

Factors associated with adolescent fertility: A study of Ethiopia

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ABSTRACT

Objective: To determine the level of adolescent fertility and identify factors associated with adolescent fertility, as well as compare the factors associated with adolescent fertility among all and ever-married adolescents.

Method: A nationally representative data was used from Ethiopian Demographic Health Survey (EDHS), 2011. From large data set, 3,323 observations of adolescents 15-19 years of age were extracted. Firstly, the characteristics of the study population were summarized. The outcome variable was live birth experience. The predictor variables were age, marital status, household size, educational level, region, religion, employment status, contraceptive use, ideal family size, drinking alcohol and chewing khat for all adolescent analyses; additional variables like age at first marriage, husband education level was included in ever-married group analyses. Secondly, separate bivariate and multivariate logistic regression analyses were conducted to identify the factors associated with adolescent fertility.

Results: The live birth experience among all adolescents was 10.74%, while it was 42.68% among ever-married adolescent group. Age, marital status, household size, region, educational status, religion, contraceptive use, ideal family size was significantly associated with live birth experience; under adjusted comparison, age, marital status and some regions were positively associated with live birth experience, while education level of secondary and above was negatively associated with live birth experience in all adolescent mode. In the ever-married adolescents group analyses; age, household size, region, educational level, child death experience, age at first marriage, ideal family size and drinking alcohol were significantly associated with live birth experience; under adjusted comparison, age, some regions and ideal family size of greater than four were positively associated with live birth experience, while late age at first marriage and living in larger household size were negatively associated with live birth experience.

Conclusion: Live birth experience among adolescents was relatively high in Ethiopia. Based on the results of this study to identify factors associated with adolescent fertility, improving the educational status of adolescents to secondary and above level, providing access to basic reproductive health services in regions with high adolescent fertility, and awareness creation of the family and marriage law are highly needed to mitigate the challenges of adolescent fertility in Ethiopia.

INTRODUCTION

Background

Adolescence is a period of transition from childhood to adulthood, mainly characterized by a progressive change in physical, biological, emotional and social status. The age range from 10-19 years is considered an adolescence period, while people in the 10-24 year age range generally are called youth [1].

Adolescence is a highly transitory period of life; the number and types of changes that adolescents experience in family structure, livelihood, schooling, communities, and identities are unparalleled

in any other period. Literatures on adolescents in developing countries and Sub-Saharan Africa in particular, indicate that it is necessary to treat this period of life differently from childhood and adulthood [2]. To cope with diverse and rapid changes that occur in their lives, adolescents have specific needs for new types of decision-making powers. Adolescents needs safe places to meet with peers and mentors as well as resources to find alternatives to pressure to leave colleges and universities, engage in illegal or unsafe work, abuse substances, marry early, have unsafe sex, and exchange sex for gifts or money [3].

Adolescent fertility, also known as teenage fertility, is a condition where a woman has given live birth before twenty years of age.

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Teenage fertility is calculated as the proportion of women aged 15-19 who have ever given live birth by the time of the survey [4].

Worldwide adolescents suffer from a disproportionate share of early marriage, unwanted pregnancy, unsafe abortion, sexually transmitted infections including the dreaded HIV/AIDS, female genital cutting, malnutrition, anemia, infertility, sexual and gender-based violence and other reproductive health challenges. About 16 million adolescent girls give birth each year, roughly 11% of all births worldwide. Almost 95% of these births occur in developing countries. They range from about 2% in China to 18% in Latin America and the Caribbean. Half of all adolescent births occur in just seven countries: Bangladesh, Brazil, the Democratic Republic of Congo, Ethiopia, Nigeria, India and the United States [5].

Adolescent pregnancy is associated with negative outcomes for the mother, the new born and the society at large. For the mother, pregnancy brings increased health risks like; severe morning sickness, pregnancy associated hypertension, pre-term labor, premature birth and difficult labor leading to higher operative deliveries. Similarly the newborn also suffers from low birth weight, perinatal deaths; increased neonatal deaths (6).

The health risks to the young mothers due to pregnancy and early childbearing have been documented in several studies across the globe. One of such studies has revealed that, maternal mortality rates for adolescent mothers under the age of 16 are four times higher than, those mothers who bear children above the age of 20 (7). Factors complicating the perinatal outcome of adolescent pregnancy, are exacerbated by the fact that, pregnant adolescents tend to care less about getting the necessary antenatal services, having effect on the nutritional intake of pregnant adolescents, leading to low birth weight and its consequences. This has been supported by a study which analyzed antenatal follow up and weight gain; compared to older pregnant mothers adolescents have gained lower weight and had significantly lower prenatal care visits [6].

Moreover childbearing at a young age poses risk of school dropout and truncated educational opportunities, as early motherhood impedes the pursuit of other life options that might compete child bearing, due to the fact that child bearing hinders mothers educational attainment it often results in reducing economic opportunities for the mother and the household as a whole [8].

Furthermore, adolescent pregnancy has socio-economic impacts on the individual as well as the overall society; numerous studies have shown as association between adolescent pregnancy, and negative social and economic effects on both the mother and her child. Studies have shown that, delaying adolescent births could significantly lower population growth rates, potentially generating broad economic and social benefits [9, 10].

Despite the downward trend, adolescent fertility remains very prevalent, particularly in the poorest countries like Ethiopia. The age at which women in developing countries have their first child has important consequences on the demographic character of the population. Long term demographic effects of adolescent fertility may include larger completed family sizes. Childbearing at younger ages implies a higher rate of fertility and population growth because of a shorter length of time between generations [11].

Though there are studies done on the specific topic of adolescent fertility in Ethiopia [12-18], these studies have mainly focused on factors related to educational status, age at first birth, age at

first marriage and type of residence. However equally important factors like, Household size, ideal family size, Substance use by adolescents, employment status of women, child death experience, regional variation, level of education of the husband/partner, have been given little attention, therefore this study will use a recent nationally representative data to confirm previous studies and observe new facts and it will help in bridging the information gap and shade some more light on the adolescent fertility challenges in Ethiopia.

Objectives

This study aims to investigate factors associated with adolescent fertility in Ethiopia. This study is constructed as follows:

1. To determine the level of adolescent fertility (Live birth experience) among Ethiopian adolescents.
2. To identify factors associated with adolescent fertility; demographic, socio-economic, fertility-related and behavioral factors.
3. To compare factors influencing adolescent fertility, among all and married adolescents.

METHODS

Data source

This study uses secondary data from the Ethiopian Demographic and Health Survey (EDHS) 2011, which is a nationally representative sample data. The primary purpose of this survey was to furnish policymakers and planners with detailed information on fertility, family planning, infant, child and adult maternal mortality, maternal and child health, nutrition, and knowledge of HIV/AIDS and other sexually transmitted infections. The 2011 EDHS was carried out under the Ministry of Health of Ethiopia by Central Statistics Agency (CSA) and ICF International through funding from USAID. Permission to access and use the data was requested and obtained by an online application to the administrator of the database in USA. Details of information concerning the data can be obtained at the following web page: Measure Demographic Health Surveys [19].

Sampling frame and sample selection

The 2011 EDHS used the sampling frame provided by the list of census enumeration areas with population and household information from the 2007 National Population and Housing census. Administratively, regions in Ethiopia are divided into zones, and zones into administrative units called Wereda. Each Wereda is further subdivided into the lowest administrative unit called kebele.

During the 2007 census each kebele was subdivided into census enumeration areas (EAs). The 2011 EDHS sample was selected using, two-stage cluster design, and EAs were the sampling unit for the first stage. The sample included 624 EAs, 187 in urban areas and 437 in rural areas. Households comprise second stage of sampling. A complete listing household was conducted in each of the 624 EAs selected from September 2010 through January 2011. A representative sample of 17,817 household was selected for 2011 EDHS. The individual women data is used for this study and all women within the age group of 15-19 were selected.

All female adolescents age from 15-19 years from the women data were selected, the total number were 3,835 after proper

data cleaning, a total of 3,323 individuals were analyzed for all adolescents group, and 806 adolescents, for ever-married sub-group analysis.

Measures and Variables

This study analyzed the specific measure of adolescent fertility; there are multiple ways to measure adolescent fertility; age specific fertility rate, total fertility rate, children ever born and total fertility rate (TFR) is a summary measure of fertility and can be interpreted as the average number of births a hypothetical woman would have at the end of her reproductive life, if she were subject to the currently prevailing age specific fertility rate throughout her reproductive age, while age specific fertility rate (ASFR) is number of births per year per women of a specific age group, the other measure of fertility is children ever born (CEB), which is number of children ever born at various age of the mother, this is presented in a continuous scale, and the measure of fertility used in this study is derivative of the children ever born (CEB) in categorical scale, if the adolescent had no children ever born(no event) to the date of the interview, live birth experience is taken as zero, and if the respondent had any live birth experience (event), then live birth experience event is taken as one. Therefore, live birth experience is a binary outcome with event or no-event. So, the dependent variable used in this study is Live birth. Live birth comprises information on the experience of whether the respondent had live birth up to the survey date.

Live birth experience, the outcome variable is treated as a categorical variable in both bivariate and multivariate analyses. The demographic, socioeconomic, fertility-related and behavioral factors used as independent variables are; age of respondents, marital status, household size, region, educational level, religion, employment status, contraception use, ideal family size and use of substance (chewing khat or Drinking alcohol). In sub-group analysis for ever-married adolescents child, age at first marriage, child death experience and husband's education level, have been included as independent variables.

In previous Ethiopian studies on adolescent fertility; age, marital status, education level, employment status and contraceptive use were significantly associated with adolescent fertility [12-17]. However religion, household size, ideal family size had mixed effects on adolescent fertility [20, 21]. Many of the independent variables were categorical variables. For example, the variable ideal family size refers to respondents' perceptions concerning the ideal number of children they would like to have. This variable is

categorized into three groups depending on its distribution (up to two children, three to four children and above four children) for both bivariate and multivariate analyses.

Analytical Procedures

Initially, descriptive analysis was used to describe the number and percentage of respondents according to demographic, socio-economic, fertility-related and behavioral patterns, for all adolescents and for adolescents who were ever-married. Then to identify the association between the outcome variable live birth experience and independent variables, bivariate analyses were conducted for both groups using chi-squared test, before multivariate analyses were run, the relationship between independent variables were checked for Multicollinearity and independent variables with their p-value less than 0.20 on chi-squared test, were inserted into the multivariate analysis to identify differentials of the adolescent fertility.

Furthermore, the net effect of each predictor variable on the dependent variable after controlling for the effect of other predictors was measured via multivariate analysis (Multivariate logistic regression). Multivariate analyses were performed separately for all adolescents and forever-married adolescents, in both bivariate and multivariate analyses. Value of $p < 0.05$ were considered statistically significant. All analyses were performed using SAS version 9.2 (SAS institute Inc., Cary, NC, USA).

RESULTS

Characteristics of Study Subjects

Table 1 revises characteristics of Ethiopian female adolescent aged 15-19 years from the data of the study, for all adolescents and ever-married adolescents. The age distribution among all adolescents shows, young adolescents aged 15-17 were 60% while those aged between 18-19 were about 40% of the study population, among ever-married group the age distribution showed, one third of them were in the age group of 15-17 and the remaining two-third of the ever-married adolescents were 18-19 years of age. The marriage pattern among all adolescents was that three-fourth (75%) of them were never married, while the remaining one-fourth of the adolescents were ever-married, of which 80% of them were still in the marriage union by the time of interview, while 20% of the ever-married adolescents were already, separated, divorced or widowed.

As to the size of family in which the adolescents live with; about 67% of all adolescents live in a large family size of above five family

Table 1. Characteristics of study population (N=3,323).

Characteristics	All adolescents (N=3,323)		Ever-married adolescents (N=806)	
	n	%	n	%
Age (Years)				
15	734	22.09	58	7.2
16	678	20.4	101	12.53
17	590	17.76	127	15.76
18	809	24.35	301	37.34
19	512	15.41	219	27.17
Marital status				
Never Married	2507	75.44	-	-
Sep./Wid./Div.	137	4.12	136	16.87
Married	679	20.43	670	83.13
Household size				

0-4	1088	32.74	435	53.97
5-8	1679	50.53	251	31.14
>8	556	16.73	120	14.89
Region				
Tigray	427	12.85	106	13.15
Afar	225	6.77	82	10.17
Amhara	427	12.85	156	19.35
Oromia	456	13.72	98	12.16
Somali	133	4	31	3.85
Benishangul-Gumuz	243	7.31	94	11.66
SNNP	393	11.83	46	5.71
Gambela	224	6.74	83	10.3
Harari	230	6.92	52	6.45
Addis Ababa	371	11.16	25	3.1
Dire Dawa	194	5.84	33	4.09
Education level				
No-education	606	18.24	321	39.83
Primary	2191	65.93	435	53.97
Secondary and above	526	15.83	50	6.2
Religion				
Christian orthodox	1551	46.67	348	43.18
Muslim	1144	34.43	323	40.07
Protestant	586	17.63	126	15.63
Other	42	1.26	9	1.12
Employment status				
No	2475	74.48	618	76.67
Yes	848	25.52	188	23.33
Live birth experience				
No	2966	89.26	462	57.32
Yes	357	10.74	344	42.68
Current pregnancy				
No	3211	96.63	695	86.23
Yes	112	3.37	111	13.77
Contraceptive use				
No	3111	93.62	634	78.66
Yes	212	6.38	172	21.34
Ideal family size				
0-2	965	29.04	146	18.11
3-4	1539	46.31	384	47.64
>4	819	24.65	276	34.24
Chew khat				
No	3159	95.38	736	91.32
Yes	164	4.59	70	8.68
Drink alcohol				
No	2132	64.18	463	57.52
Yes	1190	35.82	342	42.48
Husband education level				
No education				
Primary			321	39.83
Secondary and above			338	41.94
			147	18.24

Child ever born			
0		481	59.68
1		270	33.5
2		49	6.08
3		6	0.74
Age at first marriage			
<15		261	32.38
15-17		446	55.33
18-19		99	12.28
Child death exp			
No		761	94.42
Yes		45	5.58

members, while the remaining third live with relatively smaller family size of less than four. The family size pattern among ever-married adolescent group was that 46% of them were living with bigger family size, while the rest (53.97%) were living with smaller family size of less than four family members.

The percentage distribution of socio-economic factors were as follows; the regional distribution of all adolescents across the country were that; Tigray (12.85%), Afar (6.77%), Amhara (12.85%), Oromia (13.72%), Somali (4.0%), Benishangul-Gumuz (7.31%), SNNP (11.83%), Gambela (6.74%), Harari (6.92%), Addis Ababa (11.16%), Dire Dawa (5.84%), this distribution across the region among ever-married group had similar pattern.

Regarding literacy level measured in this survey with the educational level of the adolescents at the time of interview shows that, one in five (18.24%) adolescents have no any form of formal education, and overwhelming majority (65.935) of those who had some education, had only primary level of education, while only 15.83 of adolescents had education level of secondary level and above, among the ever-married group the literacy level suggested by similar measure of education level shows, the percentage of ever-married adolescents with no any formal education rises to 39.83%, while those with primary education level were 53.97%, the proportion of ever-married women with education level of secondary and above sharply declines to only 6.2%.

Respondents religious affiliation was asked in the survey and the result was, Christian Orthodox (46.67%), followed by Muslims (34.43%), and then Protestants (17.63%), while those affiliated to Catholics and African Traditional Religion were only 1.26%, among the ever-married adolescents the affiliation to religion was, 43.18%, 40.07%, 15.63% and 1.12%, for Christian orthodox, Muslims, Protestant and Catholics and African Traditional Religion respectively. Employment status of the adolescent were also questioned and three fourth (74.485%) were unemployed and the remaining one-fourth had employment with paying job, among ever-married group the employment status is similar in that 76.67% were unemployed and 23.33 were employees.

The dependent variable of this study, live birth experience among all adolescents showed that, nearly 11 % of them had at least one live birth experience and the overwhelming majority (89.26%) did not had and live birth experience, the live birth among ever-married adolescents was higher (42.68%) of them had an experience of live birth, while 57.32% of ever-married adolescents had no live birth experience at the time of the survey. 13.77% of ever-married adolescents were pregnant at the time of interview and this proportion is only 3.37% among all adolescents.

The use of contraception among all adolescents in the study revealed that only 6.38% of them had ever used any form of modern contraception, while 21.34% of ever-married adolescents had ever used a modern contraception. Adolescents in this study were also asked about the ideal family size that they want to have and their response was 29.04% of them wanted family size of up to 2 children, while 46.31% responded they would like to have three to four children, and 24.65% of them wanted to have more than four children, the response on question of ideal family size, among ever-married adolescents was, 18.11% replied they want to have up to two children, while 47.64% wanted to have three to four children, and the remaining 34.24% wanted to have more than four children.

Additional issues like chewing of khat and drinking of alcohol were also included and the result revealed that, only 4.59% of all adolescents and 8.68% of ever-married adolescents chewed khat, while 35.82% of all adolescents and 42.48% of ever-married adolescents drunk alcohol.

Among ever-married adolescents additional factors like age at first marriage, husband education level and child death experience were considered and the results were as follows: 32.38% of ever-married adolescents were married before age of 15, while 55.33% of them were married by the age of 15-17, and the rest 12.28% were married between the age of 18 to 19. Concerning child death experience in this sub-group, 5.58% of them had had an experience of child death. Husband education level for ever-married adolescents showed that, 39.83% of them were married to husband with no education, and 41.94% were married to husbands with education level of primary level, while 18.24% of the women reported their husband's education level was Secondary and above Table 1.

Unadjusted association of each characteristic with adolescent fertility

The characteristics associated with live birth experience on bivariate analysis for all adolescents showed that; the proportion of adolescents with live birth experience increases linearly with age, from 1.23% at 15 years of age, to 3.39%, 7.46%, 19.04%, and 24.02% at respective 16, 17, 18 and 19 years of age. Marital status was another factor which shows association with live birth experience, the percentage of live birth increases from 0.4% among never married adolescents to 24.09% for previously married adolescents, and 46.24% for married adolescents in union. As to the household size in which the adolescents live, there is association at bivariate analysis showing inverse relation of the family size and proportion of live birth experience: for those living in household of family size up to four, the percentage of live birth experience

was 19.85%, while live birth proportion was 5.84% and 7.73% for those living in larger family size of five to eight and above eight respectively.

Significant difference in proportion of live birth experience was not observed among adolescents affiliated to different religions, Christian orthodox adolescents had 8.90% live birth experience, while Muslims, Protestants, Catholics and African Traditional Religion followers had 13.20%, 10.58% and 14.29% live birth experience respectively. Employment status of the adolescents was also associated with live birth experience, shown with higher proportion of live birth experience among unemployed (8.96% vs. 11.35%).

Other characteristics associated with live birth was contraceptive use among adolescents; the proportion of live birth experience among contraceptive users was more than that of those not using any contraceptives 34.43% vs. 9.13%. Ideal family size was also associated with live birth, proportion of live birth experience increases as the number of children one would like to have increases, from 5.49% among those who wanted to have up to two children, to 10.16 % and 17.09% among those who wanted to have three to four children and those who wanted to have more than four children respectively.

Chewing khat was also associated with live birth experience; those chewing khat have higher percentage of live birth experience compared to non-khat chewers (21.95% vs. 10.16%). Drinking alcohol was not associated with live birth experience (Table 2).

Adjusted associations of each characteristic with adolescent fertility

Two separate multivariate analyses were performed (for all adolescents and ever-married adolescents). In the first model for

all adolescents, age, marital status, region and education level were found to be strong differentials of adolescent live birth experience (fertility). Increase in age tended to increase once odds ratio of having live birth experience, relative to those at 15 years of age, those at 16, 17, 18 and 19 year of age had, 2.39 (95%CI 1.031-5.581), 3.70 (95%CI 1.642-8.352), 7.11 (95%CI 3.325-15.210) and 9.79 (95%CI 4.487-21.368) odds ratio of having live birth experience respectively.

Adolescents who were previously married and at the time of interview were either separated, divorced or widowed and adolescents who were in marriage union had significant differential of the live birth experience, compared to never-married adolescents, the odd ratio of ever-married adolescents was 49.93 (95%CI 23.234-107.333) and those of adolescents in marital union was 111.08 (95%CI 56.864-217.008). Adolescents living outside the capital Addis Ababa had higher odds ratio compared to those living in the capital: Tigray 4.83 (95%CI 1.472-15.879), Amhara 3.73 (95%CI 1.180-11.822), Oromia 5.06 (95%CI 1.554-16.502), Somali 4.08 (95%CI 1.044-15.961), Benishangul-Gumuz 6.14 (95%CI 1.868-20.194), SNNP 4.294 (95%CI 1.176-15.677), Gambela 10.37 (95%CI 3.008-35.792), Harari 7.230 (95%CI 2.058-25.394).

Adolescents education status was also one of the most important differentials explaining the variability of live birth experience among adolescents, compared to adolescents with no formal education adolescents with secondary and above level of education had significantly lower odds ratio, 0.414 (95%CI 0.210-0.819). while household size, religion, employment status, contraceptive use, ideal family size, chewing khat did not show any significant association with adolescents live birth experience in the multivariate analysis for all adolescent group (Table 3).

Table 2. Adjusted associations of each characteristic with live birth experience: All adolescents (N=3,323).

Characteristics	n	OR	95%CI	p-value
Age (Years)				
15	734	1		
16	678	2.399	1.031-5.581	0.0422
17	590	3.703	1.642-8.352	0.0016
18	809	7.111	3.325-15.210	<.0001
19	512	9.792	4.487-21.368	<.0001
Marital status				
Never Married	2507	1		
Sep / Wid / Div	137	49.937	23.234-107.333	<.0001
Married	679	111.085	56.864-217.008	<.0001
Household size				
0-4	1088	1		
05-Aug	1679	0.814	0.573-1.158	0.2527
>8	556	0.749	0.473-1.186	0.2178
Region				
Addis Ababa	371	1		
Tigray	427	4.835	1.472-15.879	0.0094
Afar	225	2.328	0.661-8.197	0.1881
Amhara	427	3.735	1.180-11.822	0.025
Oromia	456	5.064	1.554-16.502	0.0071
Somali	133	4.081	1.044-15.961	0.0432
Benishangul-Gumuz	243	6.142	1.868-20.194	0.0028

SNNP	393	4.294	1.176-15.677	0.0274
Gambela	224	10.376	3.008-35.792	0.0002
Harari	230	7.23	2.058-25.394	0.002
Dire Dawa	194	3.394	0.896-12.864	0.0722
Education level				
No-education	606	1		
Primary	2191	0.78	0.552-1.104	0.1608
Second and above	526	0.414	0.210-0.819	0.0112
Religion				
Christian orthodox	1551	1		
Muslim	1144	1.074	0.674-1.710	0.7645
Protestant	586	0.915	0.502-1.665	0.77
Other	42	1.901	0.465-7.778	0.3716
Employment status				
No	2475	1		
Yes	848	0.79	0.547-1.142	0.2098
Contraceptive use				
No	3111	1		
Yes	212	0.916	0.616-1362	0.6641
Ideal family size				
0-2	965	1		
03-Apr	1539	1.153	0.755-1.763	0.5098
>4	819	1.55	0.954-2.518	0.0766
Chew khat				
No	3159	1		
Yes	164	1.303	0.746-2.276	0.352
c-statistic		0.949		
H-L Test, χ^2 , (p-value)			3.53(0.8969)	

Table 3. Adjusted associations of each characteristic with live birth experience: All adolescents (N=3,323).

Characteristics	n	OR	95%CI	p-value
Age(Years)				
15	734	1		
16	678	2.399	1.031-5.581	0.0422
17	590	3.703	1.642-8.352	0.0016
18	809	7.111	3.325-15.210	<.0001
19	512	9.792	4.487-21.368	<.0001
Marital status				
Never Married	2507	1		
Sep / Wid / Div	137	49.937	23.234-107.333	<.0001
Married	679	111.085	56.864-217.008	<.0001
Household size				
0-4	1088	1		
05-Aug	1679	0.814	0.573-1.158	0.2527
>8	556	0.749	0.473-1.186	0.2178
Region				
Addis Ababa	371	1		
Tigray	427	4.835	1.472-15.879	0.0094
Afar	225	2.328	0.661-8.197	0.1881
Amhara	427	3.735	1.180-11.822	0.025
Oromia	456	5.064	1.554-16.502	0.0071
Somali	133	4.081	1.044-15.961	0.0432
Benishangul-Gumuz	243	6.142	1.868-20.194	0.0028

SNNP	393	4.294	1.176-15.677	0.0274
Gambela	224	10.376	3.008-35.792	0.0002
Harari	230	7.23	2.058-25.394	0.002
Dire Dawa	194	3.394	0.896-12.864	0.0722
Education level				
No-education	606	1		
Primary	2191	0.78	0.552-1.104	0.1608
Second and above	526	0.414	0.210-0.819	0.0112
Religion				
Christian orthodox	1551	1		
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Contraceptive use				
No	3111	1		
Yes	212	0.916	0.616-1362	0.6641

DISCUSSION

Study design and methods

This study was a cross-sectional study, of the Ethiopian Demographic Health Survey data (EDHS, 2011). In previous researches to investigate determinants of adolescent fertility, similar cross-sectional studies were used [12-17]. The strength of this study was that it used a nationally representative data, and the most recent data of the EDHS, therefore it is believed that it would reflect the recent determinants on fertility of Ethiopian female adolescents. Additional strength of this study was that thorough cleaning of the data was conducted. The total adolescents number extracted from the women's individual data of EDHS, 2011 were 3,835, after thorough cleaning 3,323 were put to the final analysis. Furthermore, multicollinearity between independent variables were checked before regression analyses were conducted.

To investigate the influence of independent variables like: age, marital status, household size, religion, education level, region, contraceptive use, ideal family size, substance use on the adolescent live birth experience; logistic regression analyses were performed. In the regression analyses the outcome variable was live birth experience.

Considerations of the Study Results

In this study, it has been found that, adolescents in Ethiopian have higher fertility. Among all adolescents in the study 11% of them had live birth experience and about 21% of all had already been married. This higher percentage of adolescent fertility indicates that, more reproductive health programs and services are highly needed. All adolescents regardless of their demographic, socio-economic and behavioral patterns would benefit from programs focusing on providing adequate knowledge, skill and services on adolescent sexual and reproductive health. There have been wider discrepancies among adolescent fertility across adolescent age, marital status, household size, where they live (region), use of contraception, employment status, according to the findings of this study.

The overall female adolescent fertility observed in the present study was 11% with additional 3.37% pregnant making adolescent child

bearing rate of 14.37% implying that one out of six adolescents aged between 15 and 19 years were either pregnant or had already given birth. Compared to other countries in the region, the adolescent fertility rate in Ethiopian is relatively lower than the rates for Kenya, Uganda, Tanzania, and Malawi which were 18.5%, 19.2%, 19.6%, and 25.3% respectively, but higher than some African countries like Eritrea 11% and Rwanda 3.3% [22].

In this study adolescents aged 16 years were about 2.4 times more likely to be fertile, while those aged 17 were 3.7 times more likely to be fertile than adolescents at 15 years of age. Similarly, adolescent's aged 18 were 7.1 times more likely to be fertile while those aged 19 were almost 10 times more fertile when compared to adolescents aged 15. Similar findings have been documented in studies conducted in Ethiopia [15]. As the age increases, the risk of exposure to pregnancy and child-bearing also increases significantly, because of higher chances of getting sexual relation, and getting married is also a relatively high possibility making sexual relations and child bearing socially acceptable phenomenon. In this study the percentage of live birth linearly increases with the age of the adolescents, for adolescents aged 15 the percentage of live birth experience was only 1.23% and this number increases to 24% for those aged 19 at the time of interview.

In addition, a sub-group analysis done for ever-married adolescents revealed similar pattern of increase in percentage of adolescents who had live birth experience. Increase in age, among ever married women in this study showed increase in percentage of live birth experience; 14.5% of adolescents at 15 years of age had live birth experience, while 54.5% of adolescents had live birth experience at 19 years of age. Similarly in logistic regression the risk of having live birth experience is 3, 4.8, 16.9 and 29.6 times higher for ever-married adolescents aged 16, 17, 18 and 19 respectively. This clearly indicates that, adolescents in marriage have significantly increased exposure to pregnancy and childbearing early in life.

Another similar and related finding from this study was the marital status of adolescents is closely linked with their fertility, of the total adolescents in the study 21% of them are married and the percentage of live birth distribution shows that percentage of

live birth is 0.4% among never married women, while it is 24.1% and 46.24% among women with previous marriage history and among those married respectively. Compared to the non-married adolescents those previously married have 50 times more exposure to live birth experience and those in marriage have even more higher odds ratio calculated to be 110 times more.

Early marriage is quite a common practice worldwide and it is still being practiced particularly in low and middle income countries. This has been documented in studies conducted in Latin America, Asia, Middle East and in Africa [22, 23].

The other important differential of adolescent fertility is age at marriage, the earlier the marriage the longer is the fertility period of a women. The age at marriage also entails earlier start of child bearing and ultimately, these adolescents end up having many more children are by the time they complete their fertility. In present study age at marriage for ever-married sub-group analysis revealed that, 32.7% of them were married before the age of 15, and 55% of the ever-married adolescents were married in the age range of 15 to 17, and 12.25% were married at the age range of 18-19, this show majority of the adolescents ever-married, get married very young.

An increase in the age at first marriage has a negative effect on higher fertility, early marriage results in sexual union and beginning of exposure to child bearing, while delay adolescents marrying at older age have greater likelihood that, they attended school or have a paying job and better experience in life, these all combined provide better opportunity to decide on when and how many children they want to have in their family [20]. Findings are similar to other studies that find that older age at first marriage significantly impact fertility [13].

Furthermore this study has found that adolescents who live outside the capital, Addis Ababa, in different parts of the administrative regions have higher adolescent fertility compared to adolescents living in the capital. Fertility was higher in adolescents living in regions: Tigray, Amhara, Oromiya, Somali, Benishagul-Gumuz, Southern nation nationalities and peoples, and Harari.

In this study, regions where adolescents live was one of the important predictors in determining adolescent fertility, this study is similar in this with other studies which have found below replacement level fertility for women living in Addis Ababa [13, 17].

One reason could be that adolescents which who live in regions are more likely to have lesser access to sexual and reproductive health services, leading to low prevalence of contraceptive use and higher fertility among adolescents, the other reason could be that, adolescents living in the regions get married earlier than those living in the capital, as the mean age at first marriage among adolescents in Addis Ababa and those living outside the capital has difference of more than 5 years according to one study conducted in Ethiopia [17].

Similarly, the higher live birth experience among adolescents living in those regions could be because, those regions are generally speaking less developed than the capital, regions like Gambela, Somali, Benishagul-Gumuz, some parts of SNNP are remote and inaccessible and coverage of basic health care is lower. Other regions like Tigray, Amhara, Oromia, SNNP are regions which are densely populated and where the majority of Ethiopian population live.

It is a well-documented fact that adolescent fertility is negatively associated with the adolescent's educational status [24-26]. The

hypothesis of this study was that, adolescent's education level would have an impact on their fertility level, those with lower education level have higher live birth experience than their literate ones.

The proportion of adolescent with no primary education is alarming and unacceptable as it was nearly one in five adolescents in the survey had no any form of formal education (18.24%), among those who had some form of formal education the majority of adolescents had only educational level of primary level (65.93%) and only limited proportion of the adolescents had a chance to attend secondary level and above education.

There were wide discrepancies in percentage of live birth experience in this study groups, those with no formal education had almost eight times the proportion of live birth experience of those with secondary and above education (25.5% vs. 3.4%). Similarly education level of secondary and above have been found to be strongly significant in reducing the risk of having live birth experience by around 60% with OR of 0.414 (95% CI 0.210-0.864). Education level of primary level has not been found statistically significant in preventing against live birth experience. There is an inconsistent results in researches across SSA on the impact of primary education level on adolescent fertility [27-30].

Education opens a window of opportunity, by enabling access to more information and knowledge, which empowers adolescents, creates better chance of getting employment in outside environment, it makes one more aware and take responsibility of their own health and that of their children and the family as a whole, all of which are counter enablers to adolescent fertility and its associated consequences. Similarly educated women are more likely to delay marriage, have smaller family size and use family planning methods than uneducated women [30].

In recent years there is an increase in efforts to promote girls education, by government and civil societies to improve the accessibility of education to all regions of the country. This has been strengthened with the Millennium Development Goals (MDG), emphasis on addressing primary education to all in developing countries like Ethiopia. As a result, there is a rapid expansion of schools in the country, this has resulted in massive increment in enrollment of students to schools, and the proportion of female students attending the school has continuously increased over the past few years, those students which completed their primary education in the rural parts often have to move to smaller towns in the nearby area, and this has created new phenomenon in the country, where young people are living a relatively unrestricted life, far from the family and the society who knew them well. It has been a recent fact that, this increase in attendance in secondary school level has come with the down side of rising unintended pregnancy and its associated complications, in absence of targeted programs addressing these vulnerable groups.

Schools are now, not only places for acquisition of knowledge and skills, they have also become places where adolescents meet each other and socialize, the traditional role of schools in a resource limited set up has not prepared itself for the rising extracurricular demands of the increasing students.

Among the ever-married adolescents, the effect of education was not statistically significant, this could be due to the fact that once, they are in marriage, and it is obvious that adolescents will be exposed to having sexual intercourse and thus having live birth experience.

The other interesting finding in this study was the finding that ideal family size one wants to have in life will affect the fertility, as those who want to have a bigger family size would try to achieve it, among ever-married adolescents those who wants to have more than four children were positively associated with having live birth experience with OR of 1.757 (95% CI 1.027-3.006), but for all adolescents ideal family size was not significant in contrary to other findings [20, 21].

Whether the adolescents have been living in different family size households were examined in this study and it was found that, this is insignificant for all adolescents, while it was marginally significant and protective in ever-married group adolescents, that is ever-married adolescents living in larger family size households tend to reduce their fertility, this could be because they have firsthand witness of the challenges of having bigger family size, previous studies on this matter described married adolescents living with extended family size, particularly those living with parents or grandparents tend to have higher fertility [31, 32].

Policy implication of adolescent sexual and reproductive health

This study has analyzed a nationally representative data, from the most recent Demographic and Health Survey of 2011, taking the individual survey data to look in to the topic of interest; socio-demographic determinants of adolescent fertility.

Population growth is the global challenge, and it is much worse in countries with low income like Ethiopia, though the overall population growth has shown some decline from early 1990 of 3.1% per year to 2.6% per year in 2005, there has been continuous increase in the number of general populations, this uncontrolled increase in population growth has already been taking its toll on the development aspiration of the country.

Cognizant of uncontrolled population growth challenges, the Ethiopian government has been working on controlling fertility, among the first target group is reducing the fertility of reproductive age women of the country, this goes directly by identifying the most vulnerable group and intervention high response group and adolescents should be the among the primary target group of any interventions focusing on reducing fertility.

This study indicated that adolescents get married early in their life and expose to pregnancy and early child bearing, which leads to high number completed fertility by the end of their reproductive years, hence the first target area should focus on ways to increase age at marriage, though Ethiopia has enacted marriage law, depicting the legal age of marriage to be 18 years of age and above, but as revealed in this study this law is largely unknown or ignored by significant proportion of the Ethiopian population. Policy makers have to focus on findings ways to enforce the in acted family and marriage law, mainly in creating broader awareness on challenges of early marriage and its consequences among the wider population. In addition to this enforcement of the law will also help in reducing the early marriage of adolescents in the country.

Another interesting finding from this study was, the wide discrepancy in adolescent fertility in different regions of the country, regions like Tigray, Amhara, Oromia, SNNP, Somali, Benishangul-Gumuz and Harari were observed to have higher odds ratio of live birth experience for adolescents living these regions, particularly regions like Gambela had nine times higher odds ratio of live birth experience, while Harari had seven six times, and Benishangul-Gumuz five times higher odds ratio of live birth experience.

These regional discrepancies need to be addressed by policy makers in ensuring equal opportunity to all adolescents of the country, by providing universal access to basic sexual and reproductive health services. Targeting, regions with higher fertility pattern will have negative impact on the fertility of adolescents living in those regions.

The other important finding in this study was that, the significantly negative association of education level and adolescent fertility, adolescents with secondary and above education were strongly protected from adolescent fertility, as education translates to better knowledge and empowers one in making informed decision about choices in their life's, the policy implication of this is that, education for girls should be highly emphasized and focusing on improving girls school enrollment, reducing school drop outs and keeping girls at school should be the primary effort in education policy.

Similarly, this study revealed that education level of, no-education and primary level were not strongly protective of adolescents fertility. It is of notice that, nearly 85% of the study adolescents had no formal education or have only primary level of education, this should be another area of focus for policy makers, to provide these vulnerable adolescents with, universal access to education, expansion of education facilities in all regions of the country and eradication of illiteracy. These, combined will improve the adolescent fertility level and foster the development agenda of the country at large.

Limitations and future research agenda

There are some limitations of with regard to interpretations of the results of this study. Due to the cross-sectional design of the study and all the variables analyzed in the regression model, it can only provide evidence of a statistical association between those variables and the live birth experience and cannot show a cause-effect relationship.

In addition to this the measure of adolescent fertility, live birth experience, suffers from problems of censoring as it includes whether the adolescents had an experience of live birth to the date of survey. Probably the more precise way to measure adolescent fertility would be the measure adolescent conception (Pregnancy) rate, but it would be less practical, as it would be very difficult to know whether pregnancy had occurred in cases of early abortion, furthermore Ethiopia lacks a vital statistic which tracks and registers every pregnancy and abortion that had happened, this makes this more precise measure less usable. In Ethiopian and many developing countries adolescents tend to be less open about their sexuality and reproductive history, this is particularly the case if the live birth experience happened outside wedlock, and in some cases if it happens, family would give the new infant for foster to families living far from their communities or to child foster organizations, as this would threaten the chance of the young adolescent to get married and as widely believed that this experience would affect the status of the family in the community where they live.

Another error that could happen with live birth measure is the wrong inclusion of still birth or late fetal death among live birth. However, data of the Demographic Health Surveys are good quality data to estimate fertility for all age group women of reproductive age group [33].

Another limitation of the study in fully understanding the adolescent fertility in Ethiopia is the fact that the study did not

include male adolescents which should be an integral part of the problem. Further studies are needed to analyze how male adolescents contribute to this process.

The study also did not have qualitative information to substantiate the findings in the quantitative analyses, and further studies should include focused group discussions and in-depth interviews with male and female adolescents, service providers, community and religious leaders [34-41].

CONCLUSION

Sub-Saharan Africa is the world's fastest growing region in its population number, this is intensified by the high fertility rate and low contraceptive prevalence rate, despite the increased mortality secondary to infectious diseases like HIV/AIDS, the continents population has exceeded one billion, and it is expected to continue growing for the coming century. Ethiopia being located in Sub Saharan Africa, shares the characteristics defining the region; poor socio-economic development, high unemployment, early marriage, high fertility rate, low contraceptive prevalence rate, high proportion of unsafe abortion.

This study focused on the adolescents of Ethiopia, and it indicated similar patterns which is, high adolescent fertility rate, expressed in higher percentage of live birth experience in this study. Many factors contribute to this phenomenon, among these factors, age, age at first marriage, region, education level, household size, ideal family size, contraceptive use, marital status, substance use like drinking alcohol or chewing khat are some of the important contributors to fertility.

The main results in this study were as follows; 11% of the adolescents analyzed had already given at least one live birth and nearly 21% have already been married, and more than 66% of the adolescents live in larger family size and it seems this is a relatively normal pattern in the country as the response given to the question on the ideal number of family size one would like to have at the end of reproduction completion shows 25% of adolescents replied that they want to have more than four children.

The literacy status of the adolescents in the study group, measured with the level of education they have attended showed that, majority of them (85%) have lower literacy status. As an obvious consequence to adolescents low literacy level, the employment status was only one in four adolescents, and the contraceptive use rate was only 3.3%, and the alcohol use was quite common as the results suggests, which was 35.8% and khat chewing was only 4.6%, this figure is expected to rise sharply as the use of this green leaf psycho active drug is widely being practiced.

The most important factors influencing adolescent fertility in this study were age, marital status, region and educational level for all adolescents and for ever-married adolescent group, the most significant predictors of fertility were age, age at first marriage, region and ideal family size.

In conclusion of this study, the target of any form of interventions to reduce fertility in Ethiopia, focusing on adolescents should work towards increasing age of marriage, by creating awareness of the existing marriage and family law and enforcing the law, improve accessibility of sexual and reproductive health services to regions of the country which showed highest fertility and most importantly focus on improving the educational status of adolescents by increasing their school enrollment and working towards retaining girls in school for as long as possible.

In general adolescents in Ethiopia are faced with multiple interrelated challenges, and it is worsened by inadequate knowledge and skills, it looks like they are marching in to the rough sea of adolescence uninformed and unequipped, and it would be very wise to help these large proportion of the countries youth to inform and equip them with better knowledge and skills, which enables them to sail to the other side of the sea. Furthermore, this experience at young age would give them wisdom and confidence, for the rest of journey in life.

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