

**Trends in Fertility,
Reproductive, and
Maternal Health in
Ethiopia**
Summary of Key Findings

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Preface

Ethiopia, positioned as the second-most populous country in Sub-Saharan Africa and the twelfth globally, with an estimated population of nearly 120 million in 2023. The country's population exhibited an annual growth rate of 2.6%. Every year, approximately 3 million individuals were added to Ethiopia's populace, driving the potential for the nation's population to double within a span of roughly twenty-five years. Women of reproductive age constituted one-fifth of the total Ethiopian population, accounting for about 45% of all females. Ethiopia stood among the six countries responsible for over 50% of global maternal deaths. In recent decades, the nation exhibited progress across various human development measures, despite commencing from a modest starting point. It successfully achieved Millennium Development Goals in child mortality, primary education, and water accessibility. Notably, advancements were also notable in reproductive health, including reductions in maternal mortality, increased contraceptive usage, and greater utilization of healthcare services among women, especially for antenatal and delivery care.

The Ethiopia Health Sector Transformation Plan (HSTP) embarked on a mission to construct an efficient health system, striving for comprehensive and equitable universal health coverage, while maintaining acceptable quality. This journey needs to be guided by research and substantiated evidence to steer decision-making. The HSTP recognized the imperative to enhance decision-making processes through the creation, interpretation, and dissemination of evidence. This entailed activities such as research, surveys, surveillance, Health Management Information System (HMIS), and civil registration and vital statistics (CRVS), among others. Key national surveys, including the Ethiopia Demographic and Health Survey (EDHS), Ethiopia Mini Demographic and Health Survey (EMDHS), and Performance Monitoring and Accountability (PMA) surveys, played pivotal roles in offering data for a broad array of monitoring and impact indicators spanning Reproductive, Maternal, New-born, Child, Adolescents, and Youth (RMNCAHY) realms.

This analysis centred on elucidating elements such as Ethiopia's fertility patterns, family planning, adolescents' progression into adulthood, men's engagement in family planning, and maternal health conditions, emphasizing trends, disparities at sub-national levels, and influential factors. The findings of this analysis underpinned the formulation of programmatic recommendations. The selection of analytical topics was rooted in their relevance to programs and their potential to address critical data gaps. Furthermore, the selection process was influenced by recent compilations and accessibility of national data sources like EDHS (2000, 2005, 2011, 2016), EMDHS (2019), and PMA (2014-2018), which presented opportunities for in-depth analyses of RMNCHY matters within the country.

This combined report consolidates insights from six distinct reports, each focusing on a specific facet. The report is divided into six primary chapters:

Chapter 1 examines fertility trends, determinants, and policies that shape fertility in Ethiopia. It outlines policy and programmatic implications arising from findings to offer guidance to planners and policymakers in population and health programs, enhancing their grasp of the nation's fertility landscape.

Chapter 2 explores the dynamics of close and extended birth intervals, seeking a deeper understanding of their patterns, trends, and contributing factors. It also investigates the connection between birth intervals, fertility, and their impact on child health.

Chapter 3 scrutinizes the status and trends of contraceptive use, encompassing socio-economic and regional disparities in family planning practices, the mix of contraceptive methods employed, and the unmet demand for family planning. The chapter highlights programmatic implications derived from the analysis.

Chapter 4 utilizes available national survey data to examine the timing, sequence, and determinants of adolescents' progression into adulthood in Ethiopia. This entails exploring transitions to first marriage, initial sexual experiences, and first childbirth across historical cohorts, considering factors such as urban-rural disparities, education, region, and religion.

Chapter 5 delves into the role of men in fertility and family planning within Ethiopia. It studies trends in men's entry into marriage and fatherhood, along with their fertility preferences and desires, both individually and as partners. Moreover, it probes how couples' family size preferences influence contraceptive behaviors.

Chapter 6 examines trends and inequalities in the provision of crucial maternal health services, covering antenatal care, delivery assistance, and postnatal care. This chapter also addresses the policy and programmatic implications arising from these findings.

1. Ethiopia's Fertility Transition

The ramifications of high fertility extend beyond the health risks faced by both children and their mothers. It also diverts resources from investing in human capital, hinders economic growth, and amplifies environmental challenges. Nations marked by high fertility tend to lag behind in various development measures, a trend evident in their progress towards attaining the Millennium Development Goals (MDGs). Conversely, a slower pace of population growth can create an opportunity for rapid economic expansion, provided tangible strategies are implemented to educate and equip the surge of youth resulting from changing population structures due to declining fertility rates.

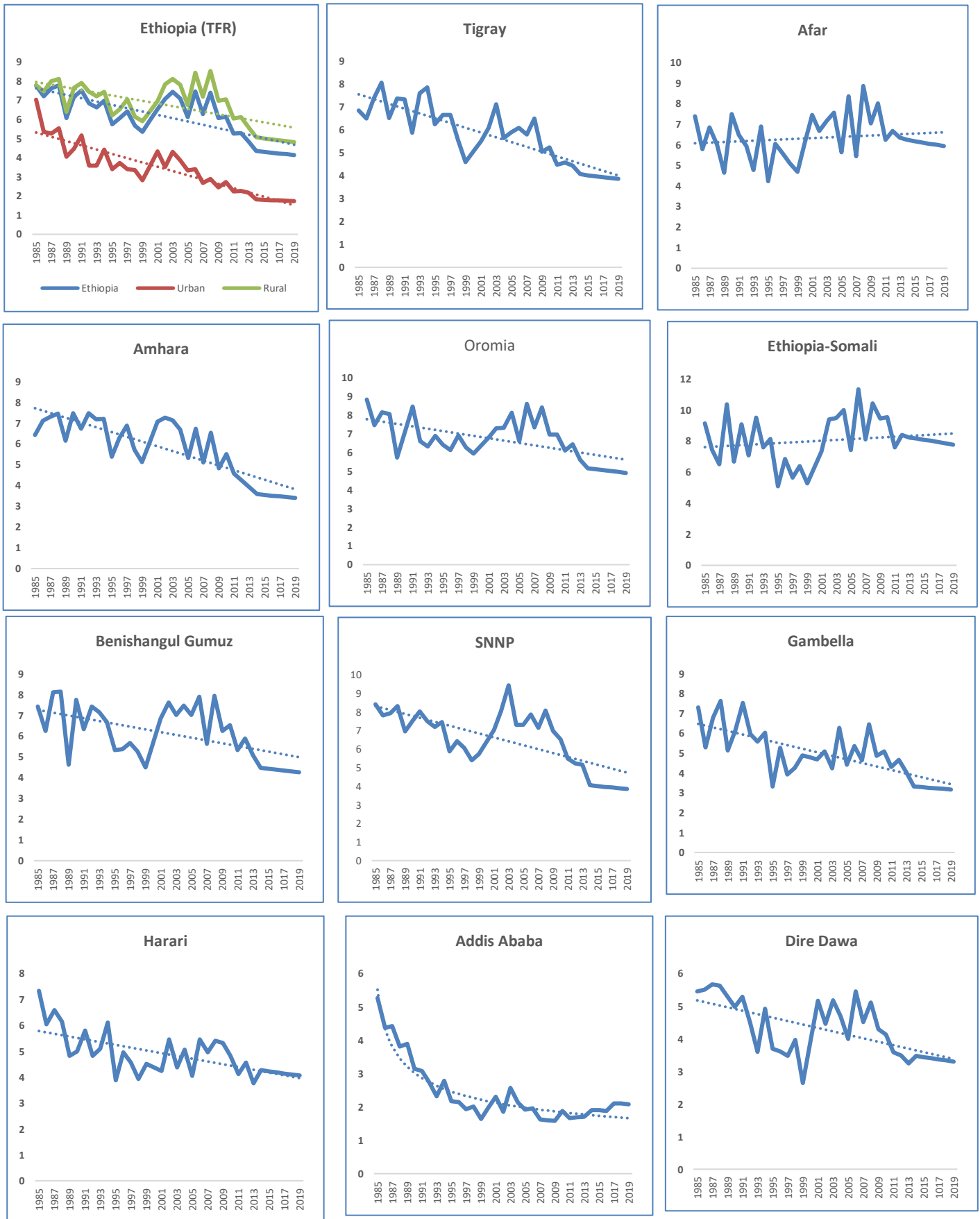
The Government of Ethiopia took a decisive step towards fertility reduction by adopting a National Population policy in 1993, envisioning a drop in the Total Fertility Rate (TFR) from 7.7 in the 1990s to 4 children per woman by 2015. This commitment has been renewed more recently through the nation's Growth and Transformation Plan-II (2016-2020) and the Health Sector Transformation Plan (2016-2020). The revised fertility target seeks a substantial reduction of TFR to 3 children per woman by 2020.

This study examined fertility trends, determinants, and the policies and programs influencing fertility within Ethiopia. The objective was to unravel the policy and programmatic implications arising from these findings, with the aim of providing insight to population and health program planners, as well as policymakers, enabling them to comprehensively comprehend the multifaceted fertility landscape of the country. The study primarily concentrated on two key aspects. Firstly, it delineated the historical and contemporary trends in national and regional fertility rates. Secondly, it identified the underlying, intermediate, and immediate factors impacting fertility. To trace fertility trends, the study employed all accessible fertility data since the 1960s. The primary data sources for analysis were the 2000, 2005, 2011, and 2016 editions of the Ethiopia Demographic and Health Survey (EDHS). The paper used the Poisson regression model to reconstruct fertility trends and differentials based on birth and exposure data. The revised Bongaarts model (2015) was employed to explore the immediate determinants of fertility.

Fertility Trends:

Over the past three decades, the Total Fertility Rate (TFR) has diminished by nearly two-fifths, plummeting from 7.5 children per woman in the mid-1980s to 4.1 children per woman in 2018 (see Figure 1.1). Evident regional disparities exist in both the levels and speed of fertility changes across the nation. The latest estimates reveal that TFR ranged from a sub-replacement fertility level of 1.9 children per woman in Addis Ababa to 7 children per woman in the Ethiopia-Somali region. A notable drop in TFR occurred between 2000 and 2016 in the Amhara and SNNP regions. The analysis of reconstructed fertility trends underscored Amhara's remarkable reduction, from 6.4 children per woman in 1985 to 3.5 children per woman in 2018, signifying a substantial decline of nearly 3 children over three decades. Similarly, the SNNP region witnessed a significant drop of nearly 3 children per woman during the same period, moving from a TFR of 7.8 in 1985 to 4.0 in 2018. Regions such as Benishangul Gumuz, Gambella, Oromia, and Tigray experienced modest fertility decline since 1985. Harari exhibited stalled TFRs at around 4 children per woman, while Dire Dawa remained around 3 children per woman. Ethiopia-Somali and Afar regions, however, demonstrated consistently high fertility over the three decades, hovering around 7 and 6 children per woman, respectively. Figure 1.1. Reconstructed Fertility trends, 1985-2018, Ethiopia

Figure 1.1. Reconstructed TFR trends by region: 1985-2019



Proximate determinants of fertility

Using the revised Bongaarts (2015) model, we estimated the indices of proximate determinants of fertility, namely the index of contraception, marriage, postpartum insusceptibility, abortion and primary sterility, for the years 2000 and 2016 [Table 1.1]. Because abortion and primarily sterility have the lowest fertility inhibiting effects (index values closer to 1) we shun away from presenting these indices. At the national level, the indices associated with postpartum insusceptibility (PPI) both in 2000 and 2016 have the lowest values, which is indicative of the greatest role played by PPI in reducing fertility from its biological maximum (natural fertility of 15.3 children per woman). Next to PPI, sexual activity/marriage appeared to have the most important fertility inhibiting effect. A closer look at the proximate determinants of fertility across regions sheds light into the roles of the different proximate determinants in driving fertility trends in the regions. The fastest fertility decline was recorded in Amhara region and the two proximate determinants that play the most important role for this are increase in contraceptive prevalence rate and decrease in the proportion sexually active and/or married women in the region. By contrast, the steadily high fertility in Ethiopia-Somali and Afar regions (>5 children per woman) is the result of the joint effects of low contraceptive use, high prevalence of marriage and shorter duration of postpartum insusceptibility. Low marriage rate coupled with high contraceptive prevalence rate determine the fertility of Addis Ababa. Stalling of fertility in Harari, for instance, occurred when the increase in contraceptive use was counterbalanced by the reduction in the duration of breastfeeding. Looking at the trends of these indices suggest that only the index of contraception has declined notably over the years, which suggests an increasing role of contraception for the decline in fertility in the country. Our analysis shows that the index of contraception was notably high at 0.92 in 2000, a reflection of the then low prevalence of contraceptive use in the country. By 2016, this has declined to 0.62 (a relative decline of 32.6% from the 2000), which mirrors substantial increase in contraceptive use over the years. In contrast, the index values of PPI increased slightly with a relative increase of 9.6% between 2000 and 2016. This slight increase is less favorable to fertility decline over the years. The indices for sexual activity/marriage remained nearly stable between 2000 and 2016 at 0.67. The other proximate determinants, abortion and sterility, not only have the lowest effect on fertility but also did not exhibit any trend over the years. Abortion rate is often difficult to measure precisely due to under-reporting by survey respondents.

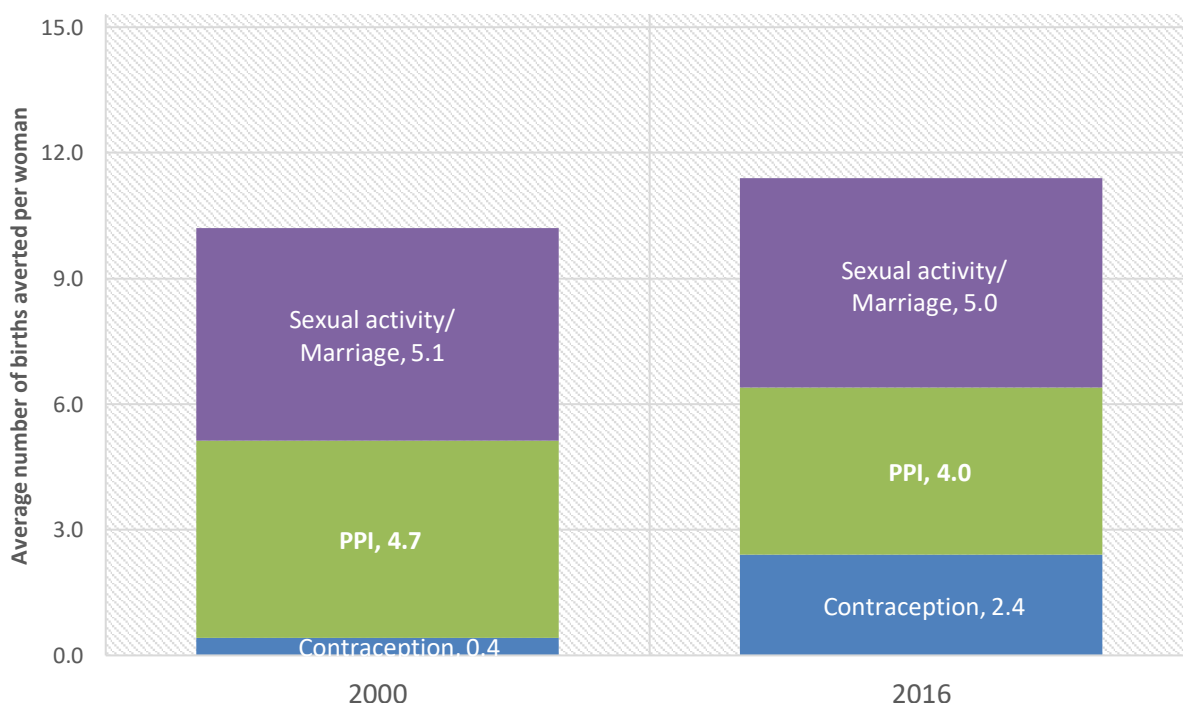
Table 1.1. Changes in the proximate determinant's indices and model estimated TFR between 2000 and 2016: Ethiopia

	Cs Index of sexual activity and/or marriage			Ci Index of postpartum insusceptibility			Cu Index of contraception		
	2000	2016	% Change	2000	2016	% Change	2000	2016	% Change
Ethiopia-Total	0.67	0.67	0.0	0.52	0.57	9.6	0.92	0.62	-32.6
Region									
Amhara	0.73	0.68	-6.8	0.49	0.51	4.1	0.93	0.5	-46.2
Gambella	0.79	0.71	-10.1	0.60	0.53	-5.4	0.87	0.63	-27.6
Addis Ababa	0.40	0.4	0.0	0.77	0.84	9.1	0.58	0.41	-29.3
Tigray	0.69	0.61	-11.6	0.51	0.58	13.7	0.90	0.62	-31.1
SNNP	0.67	0.67	0.0	0.55	0.57	3.6	0.94	0.58	-38.3
Oromia	0.66	0.72	9.1	0.56	0.59	5.4	0.94	0.7	-25.5
Benishangul Gumuz	0.72	0.72	0.0	0.56	0.56	1.8	0.92	0.7	-23.9
Dire Dawa	0.51	0.58	13.7	0.68	0.6	-11.8	0.73	0.68	-6.8
Harari	0.57	0.65	14.0	0.62	0.67	8.1	0.80	0.69	-13.8
Somali	0.67	0.72	7.5	0.75	0.72	-4.0	0.98	0.98	0.0
Afar	0.73	0.77	5.5	0.58	0.60	3.4	0.93	0.88	-5.4

NB. The other indices, Ca (index of abortion) & Cf (index of sterility) have their values close to 1 and remained nearly unchanged over the years, thus have little or no influence on the TFR

The proximate determinant model also permits the estimation of the number of births averted by each proximate determinant, as shown in Figure 2. In 2000, the proximate determinants combined predicted to avert on average 10.2 births per woman from the natural fertility of 15.3, which was shared across the three major proximate determinants as follows: 5.1 by sexual activity/marriage, 4.7 by PPI and 0.4 by contraception. In 2016, on average 11.4 children per woman were averted by the proximate determinants combined. Compared to the 2000 prediction, the number of births averted by sexual activity/marriage in 2016 remained unchanged at 5 children per woman; and similarly, that by PPI slightly decline to 4 children per woman in 2016 from 4.7 in 2000. On the other hand, the number of births averted by contraception has increased substantially from 0.4 in 2000 to 2.4 children per woman in 2016. This finding suggests that only the fertility inhibiting role of contraception has increased over the years while the roles of the other proximate determinants either remained unchanged or declined since 2000.

Figure 1.2. Number of births averted by the proximate determinants from the natural fertility (15.3 children/woman), 2000 & 2016, Ethiopia



Background determinants of fertility

We examined the background determinants of fertility using the most recent EDHS of 2016. We present two models as shown in Figure 1.2. In Model 1 only background determinants are included. Results of this model suggest that the number of children a married woman has is significantly shaped by her age, place of residence (urban or rural), region, her education, her husband's education, and religion (Table 3). As expected, women's age is associated positively and significantly with the number of children ever born. The number of children increased by 6% (IRR=1.06) with an increase of women's age by one year. Rural residents persistently exhibited higher fertility than their urban counterparts, as discussed elsewhere above in this report. The Model shown rural women appeared to have a 16% (IRR=1.16) higher fertility than their urban counterparts. The fact that rural residence carries significantly higher fertility levels even after adjusting for several socio-economic factors may well

suggest the presence unmeasured confounding factors that promote high fertility in the rural areas as well as the relatively limited access to information, services and lower utilization of family planning among the rural population.

As discussed, fertility varies greatly across regions in Ethiopia. The multivariate model revealed that after adjusting for urban/rural residence, women's education, their age, religion, women's work status, women in Addis Ababa were significantly less likely than women in the other regions to have had high fertility. The IRR ranged from 1.19 in Amhara to 1.57 in Ethiopia-Somali region, suggesting that whilst Amhara women were 19% more likely than their Addis Ababa counterparts to have high fertility; this was 57% higher in Ethiopia-Somali region. In Oromia and SNNP regions, women had a 40% and 41% higher likelihood of having high fertility, respectively, compared to women in Addis Ababa. The factors deriving fertility levels and trends in the regions cannot be fully understood. It may well be that unmeasured socio-cultural factors as well as the strength of family planning programs in the regions can contribute to these variations.

Compared to women with secondary or higher education, those women who cannot read or write were 89% more likely to have had high fertility. Having elementary education carried a 54% excess risk of high fertility. Keeping all other factors equal, being Muslim is significantly associated with high fertility. Compared to their Orthodox counterparts, Muslim women were found to be 10% more likely to have high fertility. Over three-quarter of the Ethiopia population are either Orthodox Christian or Muslim. The remaining comprises followers of protestant 23% and a tiny portion comprises other belief systems. The mechanism by which these religions influence fertility is not obvious to this present analysis but the findings confirms previous findings in Ethiopia and elsewhere¹. Part of the fertility differences across these religion groups was implicated to differences in contraceptive behaviors. Although the two major religions in Ethiopia, Orthodox and Muslims, do not openly approve the use of family planning, there has been persistently higher contraceptive use among the Orthodox women than the Muslims.

Model 2 added other variables, i.e. age at first marriage, the desired number of children and child death experiences along with the background factors. The addition of the intermediate variables in Model 2 results in a net reduction in the effects of the background factors on the number of children ever born (CEB). Indeed, background factors influence fertility partly through the intermediate determinants besides via the proximate determinants, such as contraceptive use and postpartum insusceptibility. One of the primary interests of this analysis is to understand how the intermediate determinants influence fertility and their role as drivers of fertility decline in the country. The multivariate analyses result in Model 2 suggest that early marriage, high desire number of children and child-death experience are independently and significantly associated with high number of children ever born.

¹ UNFPA. A decade of change in contraceptive use in Ethiopia. Addis Ababa. 2012.

Table 1.2. Log-linear Poisson Regression model adjusted Incidence Rate Ratio (IRR) and 95% Confidence Interval (CI) in the estimation of children ever born by selected variables. Married women, Ethiopia, 2016 DHS

	Model 1 N=38157		Model 2 N=38157	
	IRR	95% CI	IRR	95% CI
Current Age of women (an increase of 1 year)	1.06	(1.05-1.06)	1.05	(1.05-1.06)
Residence (Urban)				
Rural	1.16	(1.06-1.26)	1.13	(1.06-1.21)
Region (Addis Ababa)				
Tigray	1.33	(1.20-1.46)	1.18	(1.08-1.29)
Afar	1.31	(1.16-1.47)	1.16	(1.05-1.29)
Amhara	1.19	(1.08-1.32)	1.05	(0.97-1.15)
Oromia	1.40	(1.26-1.55)	1.30	(1.19-1.42)
Somali	1.54	(1.38-1.71)	1.42	(1.30-1.56)
Benishangul	1.37	(1.22-1.53)	1.23	(1.11-1.36)
SNNP	1.41	(1.27-1.56)	1.26	(1.15-1.38)
Gambella	1.27	(1.12-1.44)	1.10	(0.98-1.23)
Harari	1.30	(1.17-1.44)	1.22	(1.11-1.34)
Dire Dawa	1.27	(1.14-1.40)	1.14	(1.04-1.25)
Women education (Secondary +)				
No education	1.89	(1.74-2.04)	1.60	(1.49-1.72)
Primary	1.54	(1.44-1.64)	1.37	(1.29-1.46)
Husband education (Secondary +)				
No education	1.07	(0.99-1.14)	1.05	(1.00-1.11)
Primary	1.10	(1.44-1.16)	1.08	(1.03-1.13)
Women employment status (Working)				
Not Working	0.98	(0.95-1.01)	1.00	(0.97-1.02)
Household wealth quintals (Highest)				
Low	1.04	(0.99-1.07)	1.02	(0.98-1.06)
Middle	1.00	(0.95-1.05)	1.00	(0.96-1.05)
Religion (Orthodox Christian)				
Muslim	1.10	(1.04-1.17)	1.07	(1.01-1.13)
Protestant	1.02	(0.95-1.09)	1.03	(0.97-1.09)
Other	1.06	(0.95-1.17)	1.06	(0.98-1.14)
Age at marriage (18 + years)				
<18 years			1.32	(1.27-1.36)
Desired number of children (0-4)				
Ideal 5+			1.13	(1.10-1.17)
Ideal Non numeric			1.06	(1.02-1.10)
Experience of child death (No death)				
One or more child death			1.29	(1.25-1.34)

Reference category in parenthesis

Conclusion and programmatic implications

Ethiopia has come a long way in reducing fertility in the past three decades although it has not been able to meet the National Population Policy target of 4 children per woman by 2015. Decomposition of the trends in the proximate determinants of fertility suggest that increase in contraceptive use, especially in the last two decades, emerged as the single most important factor for the recent decline of fertility in the country. The decline was shared between the urban and rural areas although as expected urban fertility declined faster than rural fertility. Indeed, urban Ethiopia is at an advanced stage of fertility transition where the current TFR is closer to the replacement level. The duration of postpartum insusceptibility (PPI) is declining, which has offset possible further gains in fertility reduction and this is more vivid in some regions than others. Important background and intermediate factors for the recorded fertility decline in the country, as revealed by our analysis, include decline in the desired number of children, increase in age at marriage, increase in women's education and increase in urbanization.

Review of the different policies and plans suggests that past and present efforts to lower fertility in Ethiopia have been largely identified with the health sector. The Ethiopia Health Sector Transformation Plan (HSTP) and the Reproductive Health (RH) strategy of the Ministry of Health envisage reducing the TFR to 3 children per woman by 2020. Although the strategies to reach at this ambitious goal are not clearly stipulated in the policy documents, the fertility decline envisaged seems to rely heavily on fast increase of contraceptive use (to 55% by 2020) and reduction of unmet need for family planning from 24% to 10%. Given past TFR and CPR trends in the country, the scale of future fertility decline will depend largely on the increase in contraceptive use.

There are questions on which interventions can lead to targets for family planning as well as fertility within the stated short period. Supply-side efforts alone, such as expansion of the breadth and depth of family planning services, will not be sufficient to bring about the desired changes unless this is accompanied and complemented by efforts that can lead to lower desired family size. Promoting increase in age at marriage, increase in the duration of breastfeeding, improve child survival and increase in girls' education are also sound strategies. Finally, it has been over two and half decades since the adoption of the 1993 population policy of Ethiopia and it is a good time to appraise and revise the population policy based on evidence on current and future demographic realities, and align objectives with the GTP-II, HSTP and other national strategies. Policy and programs must also be cognizant of and responsive to the marked regional differences in fertility levels, trends and determinants for better outcomes.

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2. Inter-birth and open birth intervals in Ethiopia

Fertility control is largely based on parity-related limitation. Parity-independent limitation, on the other hand, includes any circumstances or forms of behaviour that reduce the probability of conception or increase the interval between births irrespective of the number of children that have been born². Any effective attempts to delay the next birth, whether parity related or not, should be counted as fertility control and this form of control is usually called spacing behaviour, in contrast to stopping behaviour³. Apart from its demographic rationale, birth spacing has been predominantly promoted for its health benefits. The World Health Organization [WHO] recommends a healthy and optimum birth-to-pregnancy interval of 24 months and this corresponds to a birth-to-birth interval of 33 months, assuming an average gestational age of nine months⁴.

Despite the importance of birth spacing behaviour of women for fertility transition and understanding women's reproductive intentions and motivations for contraceptive use, little is known about the levels and trends of birth spacing and its correlates and impact on fertility in Ethiopia. Using the four rounds of Ethiopia Demographic and Health Surveys (EDHS: 2000-2016), this study sought to examine close and open birth intervals to gain a deeper understanding of the pattern, trends, and covariates of birth intervals. We used Life-table Kaplan-Meier (KM) methodology to compute the median birth interval and the probability of having or not having birth within a given interval. Determinants of the lengths of the birth intervals were examined using multivariate techniques.

Inter-birth interval

Close to 40% of Ethiopia women had the next birth before the recommended minimum inter-birth interval of 33 months, with a median inter-birth interval of 38 months in 2016. National trend of the inter-birth interval has been either modest or stable over the past two decades, 36 months in 2000 and 39 months in 2019 [Figure 2.1]. For births occurring in 2015-2019, the median length of inter-birth interval ranged from 28 months in Ethiopia-Somali region to 52 months in Amhara, and the highest, 55 months, in Addis Ababa. Trends of inter-birth intervals also varied across regions. Between the first (EDHS 2000) and last (EDHS 2019) survey, there have been significant lengthening of the median inter-birth intervals, especially in Amhara (38 and 52 months), Addis Ababa (49 and 55 months) and Tigray regions (37 and 45 months). In the other regions, however, trends were either stable or declining. Of note, Afar and Ethiopia-Somali regions have seen a shortening of the median inter-birth interval in the past two decades [Figure 2.2].

² Coale, A. J., 1986, The Decline of Fertility in Europe since the Eighteenth Century as a Chapter in Demographic History, in: A. J. Coale and S. C. Watkins eds., *The Decline of Fertility in Europe* (Princeton University Press, Princeton NJ) 1-30.

³ Okun, B. S., 1995, Distinguishing Stopping Behavior from Spacing Behavior with Indirect Methods, *Historical Methods* 28, no. 2, 85-96.

⁴ Report of a WHO Technical Consultation on Birth Spacing. Geneva: World Health Organization; 2005.

Figure 2.1. Kaplan-Meier survival probabilities in the estimation of NOT having the next birth by months since the previous birth, 2000-2019, Ethiopia

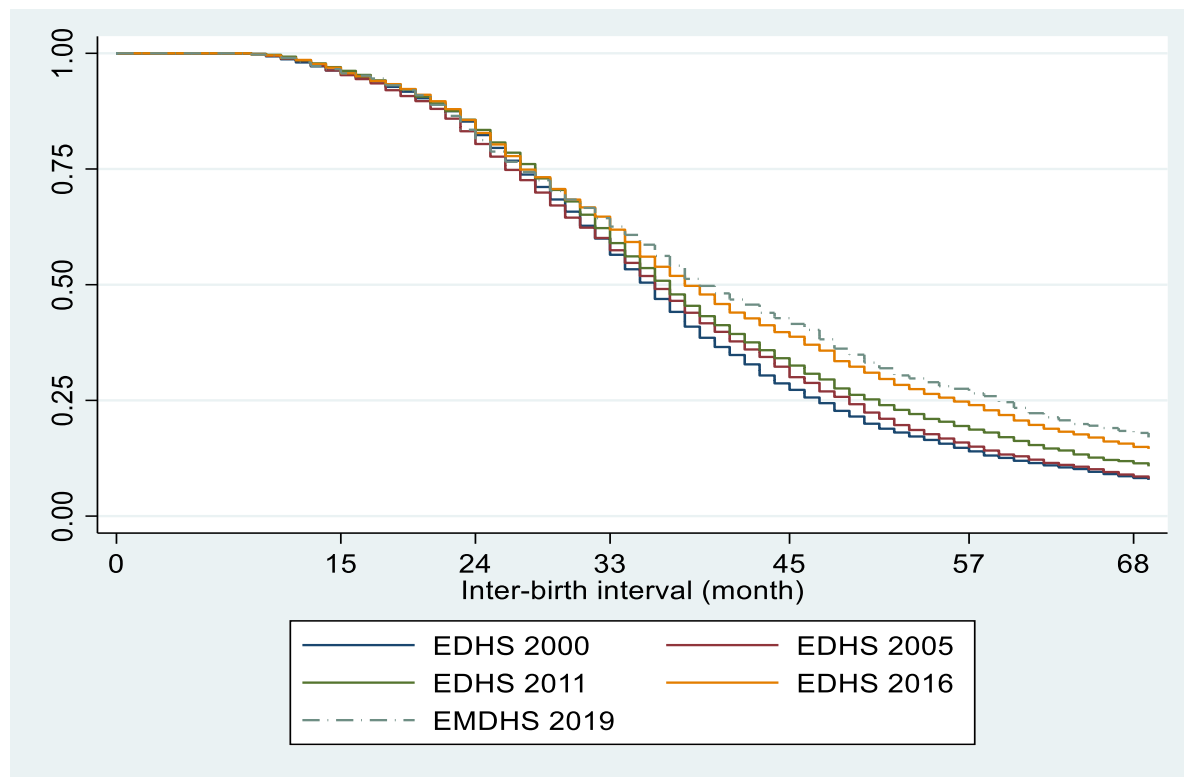
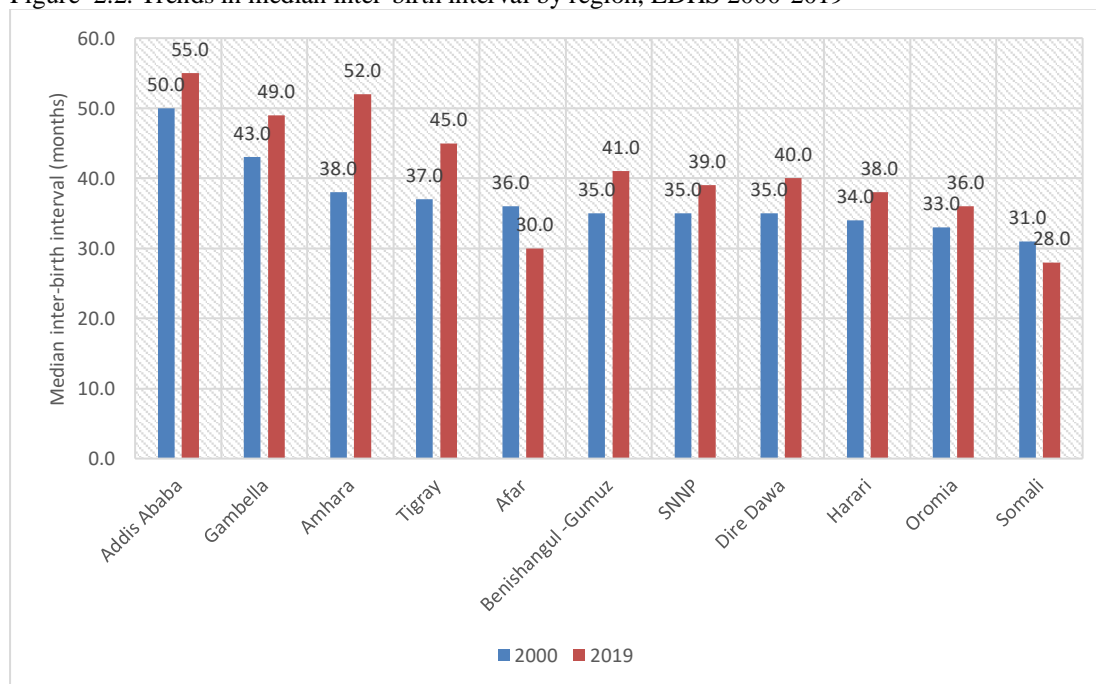


Figure 2.2. Trends in median inter-birth interval by region, EDHS 2000-2019



Determinants of inter-birth interval

Three separate multivariate Cox models are presented to estimate the hazard of having the next birth based on women's birth order [Table 2.1]. Model 1 restricts the analysis to women with birth order of one at the onset of the interval, and basically this analysis focuses on the interval from the first to the second birth. First, after controlling for several factors, the likelihood of having the second birth declined by 22% in 2019 compared to 2000. Significant predictors of first to second birth interval were region, urban/rural residence, preceding child survival status, and religion. Based on the hazard ratio estimates, the lowest probability of having the second birth for women with first order birth was found in Gambella (AHR=0.40), followed by Amhara (AHR=0.50) and Addis Ababa (AHR=0.51). On the other hand, Ethiopia-Somali region (a reference category in the model) exhibited the highest likelihood of having the second birth, and this was followed by Oromia (AHR=0.65), Dire Dawa (AHR=0.61); Benishangul Gumuz (AHR=0.60); and Harari (AHR=0.58). Urban women had a 38% lower likelihood of having a second birth compared to their rural counterparts. In the same model, the probability of having the second birth increased by 36% for women whose first child did not survive compared with those with surviving children.

Model 2 focuses on the sub-sample of women with birth order 2-3 at the onset of the birth interval. When compared to EDHS 2000, the probability of having the next birth among women with birth order 2-3 declined by 28% in 2019. Compared to Ethiopia-Somali region, all the other regions exhibited a relatively lower probability of the next birth, and almost similar pattern can be noted as in the case of the transition from first to second order birth. The effect of the survival status of the preceding child appeared even stronger in Model 2, in which the likelihood of having the next birth increased by 43% if the preceding child did not survive.

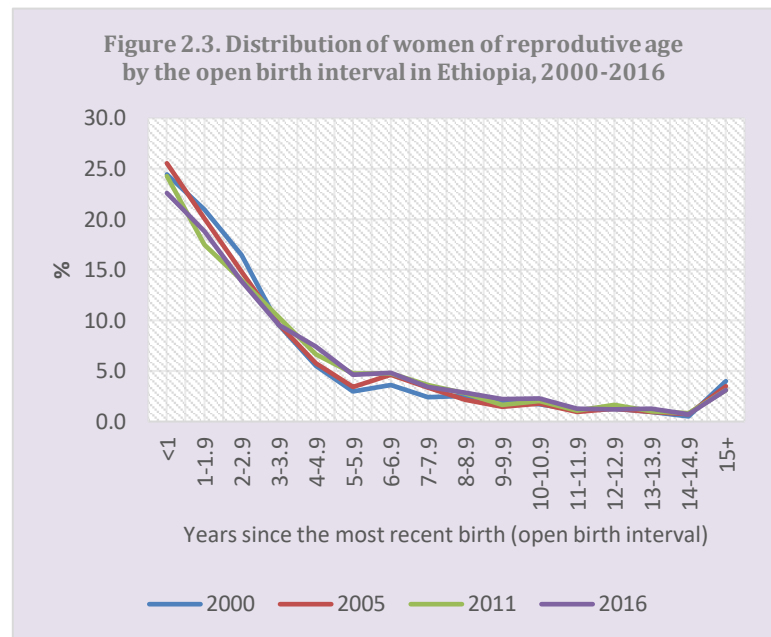
Finally, Model 3 presents the analysis for high parity women with birth order four or higher at the onset of the interval. Among women with high birth order there was a modest inter-birth interval decline over the years; the 2019 survey revealing a significant 11% decline in the probability of having next birth compared to the year 2000. Urban women with a birth order of four or more were 18% less likely than their rural counterparts to have had the next birth. In this model, women's age appeared to be associated with subsequent birth interval for high order births, and there was an inverse relationship between the likelihood of having the next birth and women's age at onset of interval. Younger women were less likely than their older counterparts to have had the next birth after they achieved a parity of four or higher. A 31% decreased likelihood of next birth was associated with having secondary or higher education in this model. Akin to the other models, for women with parity of four or higher the likelihood of having the next birth increased by 30% if the preceding child did not survive.

Table 2.1. Adjusted hazard ratio (AHR) in the estimation of next birth according to selected characteristics, Ethiopia

	Birth order at interval onset								
	1			2-3			4+		
	AHR	95% CI		AHR	95% CI		AHR	95% CI	
Upper		Lower	Upper		Lower	Upper		Lower	
Survey year (EDHS 2000)									
EDHS 2005	0.97	0.85	1.09	0.98	0.89	1.08	1.00	0.93	1.07
EDHS 2011	0.95	0.83	1.08	0.92	0.84	1.02	1.00	0.94	1.07
EDHS 2016	0.78	0.69	0.88	0.77	0.69	0.87	0.92	0.85	0.99
EMDHS 2019	0.78	0.67	0.92	0.72	0.63	0.82	0.89	0.80	0.98
Region (Ethiopia-Somali)									
Tigray	0.55	0.44	0.68	0.66	0.54	0.80	0.69	0.60	0.79
Afar	0.59	0.47	0.76	0.69	0.56	0.84	0.80	0.70	0.90
Amhara	0.50	0.41	0.62	0.56	0.46	0.67	0.57	0.50	0.64
Oromia	0.65	0.53	0.79	0.76	0.64	0.91	0.75	0.67	0.84
Benishangul-Gumuz	0.60	0.48	0.75	0.71	0.59	0.85	0.69	0.61	0.78
SNNP	0.58	0.46	0.73	0.67	0.55	0.81	0.66	0.58	0.75
Gambella	0.40	0.32	0.50	0.57	0.47	0.70	0.59	0.51	0.69
Harari	0.58	0.47	0.72	0.76	0.62	0.93	0.83	0.73	0.95
Addis Ababa	0.51	0.41	0.64	0.60	0.49	0.74	0.54	0.43	0.67
Dire Dawa	0.61	0.49	0.75	0.70	0.57	0.85	0.77	0.66	0.89
Residence (Rural)									
Urban	0.62	0.53	0.73	0.68	0.61	0.76	0.81	0.72	0.90
Age at onset of interval (35-49 years)									
<20	1.09	0.69	1.70	0.83	0.68	1.01	0.52	0.33	0.82
20-24	1.27	0.81	1.98	0.96	0.81	1.15	0.68	0.61	0.76
25-34	1.28	0.81	2.04	0.94	0.79	1.12	0.88	0.84	0.93
Immediately preceding child survives (Yes)									
No	1.36	1.16	1.59	1.43	1.24	1.65	1.30	1.19	1.42
Education (no education)									
Elementary	1.07	0.97	1.19	0.99	0.92	1.06	1.00	0.93	1.08
Secondary +	1.04	0.89	1.22	0.91	0.77	1.08	0.69	0.51	0.95
Religion (Others)									
Orthodox Christian	0.72	0.55	0.95	1.01	0.83	1.22	0.86	0.77	0.96
Moslem	0.83	0.63	1.09	1.21	0.99	1.47	1.02	0.91	1.14
Protestant	0.80	0.61	1.04	1.13	0.94	1.36	0.99	0.89	1.11

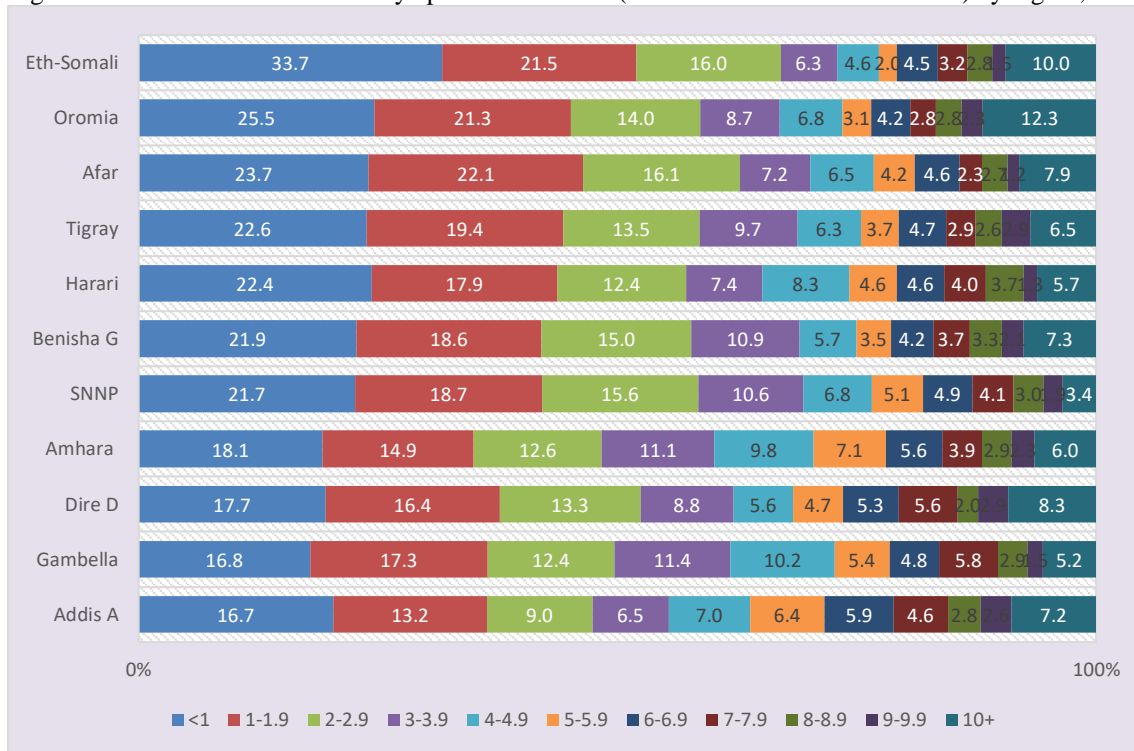
Open birth interval

We explored open birth interval as a gateway to understand and characterize women according to their reproductive status, fertility intentions, contraceptive behaviours, and the unmet need for family planning. Our data show that of all Ethiopia women with one or more live births, over half (55.3%) of them were in the open interval within less than three years away from their most recent birth [Figure 2.3]. Those within an open interval of one year were 22.6% and 41.3% were in the open interval within two years of the most recent birth. The open birth interval, especially among women within less than three years from the most recent birth, can be an entry point to identify women for targeted intervention and tamper with subsequent birth interval.



Regional variations in the distribution of women by open birth interval are apparent [Figure 2.4] and this variation parallels the regional disparities in TFR. The proportion of women who were in their first year (after most recent birth) range from 16.7% in Addis Ababa to 33.7% in the Ethiopia-Somali region. Relatively lower proportion for the same can be seen in Gambella (16.7%), Dire Dawa (16.8%), and Amhara (17.7%) regions. On the other hand, high proportion of women who clustered around first year after birth can be seen in Oromia (25.5%) and 23.7% in Afar. These regions are also known for high fertility. Similar pattern also holds for those women within less than the second years after the most recent birth.

Figure 2.4. Distribution of women by open birth interval (time since the most recent birth) by region, EDHS 2016



Open Birth Interval and reproductive health status

Data on open birth interval can inform policy and programs in family planning and reproductive health. For instance, tracking the proportion around the first year from birth informs the potential need for postpartum family planning in the population, especially in the allocation of the services needed, such as postpartum services, and early contraceptive services⁵. Monitoring the open interval along with the absolute numbers of women within the various intervals is important for program planning. Women in the open interval can be sub-divided into different mutually exclusive categories based on their reproductive status. This section concerns this classification and its implication for programming. As suggested in the literature, the women were classified into six groups based on their reproductive health status and behaviours: (1) Amenorrhic, (2) Current use of any family planning method, (3) Unmet need and intend to use family planning, (4) Unmet need, but does not intend to use family planning, (5) No unmet need and intend to use family planning, and (6) No unmet need, but does not intend to use family planning

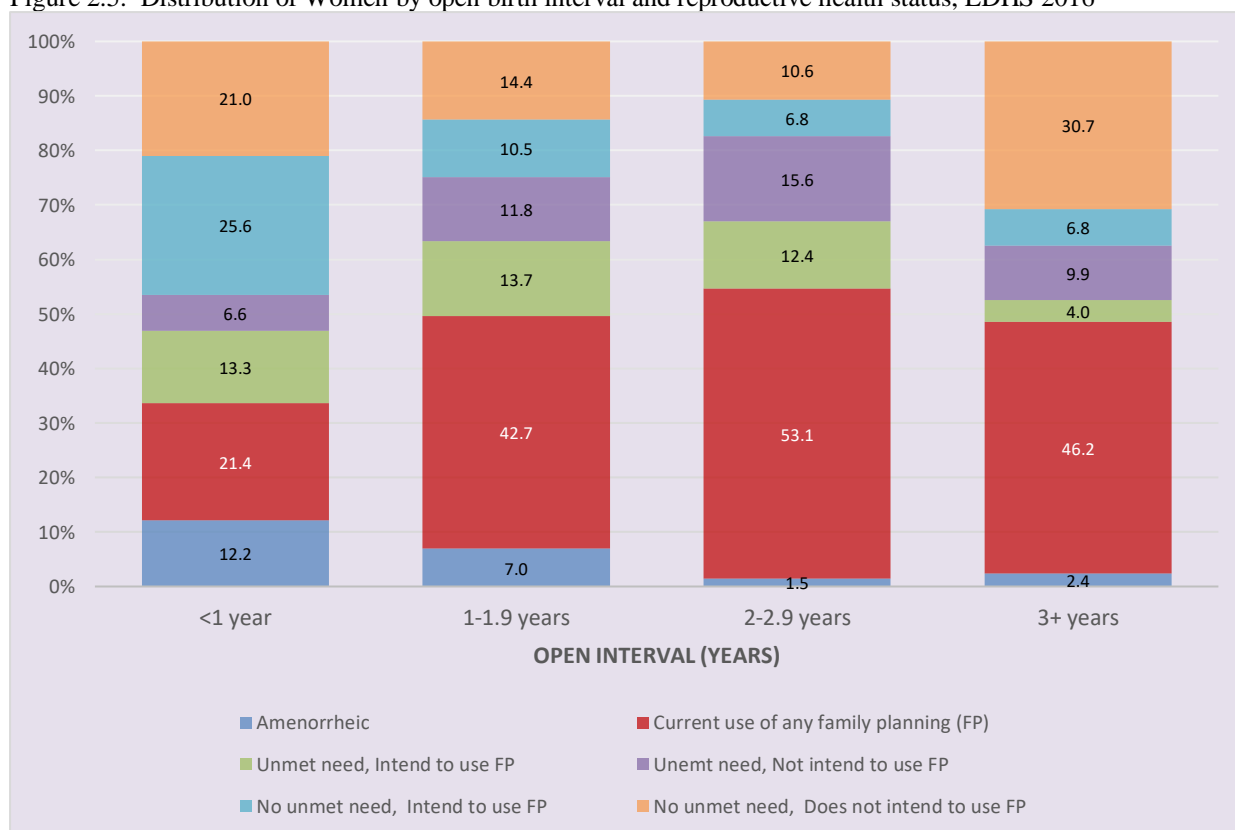
Figure 2.5 presents the distribution of women by open birth interval and reproductive health status according to the interval since the most recent birth. The open birth interval was categorized into four groups: (1) <1 year (most recent birth 1 year ago); (2) 1-1.9 year (most recent birth 1-1.9 years ago); (3) 2-2.9 years (most recent birth 2-2.9 years ago); and (4) 3 + years (most recent birth after 3 or more years). For programmatic relevance we focus on the first three categories, which correspond with the WHO recommendation of minimum birth interval. According to the EDHS 2016, among women in the first year after birth, 12.2% were Amenorrhic, and 21.4% were using contraceptive. These two groups together constitute a third (33.6%) in the category who avoided pregnancy or those who were not at risk of pregnancy.

⁵ Ross J, Bietsch K. The open birth interval: a resource for reproductive health programs and women's empowerment. *Glob Health Sci Pract.* 2019;7(3):355-370. <https://doi.org/10.9745/GHSP-D-19-00056>

In the first year after birth, about 20% had unmet need for family planning, and of whom 13.3% intended to use family planning while 6.6% did not intend to use family planning. Besides, a quarter (25.6%) of the women without unmet need intended to use family planning. By adding the two groups, i.e. (1) unmet need among those who intends to use family planning (13.3%) and (2) those without unmet need who intended to use family planning (25.6%) resulted in a higher proportion at 38.9% than the total unmet need. There is a clearly high demand for family planning in the first year after birth and program needs to identify these women and tap into their needs, especially via postpartum family planning programs. A little bit over a fifth of the women in the first year after birth (21%) did not intend to use family planning at all. Naturally, these women are more likely to have short birth interval. Programmers may want to understand the profile of women falling in this category and the reasons for not using family planning.

The second and third years after birth are also relevant for programmers and service providers. In the second and third year after birth the role of amenorrhea diminishes while contraceptive use becomes critical to postpone or stop childbearing. Among those women who had their most recent birth 1-1.9 year ago (or in the 2 year of open birth interval) the majority, 42.7% are practicing contraception, only 7% were Amenorreic. Together, 49.7% in this category were avoiding pregnancy. There were 13.7% with unmet need who intended to use family planning and another 10.5% without unmet need but intended to use family planning, and these two categories together these make up to 24.2% potential family planning users. Of note, 14.4% did not have unmet need and are not intending to use family planning and, at the same time, 11.8% with unmet need were not intending to use family planning. The same pattern can be noted for women who were within 2-2.9 years from birth.

Figure 2.5. Distribution of Women by open birth interval and reproductive health status, EDHS 2016



Conclusion and programmatic implications

There are compelling justifications for instituting intervention that focuses on the lengthening of birth interval in Ethiopia. Addressing a short birth interval has both health and demographic rationale as Ethiopia has long sustained high levels of fertility, child mortality, and undernutrition. At the policy level, there is a need to elucidate the health and demographic benefits of lengthening a birth interval and devise strategies to help promote optimum birth spacing among Ethiopian women. Although the Ethiopian Child Survival Strategy recognizes inadequate birth spacing among the factors influencing child survival, it did not provide further details on how to address the issue and lacked programmatic actions. In this analysis we have observed at least four distinct regional patterns that may have programmatic importance for region-specific approaches to address short birth intervals. Any policy actions on birth spacing in Ethiopia needs to consider such differences in formulating region-specific actionable strategies.

Family planning providers can assess the open birth interval of a woman and her underlying reproductive behaviours such as contraceptive behaviours, amenorrhea, and fertility intentions during any contact in a health facility to provide the necessary advice on subsequent birth spacing and the use of most appropriate family planning method including breastfeeding. Besides, it is relevant to focus on women with high parity (4 or more children), women with little or no education, and those whose most recent birth did not survive, as these women, in particular, have exhibited shorter birth intervals than the others.

As in most traditional African societies, prolonged periods of breastfeeding and post-partum abstinence were common practices in most cultures in Ethiopia, which helps prolong birth interval. Recently, however, with the increased urbanization that is coupled with erosion of such traditional norms, the median length of Postpartum Insusceptibility (PPI) has been trending downward – from 19.6 months in 2000 to 15.5 months in 2016. Therefore, efforts to promote optimum birth spacing should also build on existing cultural norms and practices that lead to lengthening of birth interval. This can be possible through community mobilization and engagement.

Finally, fertility in a population has been primarily monitored by the TFR, albeit its drawbacks. In addition to TFR, monitoring the most recent inter-birth interval, stratified by birth order, as well as the open birth interval, will undoubtedly improve our understanding of fertility patterns and trends at the national and sub-national levels as well as across population groups.

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3. Family planning in Ethiopia: trends and sub-national variations

Promotion and use of family planning in countries with high birth rates has the potential to avert a third of all maternal deaths and nearly a tenth of childhood deaths, thus contributing substantially to women's empowerment, achievement of universal primary schooling, and long-term environmental sustainability⁶. In the past 50 years, family-planning programs have played a major part in raising the prevalence of contraceptive use from less than 10% to 64% and reducing fertility in developing countries from six to about three births per woman⁷. Yet, today more than 200 million women and girls in developing countries who do not want to get pregnant lack access to contraceptives, information, and services – which, for many, pregnancy or childbirth could also cost them their lives⁸. Women of reproductive age make up one-fifth of the total population of Ethiopia and about 45% of the female population. The health status of women in Ethiopia remains poor; with the probability of an adult Ethiopian woman dying from a maternal cause during her reproductive lifespan about one in 40⁹. Ethiopia is also one of the six countries in the world which have contributed to more than 50% of all maternal deaths across the world¹⁰.

With the overall aim of understanding the family planning situations in Ethiopia, this paper focuses on the status and trends of contraceptive use; the socio-economic, regional inequalities in family planning practices; contraceptive method mix; and the unmet need for family planning. It also identifies and discusses key factors for the recorded increased contraceptive prevalence rate (CPR) in the country in recent years. It also outlines programmatic implications of findings emerging from the analysis. The analysis was based on available survey data since 1990; the major sources of the primary analysis being the 1990 family and fertility survey, the four rounds of the Ethiopia Demographic and Health Surveys (DHS) of the years 2000, 2005, 2011 and 2016.

Trends in Contraceptive Prevalence Rate (CPR)

In the last three decades Ethiopia has recorded success in increasing access to and utilization of family planning services and, as a result the country is considered a family planning success story in sub-Saharan Africa¹¹. The modern contraceptive prevalence rate (CPR) increased by 15 times in the last quarter of the century from 2.8% in 1990 to 40.5% in 2019 [Figure 3.1]. The national family and fertility survey (NFFS 1990) reported a contraceptive prevalence rate of 4.8%, of which only 2.8% were practicing modern methods¹². In 2000, the first Ethiopia Demographic and Health Survey (EDHS) collected data that allow estimation of CPR and other indicators at the national and regional levels. At the time, the contraceptive use rate was estimated at 8.1%; and the modern CPR was 6.3%. This was followed by the 2005 DHS that reported a CPR of 14.7% and in 2011 the country recorded a CPR of 28.6%. The most recent data from the 2019 EMDHS put the current rate at 40.5%. About 98% of the contraceptive users in 2019 were practicing modern methods.

⁶ Cleland J, Bernstein s, Ezeh A, et al. 2006. Family planning: the unfinished agenda. The Lancet Sexual and Reproductive Health Series.

⁷ United Nations, Department of Economic and Social Affairs, Population Division. 2015. Trends in Contraceptive Use Worldwide 2015 (ST/ESA/SER.A/349).

⁸ <http://www.londonfamilyplanningsummit.co.uk/>.

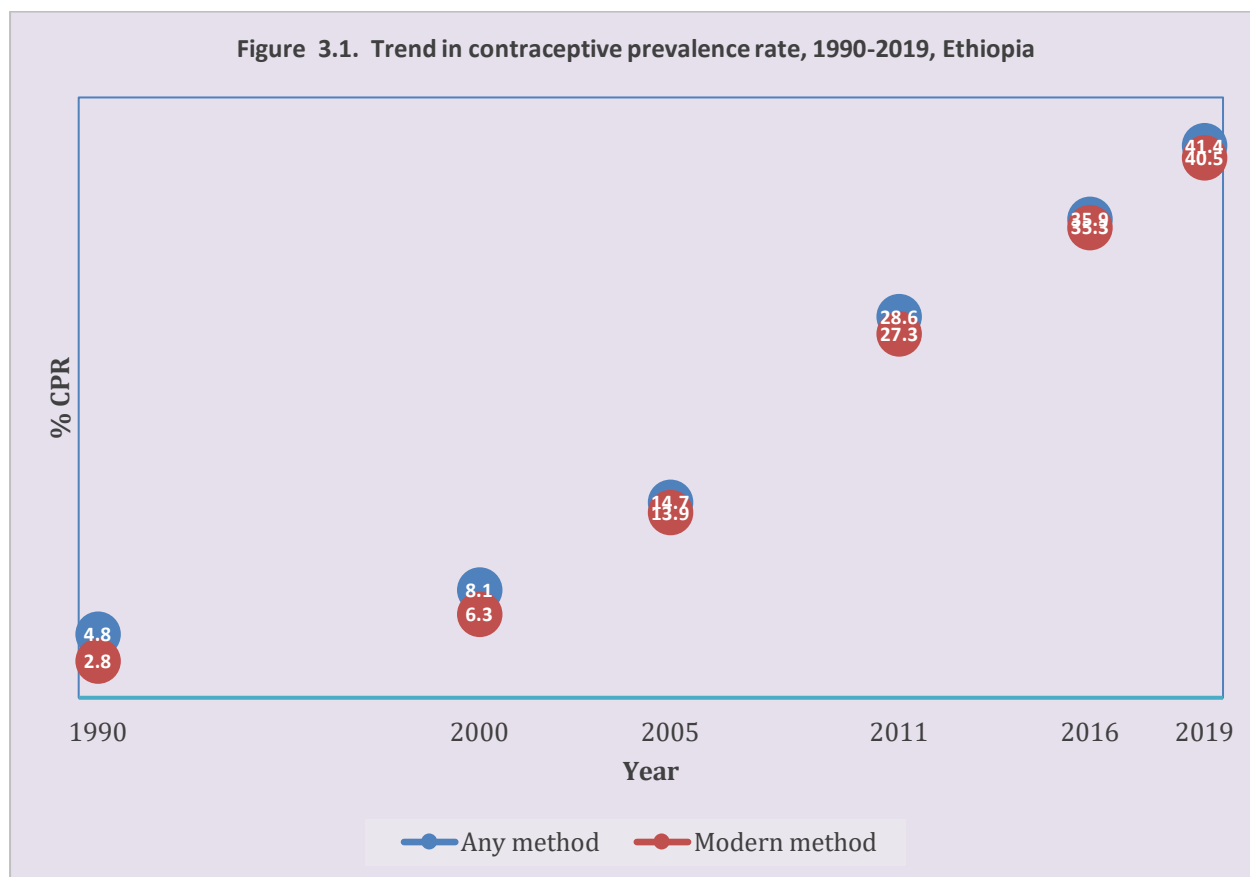
⁹ World Health Organization. 2010. Trends in Maternal Mortality 1990–2008. http://whqlibdoc.who.int/publications/2010/9789241500265_eng.pdf.

¹⁰ Yifru B, Asres B. Review Story Of The Past 30 Years Of Maternal Mortality In Ethiopia: A story of thr past 30years. 2014. Ethiop J Health Sci. Special Issue September 2014

¹¹ USAID. 2011. Three Successful Sub-Saharan Africa Family Planning Programs: Lessons for Meeting the MDGs.

¹² Central Statistical Authority. 1990. National Family and Fertility Survey. Addis Ababa

Figure 3.1. Trend in contraceptive prevalence rate, 1990-2019, Ethiopia



Decomposition of changes in contraceptive use in the last decade

In this section the interest of the analysis was to identify the factors or characteristics that explain the dramatic increase in contraceptive use in the last decade using the Oaxaca decomposition model. Although Ethiopia began to implement the DHS since 2000, the surveys were more consistent in terms of comprehensiveness and wording of several questions since 2005. We focused on decomposing trends in CPR for 2005 and 2019. The contraceptive prevalence rate increased by 26.7 percentage points between the years 2005 (14.7%) and 2019 (41.4%). The Oaxaca decomposition model allows us to unravel difference in contraceptive use between the two periods that are due to changes in the composition (endowments) of the female population, in their contraceptive behaviour (effects/coefficients) and the contributions of both sources (interaction). It also helps to identify the contributions each of the explanatory variables included in the model in terms of the changes in compositions of women's characteristics, the changes in the effect of those characteristics and the interaction of the two. Details about the Oaxaca model can be found elsewhere¹³. Here we present the results of the model in Table 3.1 and 3.2.

¹³ Oaxaca R. 1973. Male-female wage differentials in urban labour markets. *International Economic Review*; 14 [3]:.693–709

Findings in Table 3.1 reveals that the overall increase in contraceptive use that is explained by the effects of the change in behaviour (coefficients) is much higher than that explained by the changes in the composition of the women population (endowment). Contraceptive use increased by 23.0 percentage points during 2005-2019 due to the effect of the coefficients (i.e. change in behaviour) while only 6.1 percentage points of the change was due to compositional effects. This can be interpreted differently as: if the behaviour of the women had not changed during the period 2005-2019, current contraceptive use rate would have been 23 percentage points lower. In terms of contribution to the overall increase in contraceptive, positive behavioural changes towards contraceptive amongst the female population appears to be responsible for 86.1% (=23.0/26.7) of the overall increase in contraceptive use in the last decade. A little bit over a fifth (22.8% = 6.1/26.7) of the increase in the overall CPR during the period was due to compositional changes. The negative value (-2.4) of the interaction between the endowment and coefficient is not statistically significant.

Table 3.1. Mean value of CPR predicted between 2005 and 2019 (*Oaxaca logit-Model*), Ethiopia

Overall	Coeff. (x100)	Sig.
group_1: 2019	41.4	0.000
group_2: 2005	14.7	0.000
Total Difference	26.7	0.000
Difference due to endowment	6.1	0.000
Difference due to coefficient	23.0	0.000
Difference due to interaction	-2.4	0.084
group_1: 2019	41.4	0.000

The contribution of the different independent variables to the overall increase in contraceptive use varies substantially from one variable to another and, within the categories of the variables [Table 3.2]. Looking at the roles of individual variables to the overall increase in contraceptive use, and keeping all other factors constant, notable positive changes towards contraceptive receptiveness can be noted among rural women, and those women who cannot read or write. Table 2 shows that about 23% of the overall increase in contraceptive use during 2005-2019 was due to the increased use of contraceptive by rural women, and 6.2% by those women with no education (or those who cannot read or write). The negative effects on contraceptive increase that was associated with decreased receptiveness to contraceptive use among the Muslims can be apparent, as revealed by a negative and significant coefficient value (-13.9 percentage points). Stated differently, if Muslim women had behaved the same way as the Orthodox in terms of their contraceptive behaviour during 2005-2019, the overall contraceptive prevalence rate would have increased by 13.9 percentage points.

Two compositional changes were identified as playing their parts for some part of the overall increase in contraceptive use in the last decade, namely, increased women's education and increased urbanization. Of note, 12% increase in contraceptive use was associated with increased urbanization and another 12% was associated with decline in the proportion of women who cannot read or write (in other words increase in the proportion of women that have some level of education). The proportion of women who cannot read or write declined from 65.9% in 2005 to 40.4% to 2019. In contrast, the proportion of women with primary education increased from 22.2% to 41.6; and those with secondary or higher education from 11.9% to 18% during the same period. Urban population grew by an absolute of 14.5% during the period 2005-2019 - from 17.7% to 32.2%. These compositional changes in terms of increased urbanization and women's education played important roles in the recent surge in CPR in the country.

In summary, although we couldn't provide solid justifications as to why women with some characteristics or backgrounds were more receptive to contraception than the others, the findings suggest that the recorded increase in contraceptive use in the country during 2005-2019 was not shared equally among different socio-demographics and there have been clear disparities in regards to family planning trends across urban-rural residence, education and religion groups. It is likely that the sections of the women population that have displayed positive behavior towards family planning either

implemented their unsatisfied demands for fertility regulation or implemented a new reproductive behaviour that is favourable to contraceptive use or a combination of the two. Though to a lesser extent, changes in population composition in relation to female education and urbanization also contributed to the recent increase in contraceptive use. There could be different possible pathways by which these social changes influence contraceptive use but we posit here that this has been happening predominantly due to the adoption of behaviours favouring lower number of children and there by increased need for fertility regulation

	Endowments (x 100)	Coefficient (X100)	Interaction (x100)	% Contribution		
				Endowments	Coefficient	Interaction
Residence				[11.98]	[23.16]	[-10.09]
Urban	1.60**	-0.83*	-1.34*	5.99	-3.11	-5.04
Rural	1.62**	7.01**	-1.35*	5.99	26.27	-5.04
Living children				[-0.91]	[-0.16]	[0.09]
<=2	-0.18*	0.40	0.06	-0.68	1.50	0.23
3-4	-0.01	0.64	-0.09	-0.05	2.40	-0.34
5+	-0.05	-1.08*	0.05	-0.18	-4.06	0.20
Age				[-0.04]	[1.96]	[0.08]
15-29	0.01	-0.36	-0.01	0.03	-1.36	-0.05
20-24	-0.04	0.95*	-0.06	-0.14	3.56	-0.22
25-34	0.01	1.81*	0.06	0.03	6.76	0.23
35-49	0.01	-1.87*	0.03	0.04	-7.00	0.11
Education (women)				[12.12]	[7.65]	[0.54]
Cannot read or write	2.86***	1.65	-0.56	10.70	6.19	-2.11
1-6 grade	-0.37	0.88*	1.18*	-1.39	3.29	4.40
7 + grade	0.75***	-0.49*	-0.47*	2.80	-1.84	-1.75
Wealth				[1.22]	[-2.21]	[-0.49]
Low	0.13	-0.26	0.02	0.50	-0.96	0.06
Middle	0.00	0.69	-0.04	0.01	2.57	-0.16
High	0.19	-1.02	-0.10	0.72	-3.82	-0.39
Religion				[-1.31]	[-7.98]	[0.51]
Orthodox	-0.28	0.66	-0.10	-1.04	2.46	-0.38
Muslim	0.00	-3.70***	0.03	0.01	-13.87	0.10
Protestant	-0.11	0.68	0.33	-0.40	2.54	1.24
Others	0.03	0.24	-0.12	0.13	0.89	-0.46

p<0.05; **p<0.001, ***p<0.0001;

@ visited at home by health worker who talked about family planning (last year) or told about family planning by a health workers in health facility (last year). Coef. = measures the CPR value (in percentage points) that is associated with each variable and adds up to give the overall differences in CPR between 2005 and 2016.

Regional CPR Trends

The 2019 Mini-DHS revealed huge disparity in CPR across regions from 3.4% in Ethiopia-Somali to 49.5% in Amhara [Table 3.3]. Next to Amhara, Addis Ababa had the highest modern CPR in 2019 at 47.6%. Regions with notably high CPR also include SNNP (44.6%), Oromia (38.9%), Benishangul Gumuz (36.7%), Tigray (36.3%) and Gambella (33.2%). These differentials persist from the previous surveys. Except for Addis Ababa and the few urban-based regions such as Dire Dawa and Harari, most regions had largely similar CPR values back in 2000. On the one hand, the major regions including Oromia, Amhara, and SNNP had low and similar CPR values that ranged from 4.4% to 6% in 2000. On the other hand, relatively higher CPR values in the range of 18-35% were reported in Addis Ababa, Dire Dawa and Harari regions in 2000.

In the last two decades, with the exception of Ethiopia-Somali, modern contraceptive use has shown some level of increase or stable trends between 2000 and 2019 in most of the regions of the country. The most dramatic increase (in absolute percentage) was recorded in Amhara region from a low of 6.6% in 2000 to 49.5% in 2019 (absolute change, 42.9%). The recorded change in the Amhara region should be emphasized because the region now ranks first out of the 11 regions in terms of its CPR compared to a rank of 8th back in 2000. Next to Amhara, a substantial increase in CPR (absolute increase of 39.6%) was recorded in SNNP from 5% to close to 44.6%. An absolute increase in CPR that was in the range of 20-35% recorded in Tigray, Oromia, Gambella and Benishangul Gumuz. There appears a slow or stabilization of recent trends in CPR in Dire Dawa, Harari and Addis Ababa. Contraceptive use is strikingly low in Ethiopia-Somali, as the most recent DHS revealing only a tiny portion of the women (3.4%) were using modern methods in 2019.

Region	DHS /Mini-DHS Year					Absolute change (%) CPR				Average (%) change per annum (2000-2019)
	2000	2005	2011	2016	2019	2000-2005	2005-2011	2011-2016	2016-2019	
Amhara	6.6	15.7	33.0	46.9	49.5	9.1	17.3	13.9	2.6	2.3
SNNP	5.0	11.4	24.7	39.6	44.6	6.4	13.3	14.9	5.0	2.1
Tigray	9.6	16.2	21.2	35.2	36.3	6.6	5.0	14.0	1.1	1.4
Oromia	4.4	12.8	24.9	28.1	38.9	8.4	12.1	3.2	10.8	1.8
Gambella	12.8	15.8	33.2	34.9	33.2	3.0	17.4	1.7	-1.7	1.1
Benishangul Gumuz	8.4	10.4	26.3	28.4	36.7	2.0	15.9	2.1	8.3	1.5
Addis Ababa	34.5	45.2	56.3	50.1	47.6	10.7	11.1	-6.2	-2.5	0.7
Harari	18.7	29.1	31.5	29.3	30.3	10.4	2.4	-2.2	1.0	0.6
Dire Daw	24.1	31.5	31.7	29.1	30.3	7.4	0.2	-2.6	1.2	0.3
Afar	7.4	6.0	9.0	11.6	12.7	-1.4	3.0	2.6	1.1	0.3
Ethiopia-Somali	2.4	2.7	3.8	1.3	3.4	0.3	1.1	-2.5	2.1	0.1

Contraceptive Method mix

Measuring progress in meeting the demand for family planning requires not only attention to levels and trends in contraceptive prevalence and unmet need for family planning but also assessment of the

diversity of contraceptive methods used¹⁴. It also provides information on whether women are using contraceptive methods that are suitable for their fertility preferences.

Contraceptive method mix in Ethiopia is in general highly skewed to few methods although recent trends suggest an increase of implants in the country between 2000 and 2019 [Figure 3.2]. Over 93% of the contraceptive use in 2019 accounted for three methods – Injectables, implants and pills. Injectables contributed the larger share, accounting for 67.9% of all contraceptive use in 2019. Furthermore, its share has grown remarkably in the last 25 years - from almost nil in 1990, to 48% in 2000, 72% in 2005, 76.1% in 2011 and 64.8% in 2016. Nevertheless, there is a recent decline in the share of Injectables from 76.1% in 2011 to 67.9% in 2019. Ethiopia is not unique to this pattern as Injectables use has also been on the rise in most African countries in the last decade¹⁵, which is largely attributable to its widespread accessibility as well as its appropriateness for covert users¹⁶.

In recent years, the country has seen an increase use of Norplant/Implants/Implanon. The 2011 DHS revealed for the first time that Implants has become the second most practiced contraceptive method in the country although its contribution to the total CPR was only 12.5% at the time. Interestingly, Implants' share has increased notable in the past five years, and by 2016 it contributed for 22.4% of the overall CPR and by 2019 21%. The recent boost in the use of Implanon in the country is the result of the government's initiative towards expanding voluntary access to long-acting family planning (LAFP) methods. In 2009, the Ethiopian Federal Ministry of Health (FMOH) launched the provision of Implanon at the community level through the health extension workers (HEWs)¹⁷. Of note, the contribution of Pills to the overall contraceptive use has diminished notably in the last 25 years. In 1990, despite the very low prevalence, about 76% of contraceptive use was accounted to pills; and this has declined to 40% in 2000, 23% in 2005, 5.1% in 2016 and 4.9% in 2019.

Lack of women's knowledge of the different methods, resistance to adopting some of the long acting and permanent methods by women due to misconceptions and fear of side effects, health workers' biases to certain methods and absence of a range of methods in health facilities were implicated among the obstacles to achieving a balanced method mix in the family planning literature¹⁸. The prevailing poor family planning counselling and information provision to contraceptive users by health providers in the country may have contributed to the skewed method mix. For instance, only 38.3% of the contraceptive users in 2011 were told about other methods than they were practicing¹⁹.

¹⁴Biddlecom A, Kantorova V. 2013. Global trends in contraceptive method mix and implications for meeting the demand for family planning United Nations, Department of Economic and Social Affairs, Population Division.

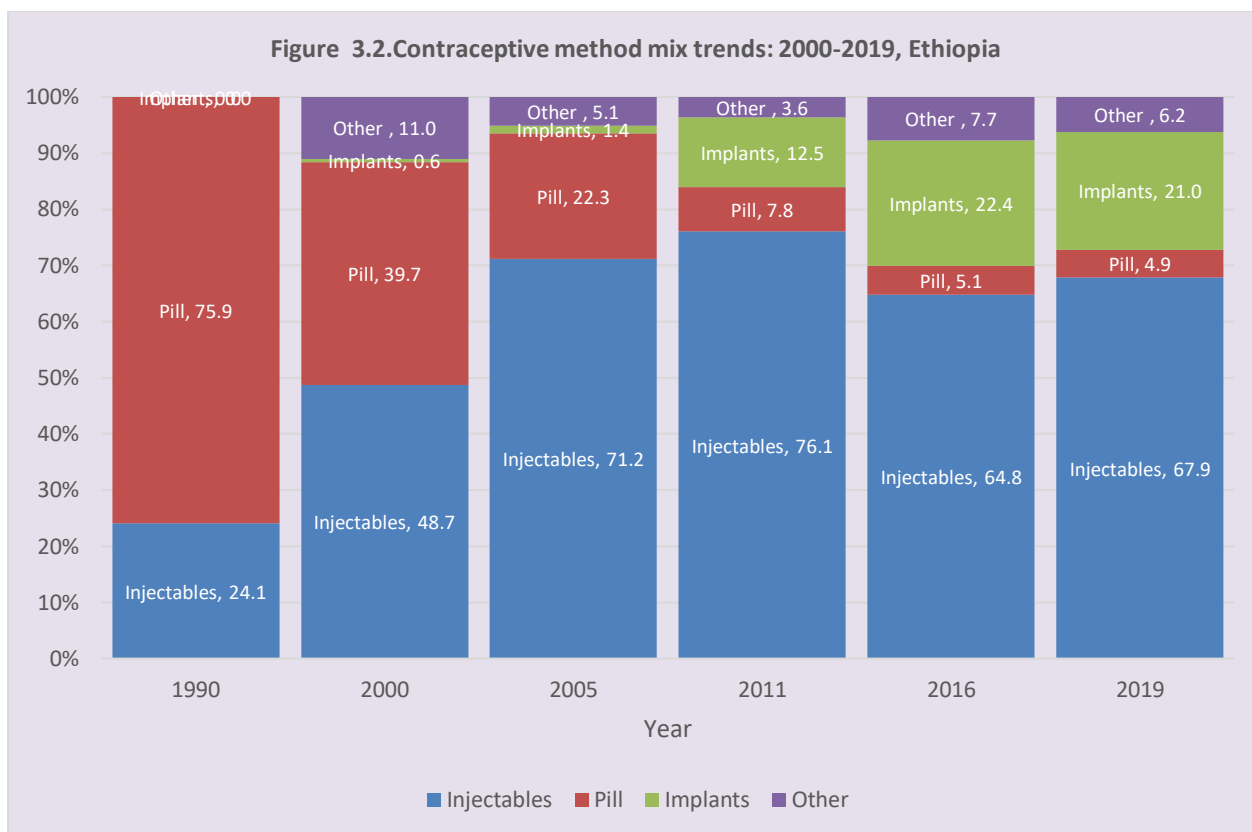
¹⁵ Sutherland E G et al, 2011. What Happens to Contraceptive Use After Injectables Are Introduced? An Analysis of 13 Countries. *International Perspectives on Sexual and Reproductive Health*, 37(4): p. 202–208.

¹⁶ Lande R, Richey C. 2006. Expanding services for Injectables, *Population Reports*. Series K, No. 6.

¹⁷ FMOH. 2014. Evaluation of the Implanon Scale-up Initiative in Ethiopia's Southern Nations, Nationalities, and People's Region. May 2014. Addis Ababa.

¹⁸ UNFPA. 2012. A decade of change in contraceptive use in Ethiopia. Addis Ababa.

¹⁹ Central Statistical Authority [Ethiopia] and ORC Macro. 2011. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro.



Unmet Need and the demand for family planning

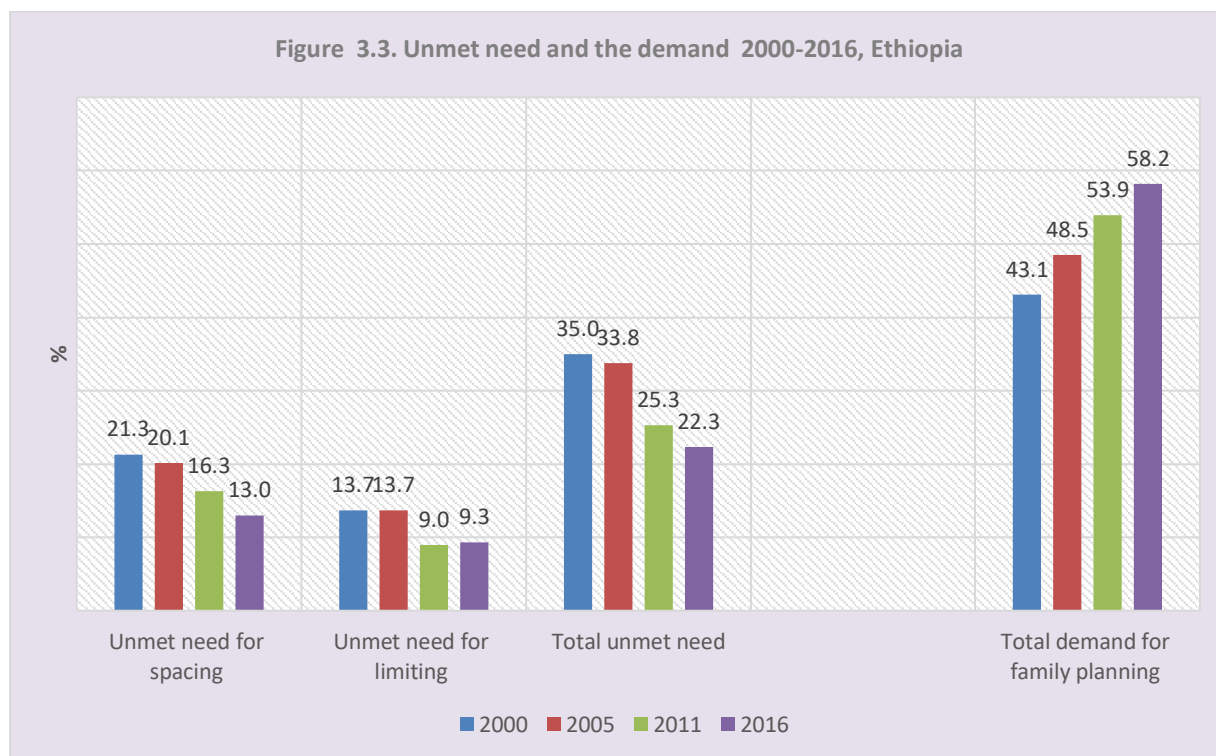
Data on unmet need is not available in the 2019 EMDHS, so this section is based on the EDHS 2000-2016. A little bit over a fifth of the married women (22.3%) estimated to have had unmet need for family planning in 2016 - 13% unmet for spacing and 9.3% unmet for limiting. Unmet need for family planning has declined from 35% in 2000 to 22.3% in 2016 [Figure 3.3]. The decline was much faster between 2005 (33.8%) and 2011 (25.3%); while the pace of decline slowed in recent years – from 25.3% in 2011 to 22.3% in 2016. Data from the four surveys suggest that unmet need for limiting has been consistently lower than that for spacing. Both unmet for limiting and spacing have declined in the past 16 years, with the unmet need for spacing declining from 21.3% in 2000 to 13% in 2016 and that for limiting from 13.7% to 9.3%. Since unmet need is a relatively complex indicator to measure as it involves several variables related to sexual abstinence, pregnancy, post-partum amenorrhea status, and contraceptive use, one cannot provide a full explanation to the trend in unmet need in a country. When unmet need is measured in a comparable way at different dates, the trend indicates whether there has been progress towards meeting women’s needs in this regard. It should be noted that, even when contraceptive prevalence is rising, unmet need for family planning may sometimes fail to decline, or may even increase. This can happen because the demand for family planning increases due to declines in the desired number of children. Changes in the desired for spacing or limiting of births or changes in the percentage of women who are at risk of pregnancy can also influence the trend in demand for family planning, independently of trends in contraceptive prevalence²⁰.

The demand for family planning, which is the sum of current contraceptive use (i.e. met need - any method, 35.9%) and the total unmet need, has increased over the years - from 43.1% in 2000 to 58.2%

²⁰ <http://www.un.org/esa/population/publications/wcu2010/Metadata/UMN.html>

in 2016. By 2016, 61.7% (=35.9%/58.2%) of the demand for contraception was satisfied; this was remarkably higher than the 19% for the same in 2000.

Figure 3.3. Unmet need and the demand 2000-2016, Ethiopia



Conclusion and programmatic implications

Ethiopia has recorded significant progress in family planning over the last two decades. Despite the recorded successes, however, Ethiopia's family planning program is still characterized by high unmet need, inter-regional and district level inequalities, socioeconomic-based inequalities, and poor contraceptive method mix. The ongoing social and demographic changes in the country such as expansion of female education and urbanization as well as the youth bulge (demographic change) can also pose additional challenges to the future of family planning in the country, as these changes are accompanied by increasing demand for family planning. The lessons learned from the recorded progresses to date suggest that continued political commitment, sustainable financing, uninterrupted contraceptive commodity security at all tiers of the health system, and consolidated support from development partners are the prerequisites for registering results.

At the program level, addressing the high unmet need for family planning while attaining equity and quality of family planning services should be the central focus of interventions. The most recent national survey found that 22% of the married women still have an unmet need for family planning and 58% have the demand for family planning. This shows that there is still a lot to be done to further increase contraceptive use in the country. Data suggest that fear of side effects/health concerns and socio-cultural oppositions still remain among major obstacles to practicing family planning among women with unmet need for family planning in the country. There are well recognized strategies that help overcome “fear of side effect/health concern”. One of the strategies has been to avail a range of contraceptive methods to clients and provide correct information and counselling about the different methods including their likely side effects. Periodic follow-up of contraceptive users with special attention to assessing side effects is of paramount importance and could encourage continuous use. Socio-cultural barriers such as religious oppositions and fatalistic views towards family planning are

known to be more challenging to overcome. But, by enlisting religious and community leaders as primary partners in family planning efforts, community acceptance towards family planning can be enhanced.

Inter-regional and district-level inequalities in contraceptive use has persisted in the country over the years. Such disparities are the results of a combination of several factors that operate at the demand and supply sides. From the demand side, socio-economic and cultural factors such as women's education, urbanization and religion that are linked to the value of children and the knowledge and access as well as responsiveness to family planning are important determinants of inter-regional and lower level inequalities in contraceptive uptake²¹. Anecdotal evidence suggest that lack of uniformity across regions in terms of political commitment towards family planning, which in turn affects regional performances have been implicated by experts among the main hurdles to narrowing the inequality gap in contraceptive use between regions and districts. The national family planning program must be cognizant of and responsive to the marked regional and lower-level differences in contraceptive use in the country and devise region-specific family planning programs based on existing evidences. The existing strong political will and proactive support to family planning program from regional governments is of paramount importance. Indeed, decentralization enables regions in Ethiopia to plan, manage, monitor and supervise implementations of their development programs including family planning program.

Family planning practice in Ethiopia is heavily dominated by two methods - Injectables and Implanon - with Injectables comprising over three-quarter of the current use. Because of poor method mix, the country's family planning program may not be as cost effective as birth limiters use Injectables for long periods, rather than switching to longer acting and permanent methods, which provide greater contraceptive efficacy at comparable or even lower cost. Although there is no such thing as perfect method mix for a certain population, the domination of one or two methods concerns family planning programmers because this affects the quality of care of family planning program. Strategies to improve method mix should focus on increasing the mix and availability of contraceptives and promoting an informed choice that allows family planning clients to choose methods that are most appropriate for their fertility desires. An effective communication strategy that focus on raising awareness about the different methods, that dismiss myths and misperceptions, and build a positive view of the methods is of paramount importance. Health service providers should be trained on the different methods so as to increase their skills and overcome biases towards few methods.

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4. Ethiopia Adolescents transition to adulthood

Globally, there are an estimated 1.2 billion adolescents aged 10-19 years today that make up 16 per cent of the world's population²². The years from adolescence through the 20s are a complex and dynamic period marked by key life course events that are often viewed as formal markers of the transition from adolescence to adulthood²³. Leaving aside the sequences of occurrences of the events, the markers of transition to adulthood often include initiation of sex, getting married, becoming a parent, leaving school, entering the labour force, and leaving one's natal home²⁴. While all the markers of transition to adulthood are important determinants of the current and future lives of adolescents, those concerning sexual and reproductive health are of greater concern because they are directly related to the health and wellbeing of adolescents. Investments in adolescent health and wellbeing bring benefits today, for decades to come, and for the next generation²⁵. Due to their large numbers and as they are reaching a major milestone in their lives, there has been a continued emphasis on adolescents in major policy initiatives such as the Sustainable Development Goals and Family Planning 2020 and that achieving a healthy adolescence is a cornerstone of much local and national development programming^{26 27}.

There are an estimated of over six million adolescent girls age 10-19 years in Ethiopia today, making the country home to the second largest adolescent population in Africa²⁸. The issues of adolescents and youth have gained attention in Ethiopia and there are policies and programs to support young people in the country. The Government adopted a national Youth Policy that recognizes the social, economic, educational, and health problems faced by adolescents and the youth²⁹. A National Adolescent and Youth Reproductive Health Strategy³⁰ represents a further commitment and a major step forward by the Government to rally resources, to harmonize efforts and interventions, and to integrate programs across sectors: education, economic, health, and agriculture with its major partners to see that the adolescent population in Ethiopia is healthy and thriving. These national policies, strategies and programs should be supported by evidences and up to date information. Nevertheless, studies on adolescents' transition to adulthood are in general scarce in Ethiopia³¹. Indeed, not much is known about the current status and trends of transitions of Ethiopia adolescents to adulthood and the factors influencing past and recent trends. Using available national survey data, this study explores the timing, sequencing and determinants of Ethiopia adolescents' transition to adulthood with emphasis to transition to first marriage, first sexual intercourse and first birth. The study in particular aimed to examine trends of these key events over four historical retrospective cohorts that date back to 1961, disaggregated by urban-rural residence, region, education and religion.

This analysis was based on pooled national data from five surveys that came from two different sources: i.e. Ethiopia Demographic and Health Surveys (EDHS) - 2000, 2005, 2011 and 2016; and Ethiopia Performance Monitoring and Accountability (EPMA) survey - 2018. The five surveys

²²<https://data.unicef.org/topic/adolescents/demographics/>

²³ Beguy D, Kabiru C, Zulu E, Ezeh A. Timing and Sequencing of Events Marking the Transition to Adulthood in Two Informal Settlements in Nairobi, Kenya. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 2011, Vol. 88, Suppl. 2
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²⁵ Patton et al. Our future: a Lancet commission on adolescent health and wellbeing. *Lancet*. 2016 June 11; 387(10036): 2423-2478.
doi:10.1016/S0140-6736(16)00579-1.

²⁶ Merrick, T.W. 2015. Making the Case for Investing in Adolescent Reproductive Health: A Review of Evidence and PopPov Research Contributions. Washington, DC: Population and Poverty Research Initiative and Population Reference Bureau.

²⁷ <https://www.pma2020.org/reports/pma2017ethiopia-round-5-adol-brief>

²⁸ United Nation Population Fund: *The State of World Population 2016*. UNFPA; 2016

²⁹ Young Lives (2014) Young Lives Survey in Ethiopia

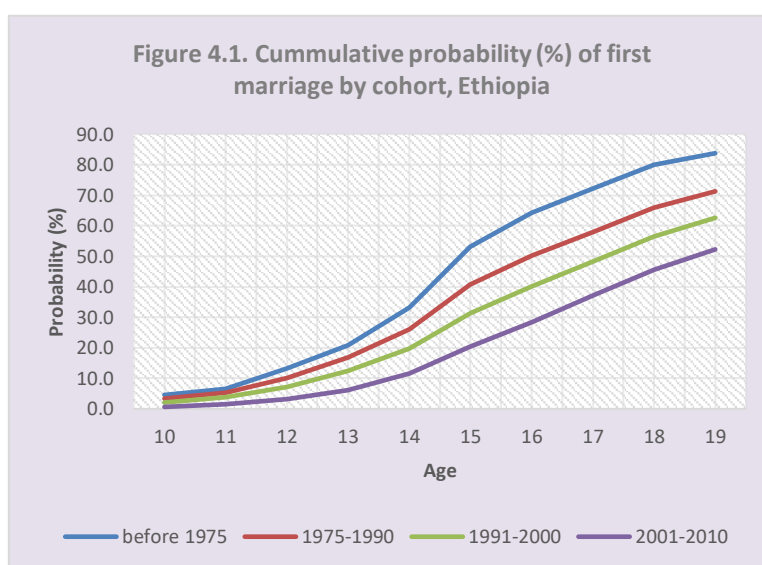
³⁰ https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/ethiopia/ayrh_strategy.pdf

³¹ Lindstrom D, Kiros G, Hogan D: Transition into First Intercourse, Marriage, and Childbearing among Ethiopian Women. *Genus* 2009; LXV(2):45-77.

altogether collected data from 69,350 women in the reproductive age. On the pooled data, we reconstructed cohorts of adolescents based on the year the survey respondent women reached age 10, i.e. the minimum age of puberty and the lowest age bound in the adolescent's age bracket of 10-19 years. The year at which women reached age 10 was computed by subtracting the number of years elapsed since they reached an age of 10 years from the date of the surveys. The key markers of transition are: early first marriage (bore the legal marriage age 18), early first sex (before age 20) and early childbearing (before age 20). Life-table based analysis using Kaplan-Meier (KM) methodology was employed to compute the cumulative probability of having early first marriage or first sex or first birth. To examine determinants of the different outcomes, multivariate analyses were performed using the Cox proportional hazards regression model.

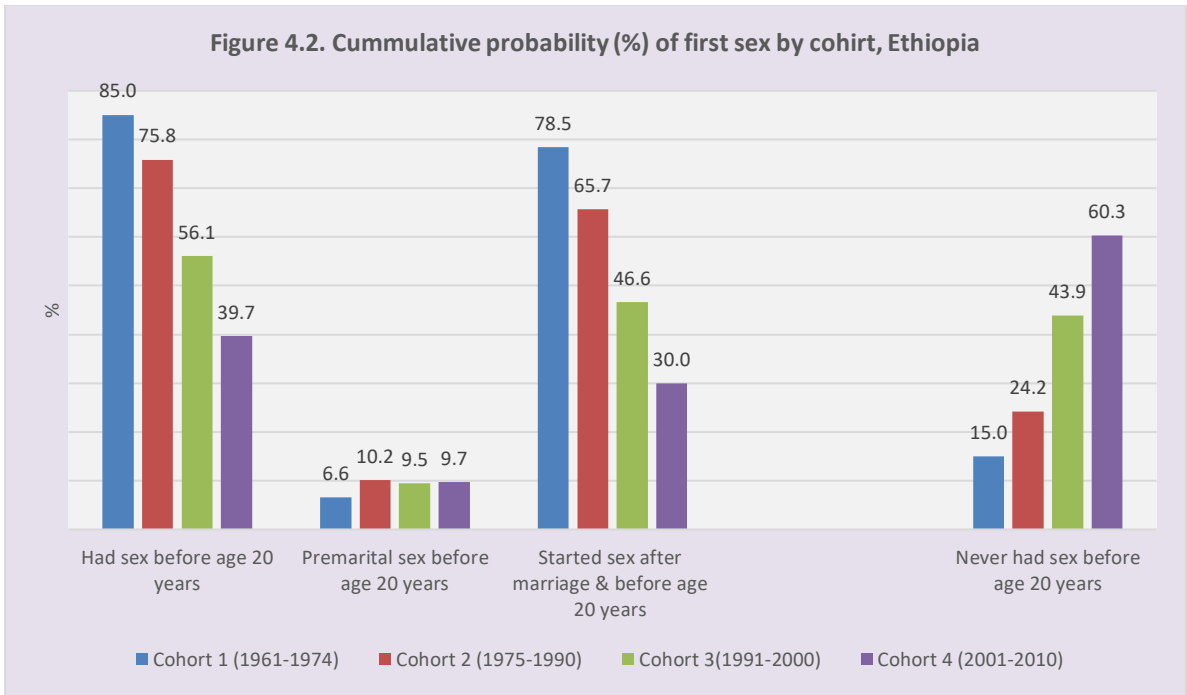
Transition to first marriage, first sex and first birth

Figure 4.1 presents the Kaplan-Meier failure function of first marriage by cohort for each single year of ages 10-19 years. The occurrence of first marriage during adolescents (i.e. before age 20 years) has declined continually over the cohorts in the past four decades. Test for survival curves of the four cohorts confirms significant differences ($p < 0.000$), suggesting substantial disparities across generation of adolescents in terms of transition to first marriage. The proportion of adolescent who married during adolescent declined from 83.8% for the earliest cohort, to 71.3%, 62.6% and 52.3%, respectively, for the second, third and fourth cohorts.



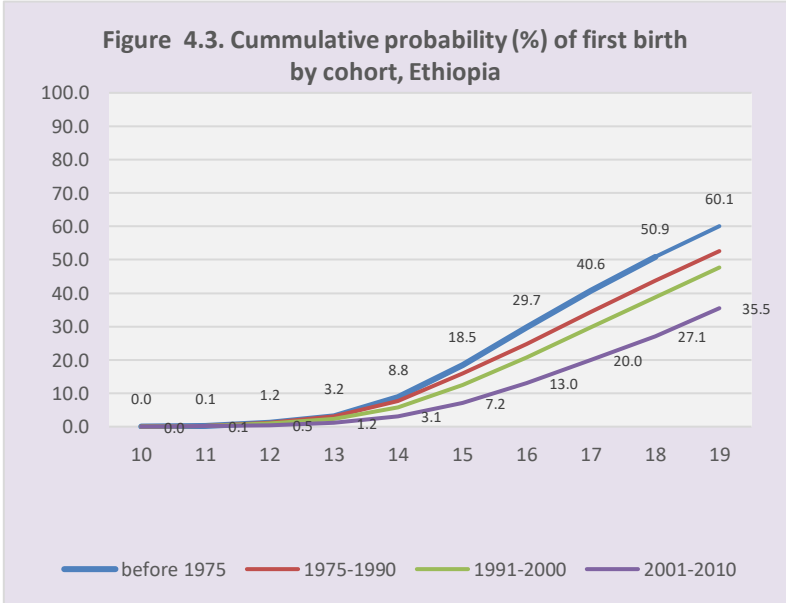
Of note, the fourth (most recent cohort) comprises of adolescents who reached age 10 years during 2001-2010, and whose current age (in 2020) ranged from 20 to 30 years. The pace of decline in the incidence of first marriage has been faster between the last two cohorts, with an absolute 10-year decline of 10.2 percentage points, which can be translated to a 1 percentage point decline per annum. In the previous cohorts, the annual rate of decline was lower at 0.67 and 0.83 percentage points, respectively, between the earlier successive cohorts. In addition, the median age at first marriage increased by 5 years over the past four decades, from 15 years for the earliest cohorts to 20 years for the most recent cohort. Despite the decline, adolescent's marriage still remains notably high with over half (52.3%) of adolescents in the most recent cohort having their first marriage before age 20 years.

The distribution of adolescents according to their engagement into first sex is shown in Figure 4.2. Overall, about 40% of the adolescents started sex before age 20 years as per the most recent cohort, and this represented a significant decline by 45 percentage points compared to the earliest cohorts (85%). Premarital sex was reported to have occurred for 9.7% of the adolescents in the most recent cohort and this has remained nearly stable over the past four decades – from 6.6% in the earliest cohort to 10.2%, 9.5% and 9.7% in subsequent cohorts. It also appeared that the vast majority of adolescent started sexual intercourse within the milieu of marriage, as the proportion that started sex after marriage ranging from 78.5% in the earliest cohort to 30% in the most recent cohort.



We presented the probability of having a first birth before 20 years (early childbearing) by cohort. As shown in Figure 4.3, the cumulative probability of having a first birth before the age of 20 years dropped significantly from 60.1% for the earliest cohort to 35.5% for the most recent cohort. This means early childbearing has declined by over two-fifth in the past four decades. Likewise, we have also observed an increase in the median age at first birth during the same period. In the earliest cohort the median age at first birth was 18 years and this has increased to 19, 20 and 22 years, respectively, in subsequent cohorts. Decline was also apparent at any age during adolescent, especially in the age range 14-19 years, over the cohorts. Test for survival curve that compared the four cohorts was statically significant ($p < 0.000$).

Trend data also showed that the decline in early childbearing has been much faster in the most recent cohort (2001-2010 cohort) compared to the earlier cohorts. The annual rate of decline between the most recent cohort (2001-2010) and the next to last cohort (1991-2000) was 1.22 percentage points. This was much faster than the decline observed between the previous successive cohorts at -0.38 and -0.5 percentage points per annum. The most recent cohort revealed that, albite the recorded decline, early childbearing still common in the country with over a third of the adolescents (35.5%) already given birth, and 20% of them had their first birth before the age of 18 years and 13% before 17 years.

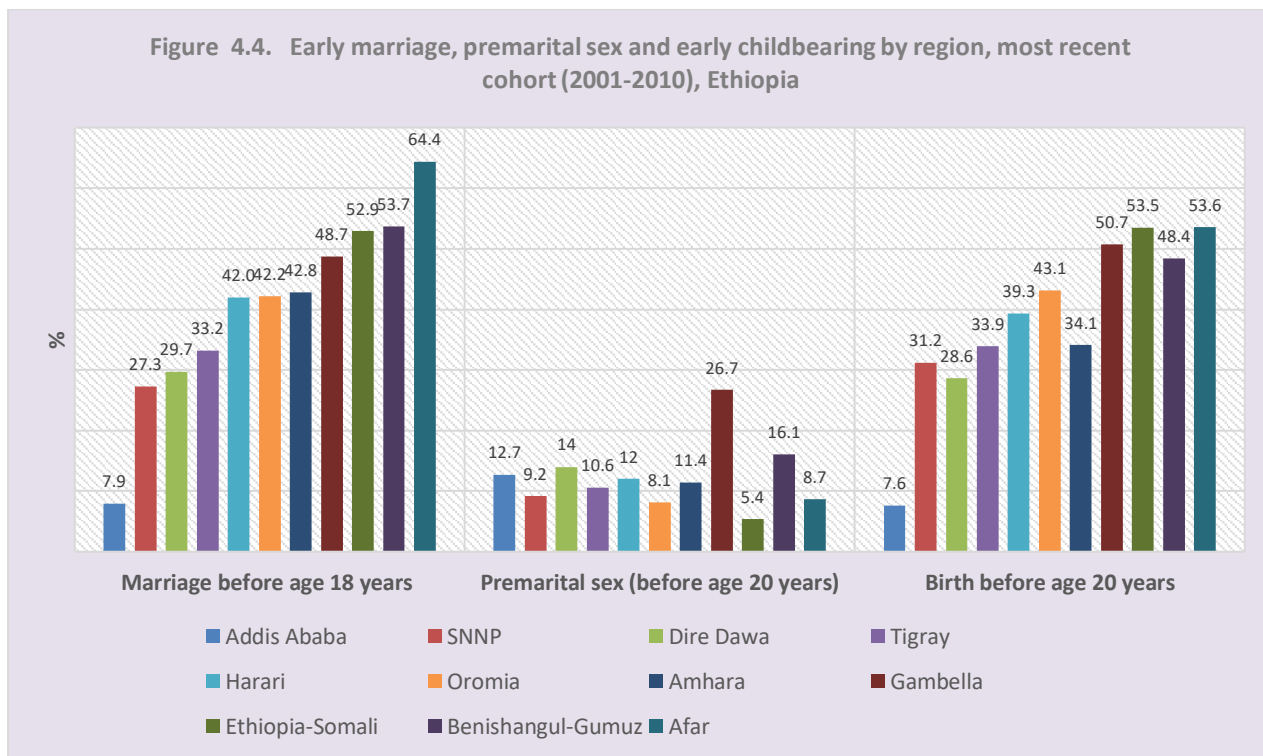


Regional variations

Figure 4.4 presents variations in early marriage (before age 18 years), premarital sex during adolescence and early childbearing (before age 20 years) by region for the most recent cohort. Early varied significantly across regions – from about 8% in Addis Ababa to 64.4% in Afar. Six out of the 11 regions had higher early marriage rate than the national average, including Benishangul-Gumuz (53.7%), Ethiopia-Somali (52.9%), Gambella (48.7%), Amhara (42.8%), Oromia (42.2%) and Harari (42%).

Premarital sex also varied across regions. Based on the most recent cohort, the proportion of adolescents who had engaged in premarital sex ranged from a low of 5.4% in Ethiopia-Somali region to 16.1% in Benishangul Gumuz, and, the highest, 26.7% in Gambella. Seven out of the 11 regions had higher premarital sex rates than the national average. Few regions have seen significant increasing trend in premarital sex between the two most recent successive cohorts: Benishangul-Gumuz (from 9.6% to 16.1%), Gambella (from 16.2% to 26.7%), and SNNP (from 6.9% to 9.2%).

Figure 4.4 also presents adolescents' childbearing levels by region. According to the most recent cohort, the proportion of adolescents who had given birth before age 20 years varied significantly by region, the highest being recorded in Afar at 53.6% and the lowest at 7.6% in Addis Ababa. Following Afar, regions with notably high rates of adolescents' childbearing include Ethiopia-Somali (53.5%), Gambella (50.7%), Benishangul-Gumuz (48.4%), and Oromia (43.1%). The big regions with moderate level of adolescents' childbearing rates closer to the national average are Amhara (34.1%), Tigray (33.9%) and SNNP (31.2%).



Determinants of early marriage and early childbearing

The factors influencing first marriage, premarital sex and first birth in adolescents could be numerous. However, we can only investigate the few key covariates available in the DHS. Table 4.1 presents results of three multivariate Cox models in the estimation of the likelihood of first marriage, premarital sex and first birth.

Amongst the variables included in the models, women's education emerged as the single most important determinant of all the three outcomes. Having primary or secondary or higher education is associated with lower likelihood of first marriage, premarital sex and first birth. Compared to adolescents with no education, those with primary education were 42%, 30% and 41% less likely to have had first marriage before age 18 years, premarital sex and first birth before the age of 20 years, respectively. The corresponding decreased hazards for those with secondary or higher education was even much higher at 85%, 63% and 87%, respectively.

The effect of religion on these key outcomes revealed that the Orthodox Christians and Protestants were significantly less likely by 10% and 14%, respectively, than their Muslim counterparts to have married before the age of 18 years. Whilst the likelihood of engaging in premarital sex before age 20 years appeared significantly lower by 37% among the protestant compared to the Muslims; whereas there was no significant difference in the likelihood of premarital sex between the Orthodox Christians and the Muslims. On the other hand, being Orthodox Christian carried a 16% lower likelihood of having first birth before the age of 20 years compared to the Muslims. The Protestants did not differ significantly from their Muslims counterparts in terms of the likelihood of first birth before the age of 20 years.

Urban adolescents were found 30% less likely than their rural counterparts to have had their first marriage before age 18 years and first birth before the age of 20 years. No significant difference was noted between the urban and rural adolescents in terms of their likelihood of engaging in premarital sex.

Four out of the 11 regions, namely Addis Ababa, Dire Dawa, Ethiopia-Somali and SNNP regions, appeared to have significantly lower likelihood of first marriage before age 18 years. Compared to the Afar region (the reference region), adolescents in Addis Ababa were 70% less likely to have married before the age of 18 years, and this was lower by 27%, 32%, and 29%, respectively, for Dire Dawa, SNNP and Ethiopia-Somali regions. Although premarital sex reported to be in general low in the country, two regions – Gambella (AHR=3.28) and Benishangul Gumuz (AHR=3.26) - emerged as having the highest likelihood of premarital sex. Adolescents in the other regions did not vary significantly in their likelihood of engaging in premarital sex. Multivariate analysis also revealed that Gambella (AHR=1.83) and Benishangul-Gumuz (AHR=1.54) regions in particular saw an increased likelihood of first birth before the age of 20 years. On the other hand, only Addis Ababa appeared to have significantly lower likelihood of first birth (AHR=0.43) compared to Afar (reference category).

The multivariate results for first birth that included marital status confirmed the expected association between marriage and first birth. The risk of first birth increased by 27-fold for those adolescents who married before the age of 18 years compared to those who did not marry before the age of 20 years. The likelihood of first birth was also higher significantly (AHR=4.84) for those who married between the ages of 18 and 19 years. However, the magnitude of the hazard ratio associated with adolescents age 18-19 years was much lower than those under the age of 18 years, suggesting a lower risk of first

birth in the older adolescents than the younger ones. In all, this finding also confirms the low incidence of out-of-wedlock childbearing among adolescents in the country.

Table 4.1. Multivariate Adjusted Hazard Ratios (AHRs) and 95% Confidence Intervals (CIs) in the estimation of first marriage, premarital sex and first birth according to selected characteristics, most recent cohort (2001-2010), Ethiopia

	First marriage (before age 18 years)			Premarital sex (before age 20 years)			First birth (before age 20 years)					
	AHR	95% CI		AHR	95% CI		Model without marriage			Model with marriage		
		Lower	Upper		Lower	Upper	AHR	95% CI		AHR	95% CI	
					Lower	Upper		Lower	Upper		Lower	Upper
Residence												
Rural (ref)	1.00			1.00						1.00		
Urban	0.70	0.57	0.85	1.22	0.95	1.57	0.70	0.56	0.89	0.87	0.69	1.09
Region												
Afar (ref)	1.00			1.00						1.00		
Tigray	0.92	0.73	1.16	1.36	0.76	2.43	1.30	0.94	1.78	1.37	0.97	1.94
Amhara	1.03	0.84	1.27	1.71	0.99	2.97	1.05	0.77	1.42	1.02	0.72	1.44
Oromia	0.87	0.74	1.03	1.11	0.64	1.94	1.18	0.91	1.53	1.39	1.04	1.86
Ethiopia-Somali	0.71	0.58	0.88	0.58	0.30	1.14	0.97	0.71	1.32	1.38	1.00	1.90
Benishangul-Gumuz	1.16	0.93	1.45	3.26	1.56	6.82	1.54	1.09	2.18	1.64	1.04	2.58
SNNP	0.68	0.54	0.87	1.40	0.77	2.54	1.07	0.76	1.50	1.34	0.96	1.88
Gambella	1.25	0.88	1.78	3.28	1.79	5.92	1.83	1.20	2.80	1.49	1.00	2.24
Harari	1.05	0.85	1.30	1.91	0.88	4.17	1.37	0.94	2.01	1.65	1.00	2.71
Addis Ababa	0.30	0.21	0.41	1.27	0.70	2.29	0.43	0.27	0.67	0.89	0.56	1.39
Dire Dawa	0.73	0.58	0.92	1.59	0.71	3.55	1.00	0.73	1.37	1.20	0.85	1.68
Education												
No education (ref)	1.00			1.00						1.00		
Primary	0.58	0.52	0.64	0.70	0.54	0.90	0.59	0.51	0.68	0.76	0.66	0.87
Secondary +	0.15	0.12	0.19	0.37	0.27	0.50	0.13	0.10	0.18	0.43	0.33	0.56
Religion												
Muslim (ref)	1.00			1.00						1.00		
Orthodox Christian	0.90	0.80	0.99	0.90	0.70	1.15	0.84	0.68	0.99	0.85	0.70	1.00
Protestant	0.86	0.72	1.00	0.63	0.44	0.90	0.93	0.74	1.17	1.24	1.02	1.50
Marital status												
Did not marry before age 20 years (ref)										1.00		
Married before age 18 years										27.40	19.64	38.23
Married at the ages 18-20 years										4.84	3.33	7.02

Ref: reference category; significant results are highlighted in bold

Conclusion and programmatic implications

Findings of this study demonstrated trends towards delayed transition to adulthood among Ethiopia adolescents in the past four decades. During the period, we documented substantial reduction in the prevalence of early first marriage, first sex and first birth, with the fastest decline occurring for the cohort of adolescents who reached puberty in the last two decades. The last two decades coincide with the implementation and expansion of several social programs and policies, especially in the areas of health and education, that are beneficial for improving the sexual and reproductive health of women and young girls. The study also notes uneven progress in reducing adolescent's first marriage and childbirth across socio-demographics, resulting in a widening of the pervasive inequalities in these key events at least by education, residence and religion. The magnitudes of these inequalities have been widening over time and that early marriage and childbearing are increasingly concentrated amongst adolescents with no education, non-Orthodox Christians, and rural residents. Regional variations in these key events are also apparent, which is likely a reflection of differences in traditional norms,

socio-economic disparities as well as the lack of inter-regional uniformity in the implementation and enforcement of the marriage law, and other sexual reproductive health interventions. These findings taken together suggest that intervention efforts to reduce early marriage and childbearing in the country should give greater emphasis to population groups and regions with particularly high rates of early marriage and childbearing. Priority interventions to help delay adolescents' transition to first marriage, first sex and first birth should focus on delaying the age at marriage and keeping girls in school. Such efforts should put emphasis on promoting wider application of the marriage law and increasing population awareness of and respect for the law.

What is important to emphasise here is the National Costed Roadmap to End Child Marriage and FGM/C (2020-24) that envisions to achieve the national target to eliminate child marriage and other HTPs by 2025 in Ethiopia. The roadmap builds upon the Revised Criminal Code (2005) that outlaw early marriage and other HTPs as well as the 2013 national strategy and action plan against HTPs. Regardless of its ambitious target for 2025, this roadmap signifies Ethiopia government's commitment to eliminate early marriage, and, by so doing, reduce early childbearing in the country. For this roadmap to be most effective, however, it has to be tailored to the specific needs and realities of adolescents of varying socio-demographics and in the regions. Our analysis revealed marked inter-regional inequalities in early marriage, early childbearing and premarital sex. For instance, data for the most recent cohort divulged that seven out of the 11 regions have over 40% of their adolescents engaging in early marriage, the highest being 64% in Afar and the lowest 7.9% in Addis Ababa. Implementation of the road map should also take account of the pervasive urban-rural divide, education-and religion-based inequalities in early marriage and other associated events.

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5. Men's role in family planning and fertility in Ethiopia

Family planning is frequently perceived as a woman's concern in many parts of the world, and that family planning programs most often target women³². Studies have shown that reproductive health programs are likely to be more effective for women when men are involved in some way^{33 34}. Nevertheless, men's role in family planning and fertility have been largely overlooked by policy makers and family planning programmers. Population and family planning programs largely rely on findings of studies and surveys on women's fertility preferences, contraceptive behavior and unmet need for family planning. This is partly due to a general paucity of data on men's fertility and family planning behaviors. But more so because women's responses in surveys are often taken as proxy for the couple's responses, and this assumption may not necessarily reflect the actual fertility behavior of the husband or the couple as a unit.

Interest in men's involvement in reproductive health has been on the agenda since the 1994 International Conference on Population and Development (ICPD)³⁵. There is also a general understanding among family planning programmers and policy makers on the need to broaden men's roles, partnership with their spouses and their active involvement in fertility, family planning and other reproductive health issues³⁶ although these important agenda have yet to be advanced to bring tangible changes. The literature exploring the reproductive and fertility behaviours of Ethiopia men is limited in scope and geographic coverage. However, the few available studies are consistent about the need for involving men in family planning programs for increased and sustained use of contraception and better reproductive outcome^{37 38}.

This study examined men's fertility and family planning behaviours as individuals and in the context of couples. Fertility and family planning studies and programs in Ethiopia, as elsewhere in most sub-Saharan African countries, have so far been predominantly focused on women, while little or no parallel efforts have been given to the incorporation of the men's perspective. To our knowledge, the men's and couples' data of the Ethiopia Demographic and Health Surveys (EDHS) have been mostly unexplored. By analysing these distinct, yet unexplored data, the main contribution of this study is perhaps to draw the attention of policymakers, researchers and the academia of the relevance and value of the data to furthering our understanding of the state of fertility and family planning in Ethiopia. The analyses presented here are based on 32,831 men and 15,854 couples that were included in the 2005, 2011 and 2016 EDHS.

³² FHI 360. Increasing men's engagement to improve family planning program in South Asia. 2012

³³ Helzner, J.F. (1996) Men's involvement in family planning. *Reproductive Health Matters*, 7, 146-153

³⁴ Mistik, S, Nacar, M., Mazicioglu, M. and Cetinkaya, F. (2003) Married men's opinions and involvement regarding family planning in rural areas. *Contraception*, 67, 133-137.

³⁵ <https://www.unfpa.org/events/international-conference-population-and-development-icpd>

³⁶ WHO. Programming for male involvement in reproductive health. Report of the meeting of WHO Regional Advisers in Reproductive Health WHO/PAHO, Washington DC, USA 5-7 September 2001. WHO/FCH/RHR/02.3

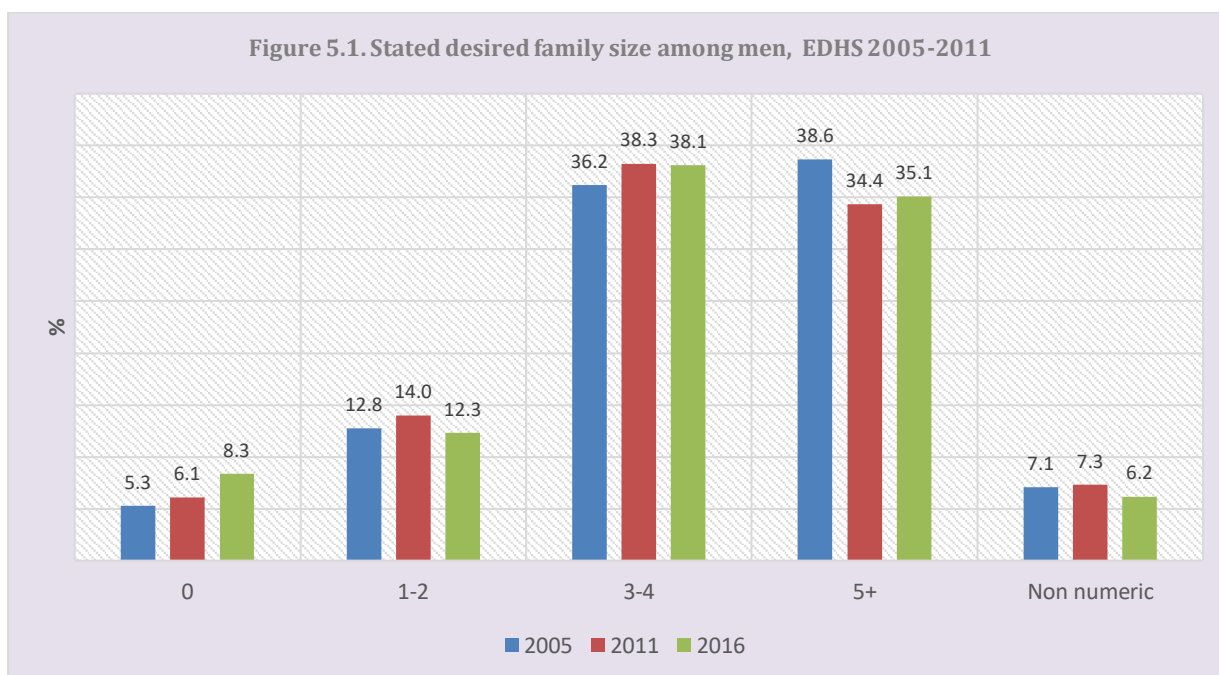
³⁷ Tilahun T, Coeneze G, Temmerman M, Degomme O. Spousal discordance on fertility preference and its effect on contraceptive practice among married couples in Jimma zone, Ethiopia. *Reproductive Health* 2014, 11:27. <http://www.reproductive-health-journal.com/content/11/1/27>

³⁸ Kassa M, Alemu A, Gedefaw M. Level of male involvement and associated factors in family planning services utilization among married men in Debreworkos town, Northwest Ethiopia. *BMC International Health and Human Rights* 2014, 14:33 <http://www.biomedcentral.com/1472-698X/14/33>

Trends in men’s desired family size

Statements of desired family size have been used to predict fertility, to assess demand for contraception, and to explain fertility trends and differentials³⁹. This information also lies at the heart of family planning and population policy concerns. Studies have also shown close relationship between wanted and actual fertility in sub-Saharan Africa. Although concerns about courtesy bias in responses and rationalization of children already born also contributed to distrust of survey questions about desired or ideal family size⁴⁰, a series of studies reacting to these concerns examined and largely confirmed the overall validity of reported family size preferences⁴¹.

In determining desired number of children, men with no children were asked, “If you could choose exactly the number of children to have in your whole life, how many that would be?” Men who already had children were asked, “If you could go back to the time you did not have any children and could choose exactly the number of children to have, how many would that be?”. As shown in Figure 5.1, among all men interviewed in 2016, about 21% wanted to have fewer than three children, while about 38.1% said they wanted to have 3-4 children in their lifetime. The proportion that preferred high fertility (5 or more children) has shown a slight decline from 38.6% in 2005 to 35.1% in 2016. In all, there was no significant trend in the desired family size among the men interviewed in the three surveys. Notably, 8.3% of the men stated they preferred to remain childless in 2016 and this has increased only slightly from 5.3% for the same in 2005. The proportion that gave non-numeric responses (up to God or do not know) was 6.2% in 2016. This also remained nearly stable since 2005.



³⁹ Bhargava, A. 2007. “Desired family size, family planning, and fertility in Ethiopia.” *Journal of Biosocial Science* 39 (3): 367-381.

⁴⁰ Bongaarts, J. 1990. “The measurement of wanted fertility.” *Population and Development Review* 16 (3): 487-506.

⁴¹ Knodel, J. and Prachuabmoh, V. 1973. “Desired family size in Thailand: Are the responses meaningful?” *Demography* 10 (4): 619-637.

Determinants of men's desired family size

Multivariate analysis is presented in Table 5.1. using Poisson Regression for the estimation of men's desired family size. Several socio-demographic covariates are included in the model, i.e., region, place of residence, age, marital status, number of living children, men's education, type of work and religion.

All other factors in the model being equal, men's desired family size is significantly influenced by their marital status, number of living children, level of education, type of work, religion and the region they belong to.

Married men were 14% (IRR=1.14) more likely than the never married to have had high desire for large family. There was a direct relationship between the number of living children and desire for large family. Men with living children four or more were 46% (IRR=1.46) more likely than those with no child to desire large family and this was 24% (IRR=1.24) higher among those with three children. High parity men wanting larger family could be a reflection of rationalization of the actual family size. Men who are engaged in agricultural activities tended to prefer larger family than any of the other professions as well as those who have no job. Religion also emerged as important predictor of men's fertility desire in which Orthodox men were 13% (IRR=0.87) less likely than their Muslim counterparts to desire large family. Regional disparity in desired family size is also apparent in the multivariate analysis. Compared to Ethiopia-Somali region, every other region with the exception of Afar, tended to have significantly lower desired for large family. Of note, the same set of factors also predict women's desired family size (data not shown).

Table 5.1. Log-linear Poisson Regression model adjusted Incidence Rate Ratio (IRR) and 95% Confidence Interval (CI) in the estimation of the desired number of children by selected variables. Men, Ethiopia, 2016 EDHS

	IRR	P-value	95% CI	
			Lower	Upper
Region (Ethiopia-Somali)				
Tigray	0.68	0.000	0.55	0.83
Afar	1.21	0.074	0.98	1.48
Amhara	0.64	0.000	0.53	0.78
Oromia	0.65	0.000	0.54	0.80
Benishangul Gumuz	0.78	0.021	0.63	0.96
SNNP	0.67	0.000	0.54	0.82
Gambella	0.79	0.034	0.63	0.98
Harari	0.67	0.000	0.54	0.82
Addis Ababa	0.64	0.000	0.52	0.78
Dire Dawa	0.73	0.002	0.60	0.90
Residence (Urban)				
Rural	1.10	0.026	1.01	1.20
Age (15-19)				
20-24	1.00	0.918	0.95	1.06
25-34	0.97	0.399	0.90	1.04
35-49	0.99	0.888	0.90	1.10
50-59	1.03	0.641	0.90	1.18
Marital status (Never married)				
Married /living with a woman	1.14	0.018	1.02	1.28
Divorced/widowed	0.97	0.700	0.82	1.14
Number of living children (0)				
1	1.01	0.833	0.89	1.15
2	1.09	0.245	0.94	1.25
3	1.24	0.004	1.07	1.43
4+	1.46	0.000	1.25	1.71
Education (no Education)				
Grades 1-6	0.94	0.006	0.90	0.98
Grades 7-9	0.95	0.146	0.88	1.02
Grade 10-12	0.93	0.038	0.86	1.00
College or higher	0.89	0.008	0.82	0.97
Type of work (Not working)				
Professional/technical	1.06	0.128	0.98	1.14
Manual labour	1.10	0.059	1.00	1.21
Agriculture	1.08	0.027	1.01	1.16
Religion (Muslim)				
Orthodox	0.87	0.000	0.80	0.94
Protestant	0.94	0.189	0.86	1.03
Others	0.92	0.369	0.78	1.10

Reference category in parenthesis; IRR=Incidence Rate Ratio

Couple's family size desires (ideal family size)

Figure 5.2 presents couple's family size desire, stratified into four categories: (1) both the husband and wife have the same number of desired family size (2) wife wanted more children (3) husband wanted more children and (4) either of the two/undecideds. In 2016, 18.1% of the couples had the same number of desired family size, and this has remained almost unchanged since 2005 (18.4%). Among all the couples, 37.4% of them had the husbands desired more children than the wives, while a relatively lower proportion of couples (25.7%) had the wives desired more children. No statistically significant temporal trend was noted during 2005 to 2016 in the proportion of couples with discordant desired family size. In all, discordant numbers of desired family size can be found in at least 63% of the couples and this has remained nearly the same since 2005 (61%). About 19% and 20% of the couples, respectively, in 2016 and 2005 had the husband or wife unable to decide on desired family

size. In other words, either of the spouses was unable to give specific number for the question on desired family size, rather they provided responses such as “do not know” or “up to God”.

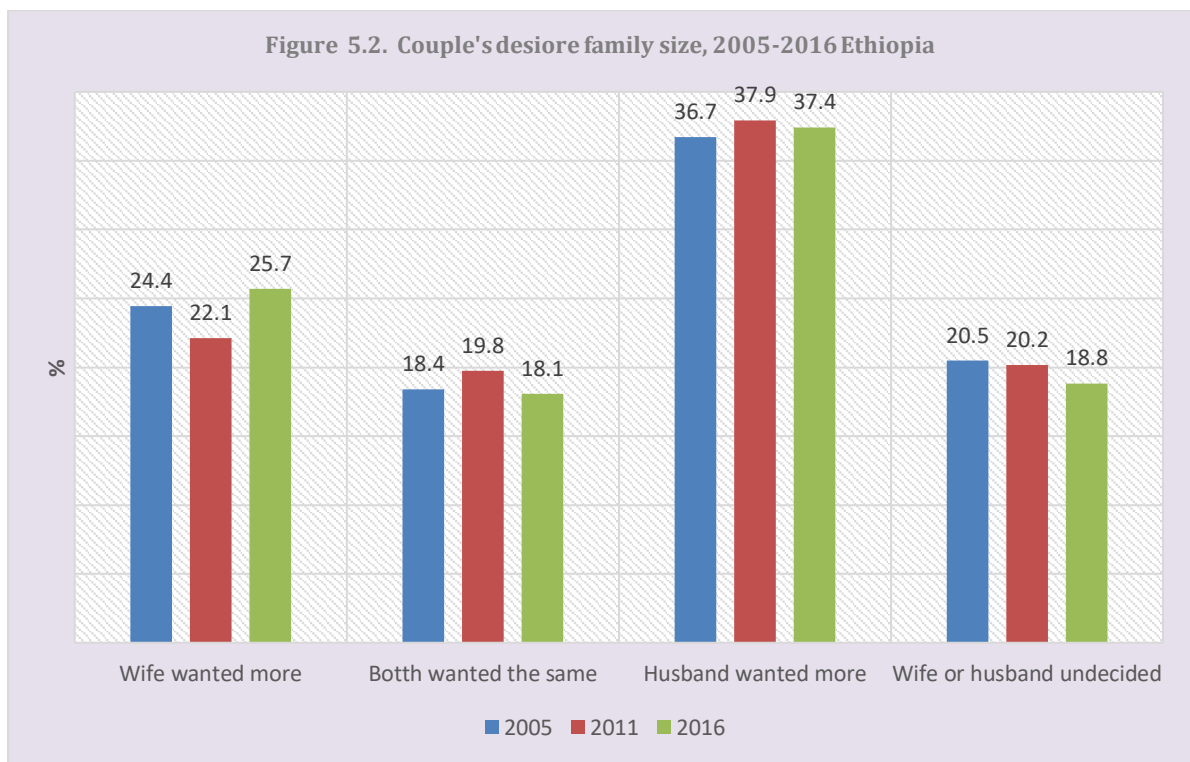
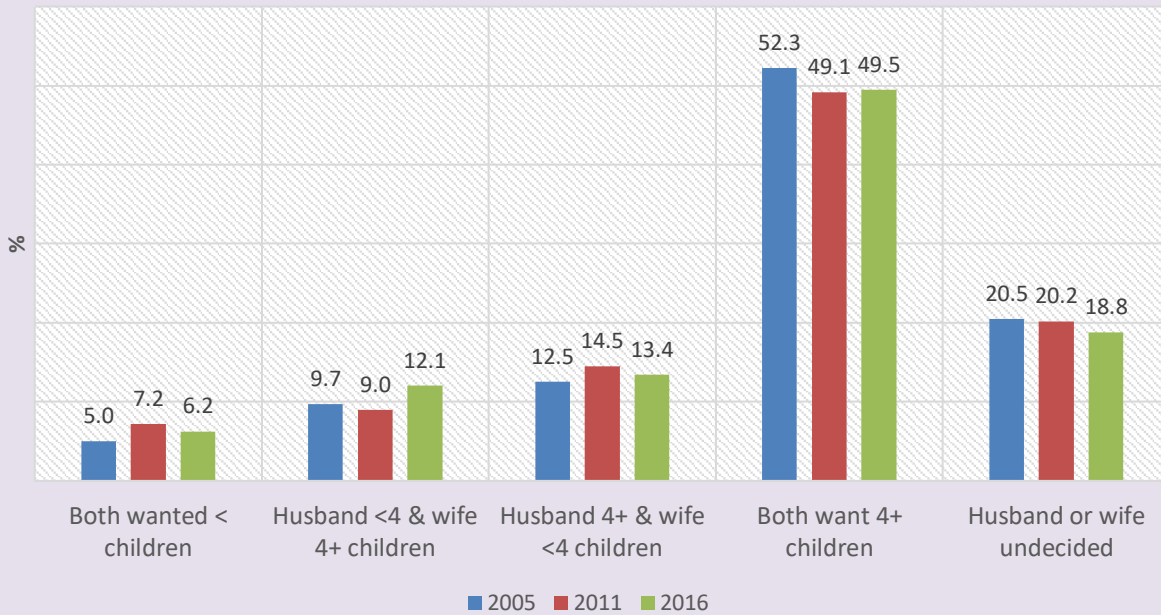


Figure 5.3 presents distribution of couples according to their desire for larger family (i.e. 4 or more children) or smaller family (i.e. less than 4 children). The proportion of couples in which both spouses wanted to have fewer than 4 children was low at 6.2% in 2016, which remained almost the same at 5% in 2005. The proportion of couples who both the husband and wife agreed to have large family (4 or more children) was notably high at 49.5% in 2016 and this was 52.3% in 2005. There was no significant declining trend in the desire for high fertility since 2005. In general, the data suggest that about half of the couples were in agreement for a large family, i.e. four or more children. The proportion of couples where husbands wanted to have 4 or more children while the wives fewer than 4 children was 18.8%. On the other hand, in 13.4% of the couples the wives reported a higher number of desired family size.

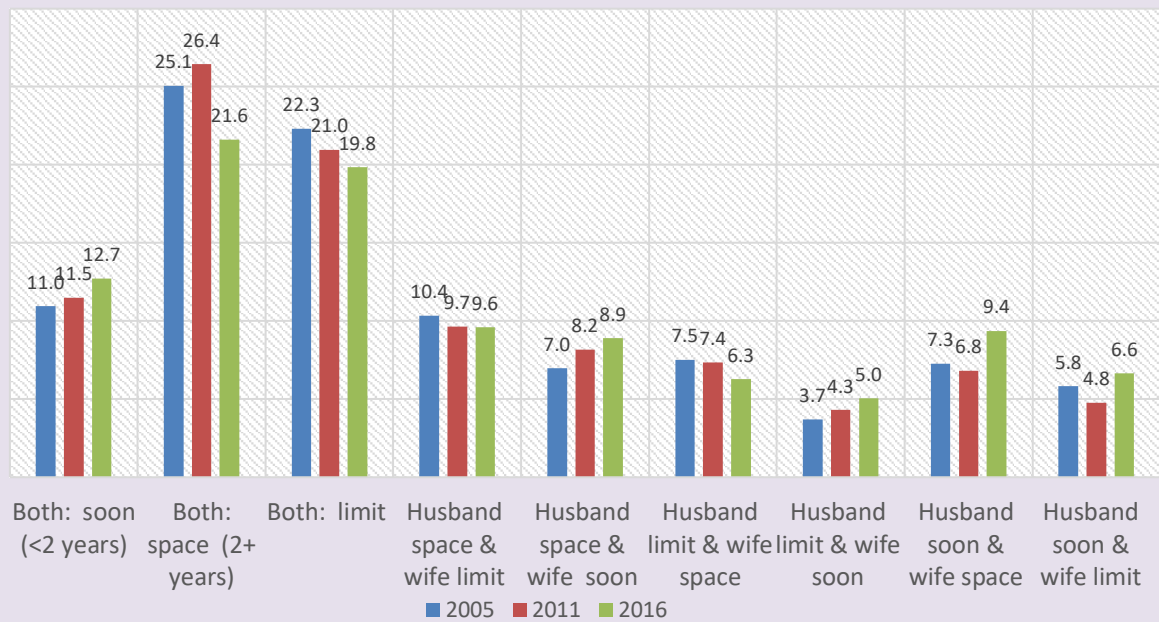
Figure 5.3. The distribution of couples by their desired for less than or greater than 4 children, 2005-2016, Ethiopia



Couple's fertility preferences (birth spacing or limiting)

Women and men were asked whether they wanted more children and, if so, how long they would prefer to wait before the next child. Those who wanted no more children are considered birth limiters while those who would like to postpone the next birth for two or more year are considered birth spacers. The remaining of the respondents are either those who wanted to have the next birth within two years (soon) or the undecideds. Figure 5.4 displays the possible combination of couple's responses in regards to their fertility preferences. In 2016, of all the couples, 21.6% of them had both the husband and wife wanted to space the next birth for two or more years, and 19.8% both wanted no more children. Whilst 12.7% of the couples had both spouses preferred to have the next birth within two years (soon). Taken together, 54.1% of the couples reported to have had concordance fertility preference while 46% did not agree whether to stop or have another child or on the timing of the next birth.

Figure 5.4. Couple's fertility preferences (birth spacing or limiting), 2005-2016, EDHS



Couple's fertility preferences by region and selected characteristics

We looked at couple's fertility preferences by selected characteristics (Table 5.2). In this analysis we are interested to understand whether couples with certain characteristics are more likely than others to agree or disagree on their fertility preferences. In the whole, according to the 2016 EDHS data, 41% of Ethiopia couples appeared in agreement in their birth limit or space need, while 12.7% of them agreed to have the next child within less than two years (soon).

Husband-wife concordance on fertility preferences appeared to be the highest in Ethiopia-Somali region, followed by Addis Ababa, Dire Dawa, SNNP and Amhara regions. About two-third of the couples in Ethiopia-Somali region agreed on their fertility preference although the vast majority of them (59.5%) wanted to have the next birth soon. Less than 1% of the couples in Ethiopia-Somali region wanted to stop childbearing and 5.3% wanted to postpone the next birth for two or more years.

The proportion of couples that agreed on fertility preferences did not vary significantly by urban-rural residence (58.2 vs. 53.5%). However, having concordance birth limiting need was more prevalent among the rural couples than the urban (20.8% vs. 14.3%). There was no significant association between couple's age differences and their fertility preferences. But, the proportion of couples that both wanted to space birth was inversely related to the couple's age difference. In those couples where there was narrow age difference between the spouses, 23.7% of the couples have agreed on spacing of the next child for two or more years. This was low at 14.5% for those couples in which the husbands are older by a minimum of 15 years.

The duration of marriage and the number of living children a couples has appeared to determine the degree of concordance between spouses concerning their fertility preferences. The proportion of couples with both wanted to limit birth was related directly with duration of marriage. High concordance on birth limiting between spouses (46%) was found among those with a marriage duration

of 20 years or longer. In contrast, low level of concordance for the same can be seen among couples with a duration of marriage of less than five years. The reverse holds for the need for birth spacing. Similarly, the proportion that both couples wanted to stop childbearing increased from a low of 1% among those with only one living child to 35.2% among those with four or more living children. On the other hand, couple's concordance on birth spacing need was related inversely with the number of living children.

Table 5.2. Couple's fertility preferences according to selected characteristics, 2016, EDHS

	Couple's fertility preferences				
	Both want to limit	Both want to space	Both want soon	Both have same fertility preferences	Discordant
Total	19.8	21.6	12.7	54.1	45.9
Region					
Tigray	16.2	30.4	11.7	58.3	41.7
Afar	1.7	14.6	29.5	45.8	54.2
Amhara	21.5	19.8	14.3	55.6	44.4
Oromia	20.0	20.0	10.9	50.9	49.1
Ethiopia- Somali	0.8	5.3	59.5	65.6**	34.4
Benishangul Gumuz	13.6	23.8	11.3	48.7	51.3
SNNP	22.4	26.4	7.0	55.8	44.2
Gambella	12.5	20.7	16.5	49.7	50.3
Harari	8.4	16.1	21.2	45.7	54.3
Addis Ababa	14.3	22.5	25.2	62.0	38.0
Dire Dawa	12.8	21.0	23.6	57.4	42.6
Place of residence					
Urban	14.3	20.8	23.1	58.2*	41.8
Rural	20.8	21.7	11.0	53.5	46.5
Couple's age difference					
Husband younger or 0-4 years older	16.5	23.7	12.5	52.7	47.3
Husband 5-9 years older	22.2	21.5	11.5	55.2	44.8
Husband 10-14 years older	20.5	21.1	15.1	56.7	43.3
Husband 15+ years older	21.2	14.5	14.3	50.0	50.0
Couple's education difference					
Both have No education	23.5	16.4	12.9	52.8	47.2
Both: same education level	12.6	30.0	14.2	56.8	43.2
Wife more educated	11.0	29.8	15.8	56.6	43.4
Husband more educated	22.0	20.8	10.9	53.7	46.3
Duration of marriage					
0-4 years	0.9	41.3	19.7	61.9*	38.1
5-9 years	6.5	35.8	9.8	52.1	47.9
10-14 years	16.1	21.4	12.4	49.9	50.1
15-19 years	22.6	11.1	12.4	46.1	53.9
20+ years	46.0	2.8.0	10.6	59.4	40.6
Living children					
0	0.5	24.1	41.7	66.3*	33.7
1	1.0	41.6**	14.3	56.9	43.1
2	7.7	32.5	10.9	51.1	48.9
3	15.1	23.6	10.3	49.0	51.0
4 +	35.2***	10.2	8.3	53.7	46.3

* $p < 0.05$, ** $p < 0.001$, *** $p < 0.0001$

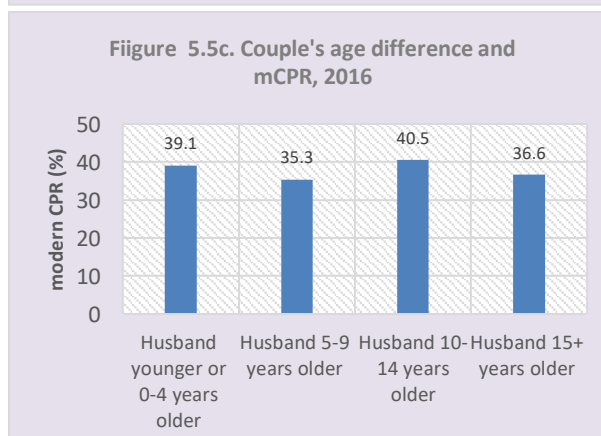
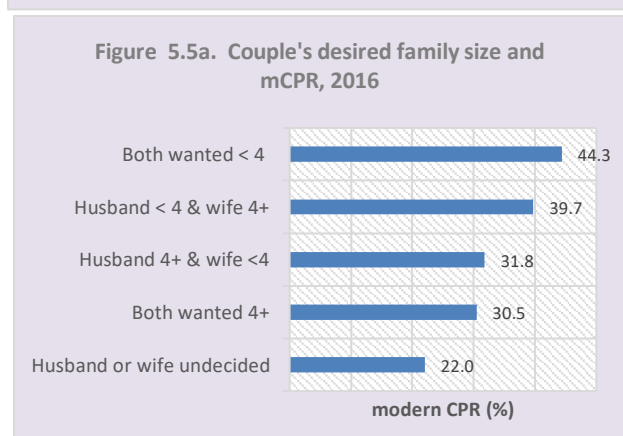
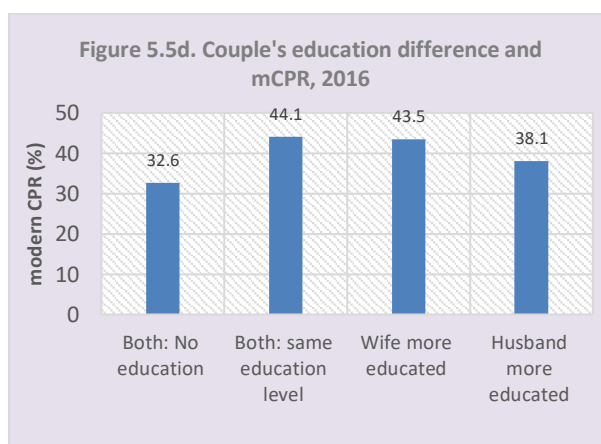
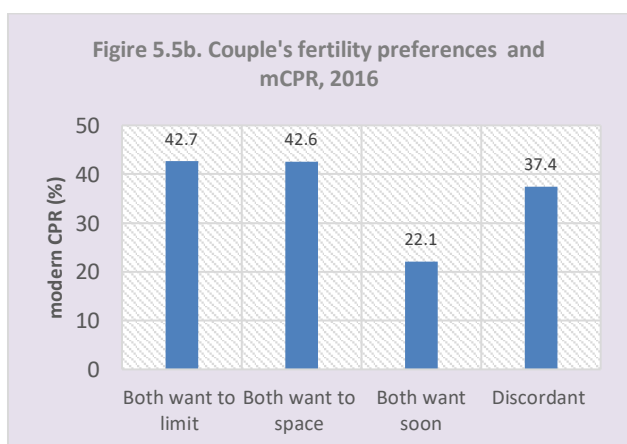
Couple's desired family size and fertility preferences and Contraceptive Use

Although it is expected that individuals who want to limit birth or those who want to postpone the next birth for two or more years are more likely to use family planning than those who want to have their next child soon, it is of interest to assess whether and to what extent contraceptives are used in situations where spouses agree or

disagree about their family size desires and fertility preferences. More specifically, this analysis focuses on unravelling couples' extent of contraceptive uptake in situations where the fertility goals of the man and woman are the same or different. In general, the data presented in Figures 5.5a-b and Table 5.3 largely confirm that couples who are in agreement in their fertility goals are significantly more likely to use contraceptive compared to those couples with discordant fertility desires/preferences. The prevalence of modern contraceptive use (mCPR) in 2016 was the highest at 44.3% among couples in whom both the man and woman wanted to have fewer than 4 children. This was followed by an mCPR value of 39.7% among those couples with the husbands wanted fewer children than the wives. On the other hand, CPR was much lower at 31.8% in couples where the husbands wanted to have four or more children, while the wives fewer than four children (Figure 5.5a). Only 22% of those couples who did not decide on the number of desired family size reported to use contraceptive in 2016

Contraceptive prevalence rate was significantly higher when both the man and woman wanted to limit birth (42.7%) or when both wanted to space the next birth (42.6%), compared to a CPR of 37.4% when the man and woman had discordant fertility preferences (Figure 5.5b). As expected, when both spouses wanted to have the next birth within two years (or soon) their contraceptive use decreased to 22.1%.

We did not find any significant association between contraceptive use and differences in couple's age (Figure 5.5c). Couple's joint educational status was related to their contraceptive behaviour as shown in Figure 14d. The highest CPR of 44.1% was associated with couples in which both the husband and wife have same level of education (both primary or both secondary or higher). Similarly, in a couple where the wife has higher education than the husband, CPR was notably high at 43.3%, while CPR was a little bit lower at 38.1% when the husband has more education. As expected, the lowest CPR of 32.6% was recorded among couples in which both spouses had no education.



Using binary Logistic Regression model, controlling for selected socio-demographic characteristics (Table 5.3), we examined the net effects of couples' fertility intentions on contraceptive use. After adjusting for region, place of residence, number of living children and duration of marriage and religion, couple's use of contraception was influenced significantly by their joint desired family size, their fertility preferences, and joint education status. The odds of using a modern contraceptive method was 49% higher (AOR=1.39) among couples in whom both the man and woman wanted fewer than four children compared to couples either of the spouses couldn't decide on their desired family size. Couples in whom both the man and woman wanted to limit birth exhibited a 40% (AOR=1.33) higher likelihood of using a contraceptive method as compared to couples in whom the spouses had discordant fertility preferences. There was increased likelihood of using contraception when both the husband and wife have same education level or when the wife had higher education, compared to those couples with both spouses did not have formal education. Other common covariates that have emerged as significant predictors of contraceptive use were region, religion, and the number of living children.

Table 5.3. Adjusted Odds Ratio (AOR) and 95% CI in the estimation of the likelihood of using modern contraceptive method (current use) according to couple's fertility behaviours and socio-demographic characteristics, 2016, EDHS				
	AOR	p-value	95% CI	
			Lower	Upper
Couple's desired family size				
Wife or husband undecided (Ref)				
Both want <4 children	1.49	0.047	1.00	2.20
Husband<4 & Wife 4+ children	1.26	0.112	0.95	1.68
Husband 4+ & Wife < 4 children	1.23	0.238	0.87	1.72
Both want 4+ children	1.09	0.510	0.85	1.39
Couple's fertility preferences				
Discordant (ref)				
Both want to limit	1.40	0.009	1.09	1.80
Both want to space	1.08	0.471	0.87	1.35
Both want soon	0.47	0.000	0.34	0.63
Couple's age difference				
Husband younger or 0-4 years older (Ref)				
Husband 5-9 years older	0.85	0.091	0.71	1.03
Husband 10-14 years older	1.08	0.484	0.87	1.35
Husband 15+ years older	0.96	0.798	0.71	1.30
Couple's education difference				
Both have No education (Ref)				
Both: same education level	1.44	0.012	1.08	1.91
Wife more educated	1.44	0.038	1.02	2.04
Husband more educated	1.28	0.067	0.99	1.59

Adjusted for region, place of residence, number of living children, religion and duration of marriage

Conclusion and programmatic implications

The findings of this study clearly underscore that incorporating men's fertility intentions and preferences, as individuals as well as within the context of couples, are of paramount importance to have a complete panorama of family planning and fertility situation in Ethiopia. To improve contraceptive uptake and warrant sustained use of contraception within couple, family planning program efforts should focus on strategies to increase men's awareness of the benefits of having fewer and spaced births. Ensuring men's role and involvement as primary partners in shared decision-making on fertility and family planning within the family should be emphasized. Fostering communication between spouses about the number of children and family planning can help to close the gap in fertility goal between spouses.

Unmet need and the demand for family planning are important measures of the need for family planning in a population and have important programmatic implication for planning and expanding access to family planning. Traditionally, unmet need for family planning is estimated based on women's stated fertility preferences and their contraceptive behaviour without considering the fertility preferences of their husbands. We have shown large discrepancies between husbands' and wives' fertility preferences, which can be translated to differences in unmet need between men and women. Excluding men's perspective from the calculation of unmet need makes it less accurate, and this calls for fine-tuning the measurement by incorporating men's fertility preferences along with their women counterparts.

Finally, it is important to recognize the general lack of up to date and comprehensive data on men's reproductive behaviour in Ethiopia. The EDHS data we presented here is limited to few variables and suffers from relatively smaller sample size as compared to the women's survey. It is therefore imperative that more data and evidence are made available on men and couples so as to enhance our understanding of the role of men in reproductive health and their contribution to the shaping of the future course of fertility in the country.

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6. Maternal health service use in Ethiopia

There is a general consensus that Ethiopia has made considerable progress in reducing maternal mortality in the last two decades. According to the UN estimates, Ethiopia has so far reduced maternal mortality by 69% from the 1990's maternal mortality ratio of 1400 per 100,000 to 420 per 100,000 in 2013⁴². The Ethiopia Demographic and Health Survey (DHS) estimate put the maternal mortality ratio for 2011 at 676 per 100,000 live births⁴³. On the other hand, the Lancet estimate of 497 per 100,000 for 2013 was closer to the UN estimate⁴⁴. Irrespective of the variations in the estimates across the different sources, all the three data sources point to the fact the country has achieved substantial reduction in maternal mortality compared to what was recorded in the 1990. With the aim of reducing maternal mortality to 267 per 100,000 live births in 2015, the country has implemented a set of high impact interventions including skilled birth services, Antenatal care (ANC) and Postnatal care among other services⁴⁵. Evidences show that high maternal, neonatal and child mortality rates are associated with inadequate and poor-quality maternal health care, including antenatal care, skilled attendance at birth and postnatal care^{46,47}.

Ethiopia has implemented different health sector development programs that are geared to address the low coverage of maternal health services use in the country, and thereby alleviate the unacceptably high maternal mortality in the country. In the past few years concerted efforts have been bestowed by the government of Ethiopia to improve maternal health services coverage through community mobilization and service promotion via the health extension program, expansion of health facilities, and increased availability of supplies and deployment of appropriately skilled health professionals. To this effect the number of health centres and hospitals providing basic and comprehensive emergency obstetric care has also increased in recent years. These efforts, taken together, resulted in significant improvements in the coverage of maternal health services use as well as reduction of maternal mortality.

In order to elucidate the state of maternal health services utilization in Ethiopia, we analyzed and presented available national data of the EDHS (2000-2019). The analysis in particular focuses on the trends, inequalities and determinants of use of antenatal care, delivery care and postnatal care services. It also discusses the policy and programmatic implications of the findings.

Antenatal care: frequency, timing and contents

The uptake of antenatal care in Ethiopia has increased dramatically over the past twenty years; the receipt of one or more ANC visit ranged from 28.2% in 1995-97 to 72.1% in 2017-2019 [Figure 6.1]. Trend was nearly stable until 2003 but started taking off afterwards. This may well correspond to the launching of the health extension program in 2003 where access to primary health care services including maternal health services have become widely available to the rural communities who otherwise had no easy access to the service. Similarly, the proportion of pregnant women who received the recommended four or more ANC visits also increased from 12.8% to 40.6% during the same period. The most recent data also suggests that only a little bit over half of the women who attended

⁴² Trends in Maternal Mortality: 1990 to 2013 Estimates. WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division

⁴³ Central Statistical Authority [Ethiopia] and ORC Macro, Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Authority and ORC Macro. 2012.

⁴⁴ Ibid, 3

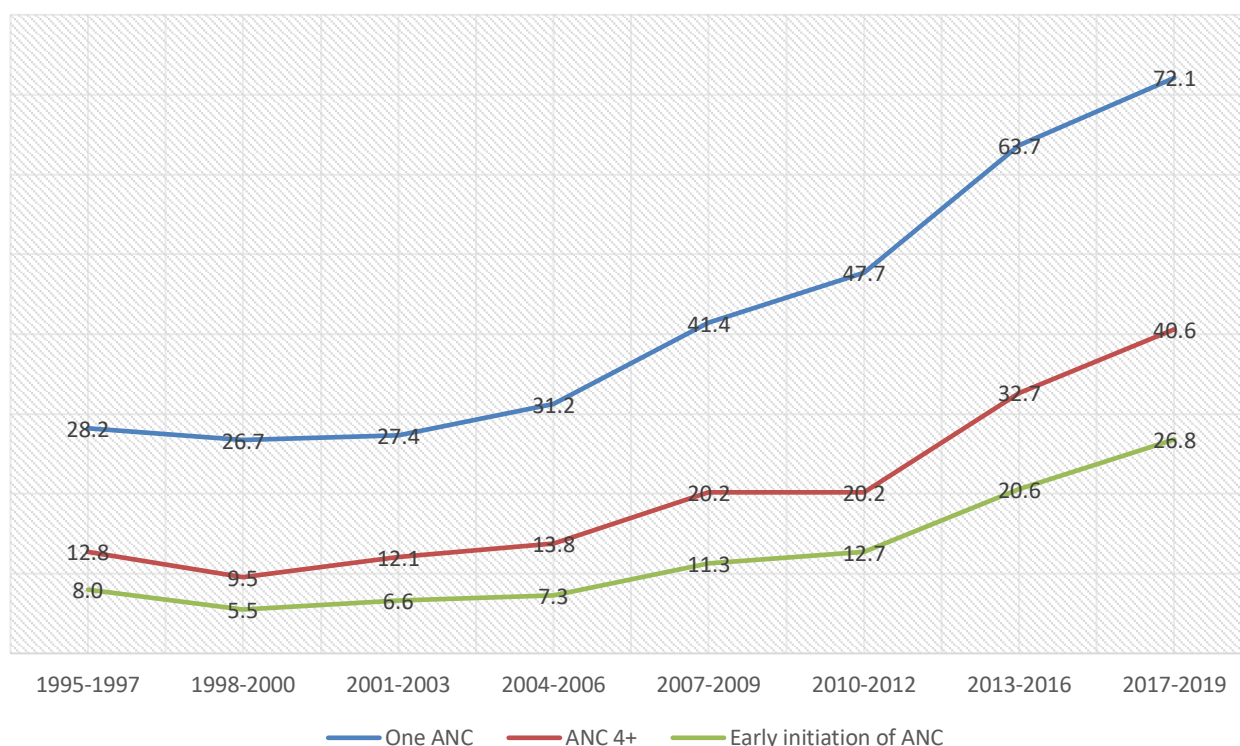
⁴⁵ FMOH. Health Sector Transformation Plan. August 2015

⁴⁶ Villar, J., H. Ba'aqeel, G. Piaggio, P. Lumbiganon, J. Miguel Belizan, U. Farnot, Y. Al-Mazrou, G. Carroli, A. Pinol, A. Donner, A. Langer, G. Nigenda, M. Mugford, J. Fox-Rushby, G. Hutton, P. Bergsjö, L. Bakketeig, H. Berendes, and J. Garcia. 2001. WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet* 357 (9268):1551-64.

⁴⁷ WHO. 1999. Reduction of maternal mortality: A joint WHO/UNFPA/UNICEF/World Bank statement. Geneva: World Health Organization.

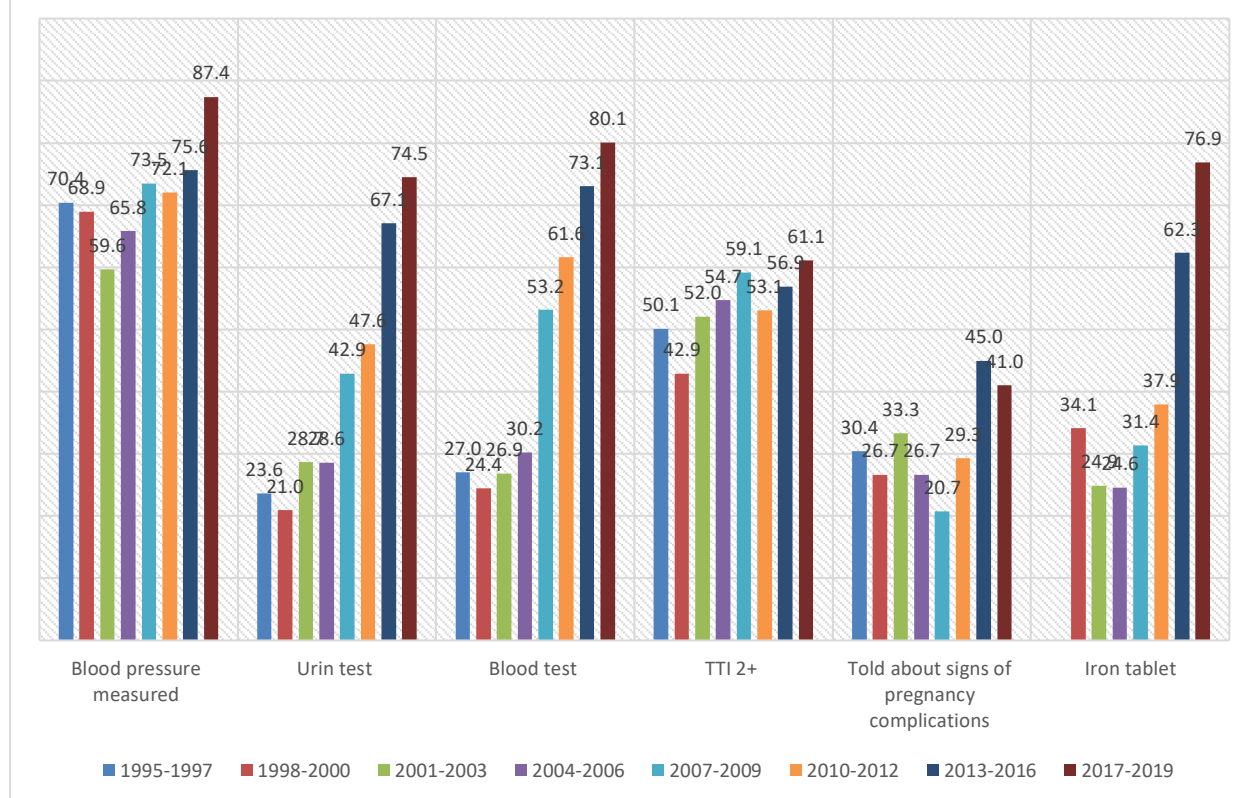
ANC (40.6% vs. 72.1%) received four or more visits. This raises concern on the quality and effectiveness of the country’s ANC program in identifying high risk pregnancies and provide services that are detrimental to the health of the pregnant women and the foetus. A key objective of maternal health care programs has been to ensure that women present for antenatal care early in pregnancy in order to allow enough time for essential diagnosis and treatment. The data suggest that this objective has not been adequately met. Although 72.1% had at least one ANC in recent years (2017-2019), only 26.8% had started their first visit during the first trimester of pregnancy. This is despite, the initiation of ANC within the first trimester has increased in the last two decades from 8% in 1995-97 to 26.8% in 2017-19.

Figure 6.1. Trends in at least one ANC visit, four or more or ANC visits and early initiation of ANC visit, 1995-2019, Ethiopia



While the mere attendance of ANC signals access, its quality is gauged by the receipt of those services with proven benefit by the women attending ANC. In the past two decades availability and accessibility of key services for ANC clients have improved in the country. Clearly, pregnant women attending ANC in 2017-19 had much better access to key services compared to those who visited ANC in previous years. For instance, among ANC attendees, the receipt of urine test increased from 23% in 1995-97 to 74.5% in 2017-19; the uptake of blood test increased from 27% to 80%; iron tablet provision from 34.1% to 76.9%; blood pressure measurement increased modestly from 70.4% to 84.7% during the period (Figure 6.2). Despite the increase, no similar trend was noted for the uptake of two or more TTI, with only half of the ANC attendees received TTI2 in 1995-97 and 61.1% in 2017-19. Pregnant women are in general ill-equipped with information to make appropriate choices especially when they are in danger – only 41% of the ANC clients in 2017-19 were told about the signs of pregnancy complications. There was a modest increasing trend in the receipt of information on danger signs in the last two decades from 30.4% in 1995-97 to 41% in the recent period.

Figure 6.2. Contents of ANC, 1995-2019, Ethiopia



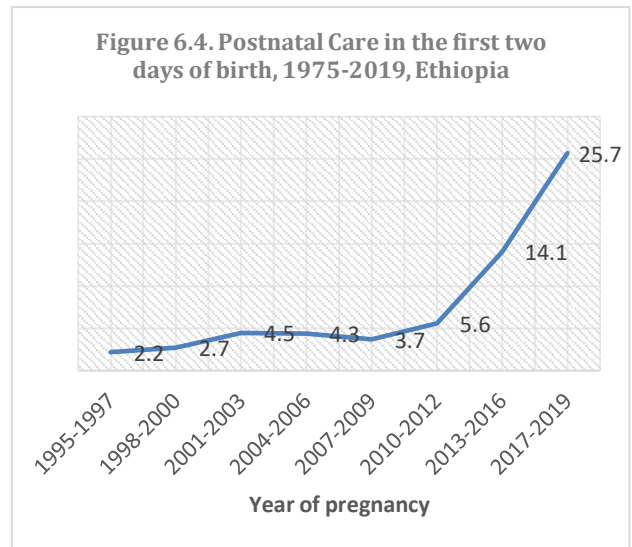
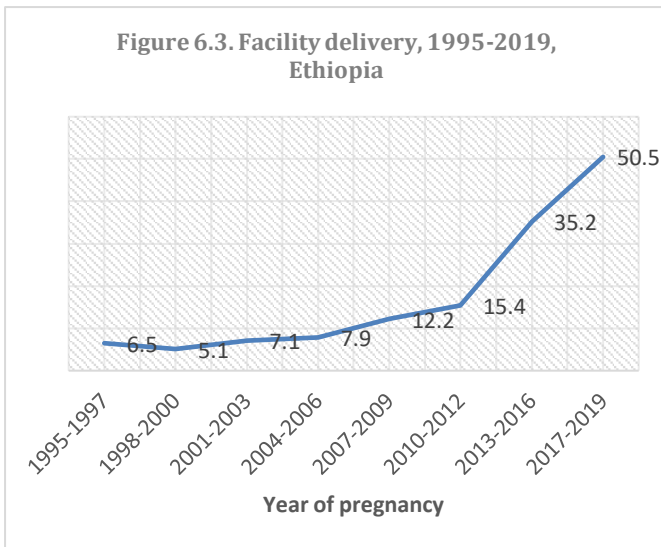
Facility delivery

There has been a recent surge in the proportion of women who delivered in health facilities. During the period 1995-2019, the proportion who delivered in health facilities increased from 6.5% to 50.5% (Figure 6.3). The increase was much faster since 2010 due to the recent concerted effort by the government to improve population access to and utilization of facility delivery in the country. Health centre was reported by far the most important health facility to provide delivery facility in the country. In 2017-19, 50.5% of the deliveries were attended in health facilities; this was much higher than the 2.2% deliveries attended in health centres in 1995-97. There were few health centres in the country back then and the recent increase in health centre deliveries is the result of the rapid expansion of health centres in the country. The recent data suggest that only about 13.8% of the deliveries were attended in other facilities such as hospitals and private facilities.

Postnatal care

Women who reported seeing health workers within two days of delivery are considered receiving Postnatal Care (PNC). Ethiopia remains to have the lowest PNC coverage although there has been modest improvement in this indicator over the years. During 1995-97, only 2.2% of the women received postnatal care within two days of delivery and this has increased to 25.7% in 2017-19 (Figure 6.4). The current rate is too low by any standard and falls at the lowest bound by the sub-Saharan Africa coverage rate; the median coverage for sub-Saharan countries being over 50%⁴⁸.

⁴⁸ Fort, et al., Postpartum Care: Levels and Determinants in Developing Countries. Calverton, Maryland, USA: Macro International Inc. 2006.



Regional variations

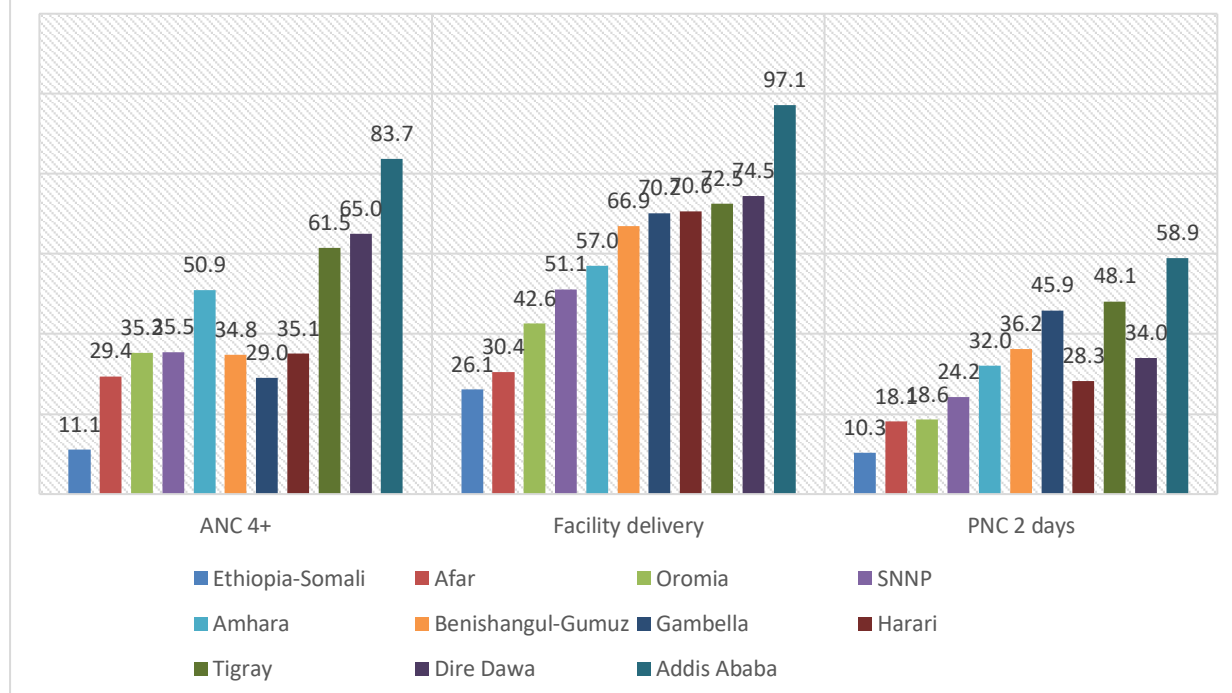
Regional differences in health indicators can be a reflection of several factors that operate at the demand and supply sides. It is also important to recognize the fact that regional differences in health indicators have been well noted ever since the country began to collect demographic and health data that are disaggregated by region. Thus, any disparity in health indicators by region is a combination of several factors including past levels and trends.

Figure 6.5 present coverage of ANC, facility delivery and postnatal care based on the most recent data (2017-2019). The uptake of four or more ANC visits by women varied significantly across regions, and the most recent data put it in the range of 11.1% in Ethiopia-Somali to 83.7% in Addis Ababa. Such inter-regional gap has persisted over the years and continue to exist in the country. Following Addis Ababa, high ANC 4+ coverage was recorded in Dire Dawa (65%), Tigray (61.5%), and Amhara (50.9%). The other regions of the country had relatively lower rate that ranged from 23.1 in Oromia to 35% in SNNP.

Similarly, inter-regional variation in facility delivery is apparent throughout the years in the country. According to the most recent data (2017-2019), this ranged from 26.1% in Ethiopia-Somali to 97% in Addis Ababa. Next to Addis Ababa, about 74.5% in Dire Dawa, 72.5% of the pregnant women in Tigray delivered in health facility. The three big regions of the country did not perform well in terms of facility delivery. Only 42.6%, 51.1% and 57.1% of the women in Oromia, SNNP and Amhara regions, respectively, delivered in health facility in 2017-2019.

The coverage of postnatal care within two days of delivery for births in 2017-2019 was in general low in the country and there have also been notable regional variations that ranged from 10.2% in Ethio-Somali region to 58.6% in Addis Ababa. Dire Dawa, Harari and Tigray regions are in the upper bound of this indicator. At the lower bound, along with Ethio-Somali region, are Afar and Oromia has their PNC (2 days) coverage rate less than 20%.

Figure 6.5. ANC, facility delivery and postnatal care (2 days) by region, 2017-2019, Ethiopia



Determinants of maternal health service use

We examined the determinants of ANC and facility delivery services use among women who were pregnant in 2013-2016 using a multivariate logistic regression model. We estimated and presented adjusted odds ratio (OR) and the associated p-values. The outcome variables of interest were attendance of four or more ANC visits and having facility delivery. Two broader categories of covariates were examined: (1) background factors, including residence (urban/rural), women's education, marital status, women's work status, household wealth and religion and (2) fertility behaviours, including age at pregnancy/birth, birth order, previous birth interval and pregnancy intention. As predictors of facility delivery, we added number of ANC visits and whether the women were told about the signs of pregnancy complications during ANC visits in a separate model. We run one model for ANC and two models for facility delivery. For facility delivery, Model 1 included variables related to background and fertility behaviours. Whilst Model 2 added the number of ANC visits and information about pregnancy complication on top of the background and fertility related covariates. All the three models were adjusted for region.

Table 6.1 presents the findings from the multivariate analyses separately from ANC and facility delivery. The uptake of four or more ANC visits by pregnant women appeared to be significantly shaped by a set of background factors as well as women's pregnancy intention. But the fertility behaviours of the women as measured by women's age, birth order and birth spacing did not emerge as significant and independent predictors of ANC use in our analysis. Urban women were 50% more likely than their rural counterparts to have had four or more ANC visits after controlling for women's education, wealth, marital status and fertility behaviours. This may well signal the role of unmeasured socio-cultural factors as well as differential in access to maternal health services between the urban

and rural areas. As expected, education almost always appeared as an important predictor of any health services use in Ethiopia including maternal health. Women with primary education appeared to have 48% increased odds of receiving four or more ANC visits compared to those women with no formal education. This was even much higher for women with seven or higher years of schooling; with a 2.4 times increased likelihood of receiving four or more ANC by these women compared to those with no formal education. A significant positive linear relationship can be noted between household wealth and the receipt of four or more ANC visits, with those women with better wealth status having significantly higher use of the service.

Interestingly, we have seen a significantly higher odds (adjusted OR=1.42) of having four or more ANC visits among women who said their pregnancy was planned compared to those who reported their pregnancy as unwanted and would have liked to stop childbearing by the time they were pregnant. This finding suggests that women may be more concerned of their health and that of the foetus when it is a planned pregnancy and more likely to use ANC services. Conversely, unwanted pregnancy could be demoralizing to women and this may discourage them from taking the necessary care for themselves and their foetuses.

Higher odds of facility delivery was associated with being urban resident, having at least primary education, and living in a relatively wealthier household (Model 1). The urban-rural disparity for facility delivery is unexpectedly high unlike ANC use, as the multivariate analysis indicated that urban women were 4.5 times more likely than their rural counterparts to have had their most recent delivery in health facilities. The inter-education gap in facility delivery is also huge. Compared to women with no education, those with seven or higher years of schooling were 4.2 times more likely to have had their delivery in the health institutions. Nearly a fourfold increase can be noted in the odds of having had facility delivery among women in the households with highest wealth score compared to those in the lowest. Another finding that is unique to facility delivery is, unlike in the case of ANC use, the low likelihood of facility delivery among women who are not followers of the mainstream religion (i.e. other than Christians or Muslims). Of note, only 3% of the women fall under the traditional religion category and this finding may not be as relevant.

Women's fertility behaviour appeared to be associated significantly with the likelihood of having facility delivery. This is unlike for ANC use. Compared to birth orders of one or two, women were 40% (adjusted OR=0.6) less likely to have had facility delivery for the fifth or higher order births. Similarly, this was lower by 29% (adjusted OR=0.71) for the third and fourth order births. It appeared that closely spaced births (less than two years interval) were less likely to be delivered in health facilities. Compared to women who had closely spaced births, those who had their immediately preceding births took place before two years had 48% higher odds of delivering in health facility.

Model 2 added the numbers of ANC visits and the receipt of information on pregnancy complication during ANC. Higher number of ANC visits is associated with an increased likelihood of delivering in health facility; with the odds of facility delivery increasing by 37% with an increase of every one more ANC visit. We also found positive and significant association between the women's receipt of information about pregnancy danger signs during ANC and delivery in health facility. Women who reported being told about the signs of pregnancy complication during ANC visit were found 45% more likely than those who did not to have had facility delivery. This interesting finding should be interested with caution and there could also be reverse causality in this association. This may well indicate that women who are informed about the different danger signs become more cautious and are encouraged to seek facility delivery to avoid any potential risk. Conversely, it is also possible that health workers selectively inform about pregnancy danger signs to those women with high risk pregnancy and encourage them to deliver in health facility. Irrespective of the source of motivation to seek facility

delivery, this finding further consolidates the benefit of information given to pregnant women during ANC in promoting facility delivery.

Table 6.1. Adjusted logistic regression odds ratio (OR) and p-value in the estimation of the likelihood of having four or more ANC visits and facility delivery according to selected covariates, 2013-2016, Ethiopia.

	ANC 4+		Facility delivery			
	Adjusted OR	P-value	Model 1		Model 2	
			Adjusted OR	P-value	Adjusted OR	P-value
BACKGROUND						
Residence (<i>Rural</i>)						
<i>Urban</i>	1.50	0.099	4.51	0.000	4.39	0.000
Education (<i>No education</i>)						
<i>1-6 grade</i>	1.48	0.000	1.55	0.000	1.34	0.004
<i>7+ grade</i>	2.44	0.000	4.25	0.000	3.21	0.000
Marital status (<i>Not married</i>)						
<i>Currently married</i>	0.86	0.425	1.31	0.164	1.25	0.316
Women work status (<i>not working/no paid job</i>)						
<i>Agriculture</i>	1.03	0.822	0.97	0.801	0.95	0.711
<i>Paid work</i>	1.02	0.840	1.13	0.357	1.08	0.562
Household wealth (<i>lowest</i>)						
<i>Second</i>	1.41	0.007	1.85	0.000	1.74	0.001
<i>Middle</i>	1.61	0.000	2.22	0.000	1.95	0.000
<i>Fourth</i>	2.32	0.000	2.72	0.000	2.05	0.000
<i>Highest</i>	2.60	0.000	3.96	0.000	2.89	0.000
Religion (<i>other religion</i>)						
<i>Orthodox Christian</i>	1.86	2.70	2.65	0.002	2.27	0.013
<i>Muslim</i>	2.08	2.76	2.77	0.003	2.30	0.018
<i>Protestant</i>	1.32	1.66	1.64	0.110	1.57	0.166
FERTILITY BEHAVIOURS						
Age at pregnancy/birth (<i><18 years</i>)						
<i>18-34 years</i>	1.32	0.302	1.24	0.397	1.14	0.615
<i>35+ years</i>	1.20	0.529	1.31	0.363	1.25	0.469
Birth order (<i>1-2</i>)						
<i>3-4</i>	1.08	0.609	0.71	0.021	0.68	0.015
<i>5+</i>	1.00	0.972	0.60	0.000	0.59	0.000
Birth interval (<i>less than 2 years</i>)						
<i>2+ years</i>	1.04	0.793	1.48	0.003	1.43	0.010
Pregnancy intention (<i>did not want any child at all/wanted to limit</i>)						
<i>Planned</i>	1.42	0.029	1.01	0.938	0.83	0.296
<i>Untimed (wanted later)</i>	1.04	0.827	0.97	0.878	0.87	0.455
ANC VISITS AND INFORMATION GIVEN						
Number of ANC visits (increase of 1 visit)					1.37	0.000
Told about pregnancy complication (No)						
<i>Yes</i>					1.45	0.001

Reference category in parenthesis; Model adjusted for region (coverage varied independently & significantly by region)

Concussion and programmatic recommendations

Maternal health continues to be a high priority target for Ethiopia and that reduction of maternal mortality remains an important goal of the country's health program. Ethiopia has seen positive developments in many health indicators in the last two decades and among these are indicators of key maternal health services. Over the past two decades, trends of the key maternal health services suggest improvements in the coverage of antenatal care and its contents, facility delivery, and postnatal care services. Concurrently, the maternal mortality ratio has declined by two-third in the last one and half decade in Ethiopia and part of the decline may well be attributable to the increase in maternal health service use, especially, facility delivery. An analysis of the correlation between maternal health service coverage and maternal mortality in sub-Saharan Africa suggest that the increasing trend in the utilization of maternal care services in the region was found to concur with a steady decline in maternal mortality⁴⁹.

In spite of the encouraging trends, however, current maternal health services coverage levels in the country can be considered low by any standard and are much lower than the sub-Saharan African averages for these indicators. Women's use of maternal health services is influenced by a set of background factors and these mainly revolve around their region, urban/rural residence, education and wealth. Clearly, the analysis presented in this report revealed that the recent improvements in the national averages of maternal health services coverage have not been achieved equally for the poor and the wealthy as well as those with higher education and those in the low/no education strata. The faster the progress in using health services among the poor and less educated has the greater potential for improvement in maternal health outcomes, which could eventually lead to the elimination of inequalities in maternal health status between these social strata⁵⁰.

Stark inter-regional inequities in maternal health services have existed and continue to exist in the country. Both demand and supply side factors could play their parts for the observed variation in maternal health service uses, in addition to the baseline differences in health service coverage across the regions. Regions need to evaluate their maternal health programs and devise tailor-made strategies that are in alignment with the national strategy and address the low coverage and sub-optimal quality of maternal health services.

The World Health Organization recommends four antenatal visits for women whose pregnancies are progressing normally, with the first visit in the first trimester. In this regard the ANC use in Ethiopia can be considered sub-optimal. The most recent DHS (2016) revealed that only 21% of the women reported to have initiated ANC in the first trimester and less than a third (33%) of the pregnant women received four or more ANC visits. ANC services can only be effective if it encompasses preventive measures and supportive care to help maintain normal pregnancy as well as health messages and counseling on potential danger signs of pregnancy complications, birth preparedness, and nutrition counseling, among others. The recent data suggest significant improvement in the uptake of key services by women attending ANC, including the measurement of blood pressure, having blood test, the administration of iron tablet, and urine test. Yet, the ANC service in the health facilities is still facing high missed opportunity for key ANC components. Among ANC clients, between 25% and 55% did not receive one or more of the following services: two TTIs, urine test, iron tablet, blood pressure test and information on danger signs. These may well concern the sub-optimal nature of the antenatal care services in the health facilities and also raise concerns on the effectiveness of the service

⁴⁹ Alam N, Hajizadeh M, Dumont A, Fournier P (2015) Inequalities in Maternal Health Care Utilization in Sub-Saharan African Countries: A Multiyear and Multi-Country Analysis. *PLoS ONE* 10(4): e0120922. doi:10.1371/journal.pone.0120922

⁵⁰ Wang, Wenjuan. 2013. Assessing Trends in Inequalities in Maternal and Child Health and Health Care in Cambodia. DHS Further Analysis Reports No. 86. Calverton, Maryland, USA: ICF International.

received by pregnant women. Program thus needs to be cognizant of the existence of high missed opportunity for essential elements of antenatal care and find ways to address the problem. Women should also be well informed and encouraged to initiate antenatal care in the first trimester of pregnancy and receive adequate number of visits for better outcome.

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