zones in Oromia region (such as Guji, West Harerge, and North Shewa zones); three zones in Tigray region (such as western Tigray, Southern Tigray and Northwestern Tigray); Liben zone in Somali region; and Agnuak zone in Gambela region. In contrast, a study showed that relatively lowest child marriage rates were predicted in Addis Ababa Administration City.

After adjusting for different confounding variables, local region and educational status were significantly associated with child marriage (Table 3). Compared to women living in Addis Ababa Administration City, those living in Gambela [AOR = 7.04; 95%CI = 3.79 - 13.08], Benishangul [AOR = 6.09; 95%CI = 3.31 - 11.21], Afar [AOR = 5.50; 95%CI = 2.96 - 10.22], Tigray [AOR = 4.44; 95%CI = 2.49 - 7.94], Amhara [AOR = 4.22; 95%CI = 2.33 - 7.63], Harari [AOR = 4.19;95%CI = 2.29 - 7.65], Oromia [AOR = 3.44; 95%CI = 1.93 - 6.15], Somali [AOR = 2.86; 95%CI = 1.56 - 5.26], Dire Dawa [AOR = 2.63; 95%CI = 1.43 - 4.84] and SNNP [AOR = 1.96; 95%CI = 1.07 - 3.61] had increased probability of child marriage.

Variables	Child marriage		COR [95% CI]	AOR [95% CI]
	No (%)	Yes (%)		
Region				
Addis Ababa (RF)[a]	334 (92.3)	28 (7.7)		
Tigray	186 (58.7)	131 (41.3)	7.58 [4.26, 13.47]	4.44 [2.49, 7.94]*
Afar	76 (32.5)	158 (67.5)	23.54 [12.87, 43.04]	5.50 [2.96, 10.22]*
Amhara	153 (55.2)	124 (44.8)	8.85 [5.00, 15.75]	4.22 [2.33, 7.63]*
Oromia	171 (52.4)	155 (47.6)	10.14 [5.75, 17.9]	3.44 [1.93, 6.15]*
Somali	120 (47.2)	134 (52.8)	13.04 [7.30, 23.31]	2.86 [1.56, 5.26]*
Benishangul	103 (49.1)	107 (50.9)	12.20 [6.71, 22.21]	6.09 [3.31, 11.21]*
SNNPR	225 (69.9)	97 (30.1)	5.31 [2.98, 9.47]	1.96 [1.07, 3.61]*
Gambela	106 (52.7)	95 (47.3)	10.30 [5.62, 18.87]	7.04 [3.79, 13.08]*
Harari	116 (59.2)	80 (40.8)	7.76 [4.23, 14.24]	4.19 [2.29, 7.65]*
Dire Dawa	146 (71.6)	58 (28.4)	4.87 [2.62, 9.05]	2.63 [1.43, 4.84]*
Media exposure				
Yes	814 (75.7)	259 (24.1)	0.47 [0.40, 0.56]	1.01 [0.81, 1.7]
No (RF) [a]	922 (50.4)	908 (49.6)		
Currently working				
Yes	914 (67.4)	443 (32.6)	0.64 [0.56, 0.75]	0.77 [0.64, 0.92]
No (RF) [a]	822 (53.2)	724 (46.8)		
Residence				
Urban (RF) [a]	864 (79.0)	230 (21.0)		
Rural	872 (48.2)	937 (51.8)	3.93 [3.12, 4.93]	1.24 [0.91, 1.69]
Religion				
Protestant (RF) [a]	334 (63.9)	189 (36.1)		
Orthodox	841 (69.8)	363 (30.2)	0.80 [0.63, 1.02]	0.95 [0.67, 1.33]
Muslim	542 (47.8)	592 (52.2)	1.75 [1.36, 2.25]	1.17 [0.83, 1.65]

Other	19 (45.2)	23 (54.8)	1.83 [0.96, 3.50]	1.55 [0 .75, 3.19]
Educational status				
Uneducated	295 (35.2)	543 (64.8)	16.61 [11.41, 24.17]	13.46 [8.60, 21.07]*
Primary	594 (55.2)	483 (44.8)	7.88 [5.50, 11.28]	7.75 [5.10, 11.77]*
Secondary	452 (80.3)	111 (19.7)	2.60 [1.77, 3.81]	2.49 [1.60, 3.86]*
Higher (RF) [a]	395 (92.9)	30 (7.1)		
Wealth status				
Low (RF)[a]	439 (42.0)	607 (58.0)		
Medium	159 (48.3)	170 (51.7)	0.80 [0.62, 1.02]	1.15 [0.87, 1.52]
Rich	1138 (74.5)	390 (25.5)	0.31 [0.26, 0.38]	0.86 [0.66, 1.12]

Table 3: *Factors associated with child marriage among women aged 20-24 years age in Ethiopia, (n = 2903).*

*Note: *: Significant at 0.05; [a]: Reference category.*

The binary logistic regression also revealed that the odds of child marriage was 1.49 [AOR = 2.49; 95% CI = 1.60 - 3.86] times higher among women with secondary education, 6.75 [AOR = 7.75; 95% CI = 5.10 - 11.77] times higher among women with primary education, and 12.46 [AOR = 13.46; 95%CI = 8.60 - 21.07] times higher among women with non-educated as compared to women with higher education.

Discussion

In this study, the prevalence of child marriage in Ethiopia was 40.2 %, which means high. The finding of this study also indicated that local region as predictor variable of child marriage in the country, which was strongly significant at 5% confidence. Factors that contributed to child marriage in local regions were traditional practices, geo-cultural identity, social norms and values of the communities. For instance, previous studies in Ethiopia showed that the rate of prevalence of child marriage in northern Amhara region (75%) is three times higher than in Addis Ababa Administration City (26%) [11]. Likewise, earlier study done from Indonesia [15] similar with the present findings that region as a factor of child marriage, implies that the role of religion, ethnic, and other geographically diverse factors.

Educational status was also associated factor of child marriage in this study. The current analysis indicated that uneducated girls were more likely to experience child marriage as compared to those relatively educated. This study was consistent with previous studies done in South Wollo and East Gojjam, Ethiopia [6], in Pakistan [8], in Indonesia [15], in Serbia [16], in Bangladesh [17,18] and Nepal [19]. From these across findings we understood that educated girls have more freedom and are better able to exercise their rights than non-educated girls. They were also getting better opportunity to join to school than other non-educated, which are escaping from child marriage.

Conclusion

In this study, the prevalence of child marriage in Ethiopia was 40.2 %. The finding of this study showed that the potential local clusters of high prevalence of child marriage were identified. These are: all zones of Afar region; all zones except Awi/Agew of Amhara region; Guji, West Harerge, and North Shewa zones of Oromia region; three zones in Tigray region (western Tigray, Southern Tigray and North western Tigray); Liben zone of Somali region; and Agnuak zone of Gambella region. The findings of this study also showed that local region and educational status were determinant factors of child marriage in the country. So as to solve the problems of child marriage in the study area concerned government bodies in collaboration with partners should provide massive awareness creation about child marriage and its effects in the country for the local communities.

Limitation

Since detailed information about female child marriage was not collected qualitatively, the qualtative method and analysis were not emplyed in this study.

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Author's Contributions

Both authors contributed to designing of the study. KTG and KFM contributed to conceptualizing the idea of the study. KTG defined background of the study and discussed results by supporting with previous study or reviewed the manuscript. KFM defined methods, performed the statistical analysis and interpreted the results. Both authors read and approved the final manuscript.

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Availability of Data and Materials

The data sets analyzed and/or used during the present study available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethical clearance for the 2016 EDHS was provided by the Ethiopian Health and Nutrition Research Institute (EHNRI) Review Board, the National Research Ethics Review Committee (NRERC) at the Ministry of Science and Technology, the Institutional Review Board of ICF International, and the CDC. All respondents to the survey provided verbal informed consent; consent for children was obtained through the parents, caregivers or guardians. The data for this study were downloaded and used once the objectives of the analysis was communicated and approved by the Measure DHS.

Consent for Publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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