Trends in Modern Contraceptive Use in Ethiopia: Empirical Evidence from a decade-long Family Planning Program Implementation

Bekele Belayihun[1*], Mengistu Asnake[1], Girma K. Gebre[1], Almaze Yirga[1], Elizabeth Futrell[2], Yordanos B. Molla[2]

Abstract

Background: Changes in modern contraceptive prevalence rate are among the determinants of a country's efforts to improve its reproductive health but limited longitudinal data and variability in data sources create difficulties in monitoring progress for family planning outcomes. The objective of this study is to be presenting empirical evidence from pathfinder monitoring and documentation experience, and lessons learned from a decade of family planning program implementation in Ethiopia from 2011 to 2019.

Method: We accessed records of 24,621 women of reproductive age from Pathfinder International's annual Follow-up survey database. The descriptive statistics (table and figure) used to estimate the changes in modern contraceptive prevalence rate and method mix from 2011 to 2019 where the organization implemented family planning services. The statistical stability of survey estimates across the nine-year period using variance estimate and coefficient of variation less than 30%. The ascertained plausible interpretation of the observed trends by referring to other national surveys and program documents of the organization. All analyses were done using SPSS version 20.

Results: Findings indicated that there was a 17-percentage point (95% CI: 4.8 – 22.1) increase in modern contraceptive prevalence rate between 2011 and 2019. Long-acting reversible contraceptives accounted for a significant share of this increase, particularly implants (mean difference =18%, 95% CI, 15-20%, p-value< 0.001). Among short-acting methods, use of injectables accounted for a significant portion of the increase (mean difference =4%, 95% CI= 2-7%, P<0.001).

Conclusion: Findings indicated that the observed changes were correlated with integration of family planning into primary health care services, improved service availability and access, and expanded method choice in the intervention areas. This analysis provided empirical evidence that aligning a program's monitoring system with national priorities can provide information to foster timely subnational decision making, document contributions of organizations to national programs, and generate scalable lessons. [*Ethiop. J. Health Dev.* 2021;35(SI-5):63-69]

Keywords: Contraceptives, Modern Contraceptive Prevalence Rate, Method Mix, Performance Monitoring, Ethiopia

Introduction

The overall trend of contraceptive prevalence rate has increased globally and unmet need for family planning (FP) declined. However, the pace of change over time varied between regions (1,2). In Ethiopia, annual modern contraceptive prevalence rate (mCPR) has shown an incremental change (3). Stakeholders have partnered with the Ministry of Health (MOH) in improving FP accessibility and contributing to the government's Family Planning 2020 (FP2020) commitment to improve the health status of its population and achieve the country's development goals (4). The Family Guidance Association of Ethiopia (FGAE) pioneered FP service in 1966 with seed money from Pathfinder Fund. FGAE remained the sole provider of FP services until 1980 when the MOH began providing services (5). The government of Ethiopia expanded FP services after 1980 with country support programs and continued to expand FP with the adoption of the national population policy in 1993 (6,7).

Following the launch of the national population policy, mCPR improved in Ethiopia. While it grew from 2.9 percent in 1990 to 6.3 percent in 2000, it remained notably low (8). Since 2003, various organizations have implemented FP interventions to address the needs of millions of Ethiopian women who wish to delay or limit births. Achievements such as expansion of community-based FP services using health-extension programs (HEP) occurred and impacted 41% of mCPR in 2019—more than six-fold increase from 2000 (4,7,9,10). Despite this progress, mCPR, including use of Long Acting and Reversible Contraceptives (LARCs), remains low, and high unmet need for FP (16.2%) (11,12).

Since 2008, Pathfinder International and its partners have supported the MOH in increasing access to and use of quality FP services by creating community awareness, strengthening provider capacity, and ensuring supplies of contraceptive commodities and consumables (9,13). From 2008 to 2016, Pathfinder International led the USAID-funded Integrated Family Health Program (IFHP) in four agrarian regions (Amhara, Oromia, SNNP and Tigray). The program strengthened 300 woredas/districts by building a stronger and more skilled health workforce, supporting HEP, providing logistic support to the public health facilities, and applying program learning to improve and inform policy (9, 13,14). Since 2017, again Pathfinder has led the USAID Transform: Primary Health Care Activity, which will operate through 2022. The Activity continues to support and expand access to quality FP services by improving household and community practices and encouraging health- seeking behavior in the same regions of the country and covering more than 400 woredas/districts (15).

Studies indicated that integration of FP into HEP could significantly improve provision of FP services in the community (16,17). The IFHP and Transform: Primary

[1*]Pathfinder International, Addis Ababa, Ethiopia [*]Corresponding Author: bbelayihun@pathfinder.org.
[2]Pathfinder International-Boston, USA

Health Care Activity were designed to integrate FP services into primary health care entities.

The MOH and its partners have worked to revitalize LARCs since 2009. Pathfinder International spearheaded an initiative aimed at expanding access to and use of implants by providing them at the community level. The projects' capacity-strengthening efforts included task sharing for implant insertion by community health extension workers (HEW) (13). Pathfinder International supported the MOH to train HEWs on Implanon insertion (13). The result showed dramatic increases in implant use as the main driver of LARC growth in Ethiopia. Prior to this task-sharing initiative, HEWs were only permitted to provide short-acting contraceptive methods. Implanon insertion services were only available at higher-level health facilities. To train HEWs on Implanon insertion, Pathfinder followed a phased based approach, which consisted of a learning phase that transitioned into a scale-up phase (9,10,13). The approach proved to be a successful model for increasing access to contraceptive methods in the community and resulted in increased contraceptive use.

To monitor the progress of project implementation, Pathfinder introduced a community-level random follow-up visit approach in 2011 as part of its routine performance monitoring system (14). The analysis examined trend of modern contraceptive use and method mix among women of reproductive age selected from the project implementation regions to assess the contributions of IFHP and Transform: Primary Health Care Activity to the national FP uptake.

Methods

Study design and setting:

The follow-up visit employed a multistage interrupted cross-sectional study design in USAID 'Transform: Primary Health Care's' implementation regions (Amhara, Tigray, Oromia and SNNP[1®]). This study is part of the effort to support the Ethiopian governments in attaining the health transformation agendas. In IFHP implementation initially started in 286 (in 2008) rural woredas/districts and over time expanded to 300 rural woredas (in 2016), and In Transform: Primary Health Care Activity implementation, initially started 300 rural woredas (2017) and over time expanded to 400 rural woredas (in 2019). The study analysis focused on all the intervention rural woredas.

Sampling size and sampling

A sampling frame was prepared by listing woreda health offices (WorHOs) under each implementation region, health centers under each WorHO, and health posts under each health center. A minimum of 128 WorHOs, 256 health centers and 512 HPs were selected randomly using proportion to the size of the region, but the sample varies in each year of the follow up visit. Once a health post was randomly selected for the follow-up visit, the kebele (village) associated with the selected health post was chosen for the next stage of sampling. From each selected kebele, five households were selected using a random-walk technique. If there was more than one eligible respondent in a household, simple random sampling was used to select one eligible respondent through lottery method. Similar approaches were used every year during the follow up visits. The primary purpose of the follow-up visit was to observe annual project performance during the implementation and monitor the progress towards project objectives, which national routine information in the intervention areas would not indicate (14, 18). There was 36,127 women of reproductive age who responded to the nine rounds of follow up visits. All non-pregnant and sexually active reproductive age (15-49 years) women who had used or not used contraceptive methods was the study population. To obtained information from the households, a standard checklist was used, and details about the follow-up visit methodology have been published (14).

Data collection process:

A household questionnaire was developed in consultation with program technical advisors. Key questions on child health, maternal and newborn health (MNH) and FP were considered. Regional program staff members received training to use the survey questionnaire and were responsible for data collection in their respective catchment areas. Data collection was conducted annually between January and March. During the visits of households for data collection, data collectors apart from forwarding the questions to the respondents, made specific observations about the availability of health-service-related materials in the household.

To measure modern contraceptive use, women were asked, "Are you or your husband or partner doing anything now to prevent pregnancy?" Respondents who answered "yes" were asked, "What kind of contraceptives are you or your husband or partner using now to keep from getting pregnant?" This question included the following specific contraceptive methods [oral contraceptive pills (OCPs), lactational amenorrhea method (LAM), tubal ligation, intrauterine contraceptive device (IUCD), injectables, implants, condoms, diaphragm, and emergency contraception], "not having sex (abstinence)," and "other." Respondents answering "other" were given the opportunity to write in a response; when possible; some responses were recoded into existing method options or were recoded as new method options.

Modern contraception use was further grouped into four categories: permanent methods (tubal ligation); LARCs (implants and IUCDs); short-acting contraceptives (injectables and OCPs); and no method. Women who reported not having sex were coded as not using contraception, and those who reported more than one contraceptive method were categorized by the most effective method they reported.

[1] ®*During the time of data collection, Sidama and South-west region was part of SNNP and in this study, the term "SNNP" is used to refer three regions (Sidama, SNNP, South-west)".*

Data management

The data management process and data quality check were managed by the Pathfinder regional and county office learning teams. Access database was used to enter the data and then transferred to SPSS Version 20 for analysis. To ensure data quality, close supervision during the data collection process was done; and before analysis, data cleaning was done whereby outliers were identified and checked with the source data. Analyses was done on annual follow-up visit data collected from 2011 to 2019 covered the USAID-IFHP project (2011-2016) and the USAID Transform: Primary Health Care Activity (2017-2019) were implemented. For this analysis, women who reported being pregnant, women with missing data on status of contraceptive use, and women who reported contraceptive use but did not respond to the follow-up questions about types of contraceptives used were excluded. A final sample of 24,621 non-pregnant sexually active reproductive age women who had used or not used contraceptive methods was analyzed. The analysis included 13,576 women of reproductive age surveyed during the IFHP project implementation (2011-2016) and 11,045 women of reproductive age surveyed during Transform Primary Health Care Activity Implementation (2017-2019).

Statistical analysis

The data analysis focused on the overall pattern of change in contraceptive use over time. This analysis employed descriptive using graph and table, and trend analysis of modern contraceptive use and method mix. All analyses were done using SPSS version 20. The proportional difference was used to determine whether there was statistically significant difference in the proportion of women who used contraceptives from year to year (19, 20). Statistical significance was determined with cut-off values set at $p<0.05$ with 95 percent confidence interval (CI). The paper compared survey results using their variance estimate (taking square root of variance, that is standard error) and coefficient of variation (CV), where CV which was calculated by dividing standard errors by mean (<30%) to assess the statistical stability of survey estimates across the nine years.

Ethical consideration

Pathfinder International obtained ethical clearance from Ethiopia Ministry of Health to implement the project through monitoring the progress of the project. During follow up visit, the interviewer read aloud a statement to get consent from the respondents and they provided a verbal consent. Therefore, this report did not require ethical clearance by the human-subject research ethics review board. Detailed information on the method and ethical issues was published (14,18).

Results

Of the 24,621 non-pregnant women of reproductive age included in the analysis, 13,362 (54%) received modern contraceptive services within the nine-year period. Comparing the analysis results with their variance is less than 30% and observed that the estimates were stable across the nine years; hence, trend analysis across the years is logical (Table 1).

The proportion of women who received contraceptives increased steadily every year, other than a decline during the transition period when IFHP ended in 2016 and Transform Primary Health Care Activity began in 2017. The proportion of modern contraceptive use increased by 21 percentage points from 42 percent in 2011 to 63 percent in 2019 (Fig1). During the first years of IFHP, there was a notable increase between 2011 and 2012, followed by stable trend between 2012 and 2015.

Table 1. **Modern Contraceptive Use by Women of Reproductive Age from Follow-up Visit 2011-2019**

Year	Number of women	Modern Contraceptive Use		
		mean	SE	CV %
2011	1999	0.415	0.011	2.65
2012	2110	0.516	0.011	2.13
2013	2144	0.518	0.011	2.12
2014	2396	0.534	0.010	1.87
2015	2397	0.538	0.010	1.86
2016	2530	0.613	0.010	1.63
2017	3313	0.487	0.009	1.85
2018	3595	0.56	0.008	1.43
2019	4137	0.625	0.008	1.28

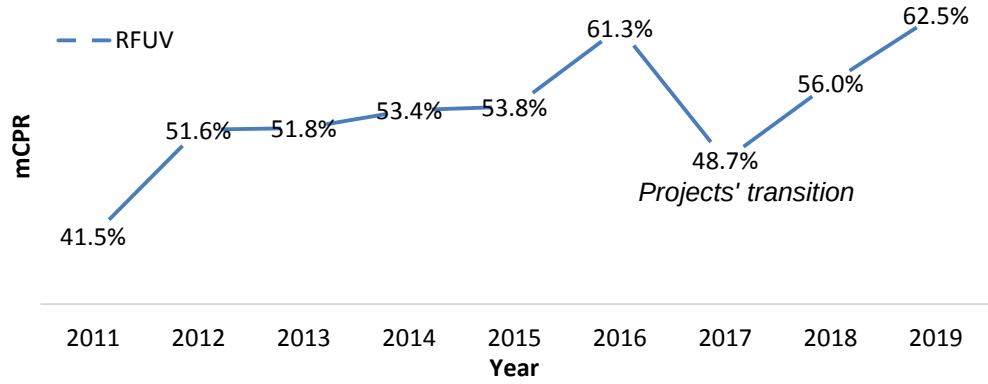

Figure 1. **Annual trends in mCPR among reproductive age women**

The next major leap was between 2015 and 2016, just before the end of the project (Table 2). The pooled average increment during the project period was 3.4 percentage points. During the USAID Transform: Primary Health Care Activity, modern contraceptive use increased close to 14 percentage points from 2017 to 2019. Overall, there was a significant change in modern contraceptive users over the nine-year period with p-value<0.001 (95% CI, 18-24%).

Table 2**. Changes in Method Choice from 2011 to 2019**

Year	Estimated change % (95% CI)	
	Any Method	Modern Method
2011-2012	9.1 (6.1,12.2)	10.1(7.1,13.1)
2012-2013	0.7(-2.3,3.7)	0.2(-2.8,3.2)
2013-2014	1.1(-1.8,4.0)	1.7(-1.2,4.6)
2014-2015	-0.9(-3.7,2)	0.4(-2.5,3.2)
2015-2016	11(8.3,13.7)	7.5(4.7,10.2)
2016-2017	-15.3 (-17.8, -12.8)	-12.6(-15.1, -10)
2017-2018	7.1(4.7,9.4)	7.3(5,9.7)
2018-2019	6(3.8,8.2)	6.5(4.3,8.7)
2011-2019	18.9 (16.3,21.5)	21 (18-24)

Of the 13,362 modern-contraceptive users, 5,038 (38%) women received injectables and 1,775 (13%) received implants. The 17-percentage points increase in LARC use, from 5 percent in 2011 to 22 percent in 2019, was progressive and significant (p<0.001;95% CI=15-19%). Short-acting contraceptive use increased from 35 percent in 2011 to 41 percent in 2016 but declined during the project transition period between 2016 and 2017. Overall use of short-acting contraceptives fluctuated over the nine-year period but ultimately increased significantly (p<0.014; 95% CI= 2-8%). Use of permanent methods remained low and did not show a significant change; however, there was a surge in 2015 (Fig.2).

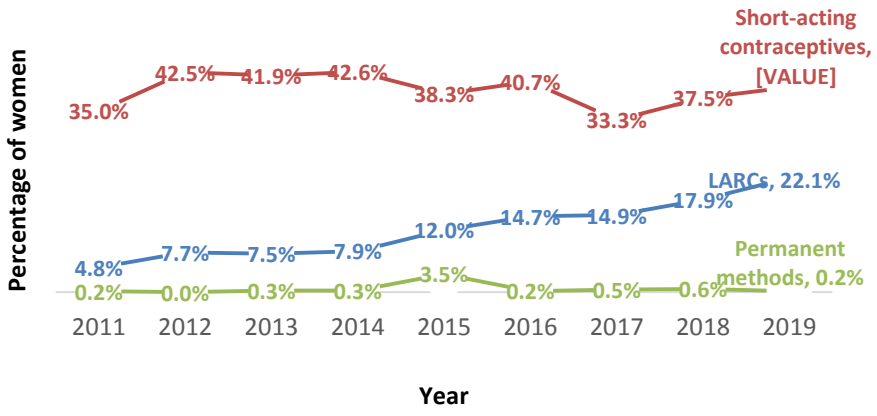

Figure 2. **Annual trends in Method Choice among women of reproductive ages**

The proportion of women using OCPs decreased from 1.5 percent (2011) to 1 percent (2019) over the nine-year period, but the decrease was not statistically significant (p=0.234). The proportion of injectable contraceptive users was uneven throughout the nine-year period but ultimately increased from 33.5 percent to 38.0 percent (p<0.001, (95% CI=2-7%)). Implant use increased steadily and significantly, from 4.4 percent in 2011 to 22 percent in 2019 (p< 0.001; 95% CI= 15-20%) (Fig 3).

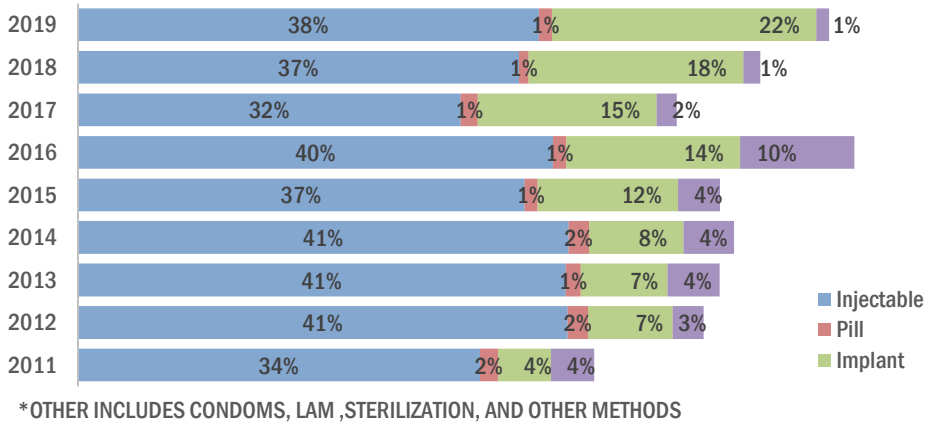

Figure 3. **Trends in Contraceptive Method Mix Among Women Ages 15 to 49**

Discussion

The use of contraceptives provides an insight into one of the principal determinants of fertility and serve as a key measure for assessing the success of national FP program efforts. This analysis from nearly a decade of Pathfinder International's FP programming provides empirical evidence using program monitoring data. The data documents positive change in modern contraceptive use and method mix, particularly in use of LARCs. The data supports an overall increase in uptake of modern contraceptive methods. A similar overall improvement in mCPR was reported for Ethiopia in its annual Performance Monitoring for Action (PMA) surveys (21).

While studies in sub-Saharan Africa have established variations in mCPR and method-specific contraceptive prevalence, short-acting methods are the most-used methods (22-26). The steady increment in Implanon uptake in the last nine years, therefore, can be attributed to improved overall quality of available services and reduction of barriers to access of LARCs. Although this analysis validates an increase in the uptake of LARCs and a resulting overall increase in contraceptive uptake. Similar evidence supports our findings, provision of Implants uptake gradually improved by the population over the years because of improved access to contraceptive services and method choice (13). However, most women who intend to delay or space pregnancies still want to use short-acting methods (27-29).

Results from trend analysis demonstrated stable growth in the uptake of LARCs from 2011 to 2019 intervention period and in line with similar studies, which also reported increases in mCPR in Ethiopia and in the specific project implementation regions (10, 21). However, there was a decline between 2016 and 2017, which was the transition period from IFHP to Transform Primary Health Care. This transition included additional new woredas selected for the follow-on project. These woredas had low mCPRs compared to those of previous IFHP project woredas.

The proportion of women who used permanent methods varied little between 2011 and 2019. However, the observed rates in the project implementation area remained lower than other studies on permanent method use conducted in the same year (30,31). The overall proportion of women using permanent methods was very low compared to the national FP target of 2020 and compared to the existing demand for permanent methods (17). However, there was a surge in tubal ligations in 2015 because Pathfinder International had a pilot initiative to revitalize permanent method service provision in 2015. It supported the regional health bureau to train medical doctors and nurses, led discussions with primary health care unit and hospital staff, and provided orientation for health extension workers about permanent method service access and delivery and impacted to improve use of tubal ligations in 2015.

A change in uptake of one contraceptive method affects the entire method mix. In this study, injectable contraceptive use was predominant over the nine-year period. This aligns with findings in many sub-Saharan countries, including Ethiopia (32). However, the data also showed increased use of LARCs, specifically implants which increased from 4.4 percent to 22 percent of the total method mix among women of reproductive age. The finding reflects the fact that long-acting methods such as implants have been reported to be improved method mix and promoted as the contraceptive option by task sharing initiatives (13,33).

Limitation

This analysis highlighted important findings to support FP programming in Ethiopia but was not without limitations. The random follow-up data collection used a similar sampling procedure for identifying the study areas and participants across the timeframe. However, it did not include individual variables that might have contributed to the change in contraceptive use such as socio-demographic and socio-cultural variables

because of the variation in the variable definition and completeness from one year to the next in the follow-up visit checklist. In addition, USAID-IFHP (2011-2016) and Transform: Primary Health Care (2017-2019) may not be the only FP programs being implemented in the project target population or regions during the period, the finding does not show other FP program contribution to the results. Furthermore, strong conclusions could not be drawn with respect to the causes of changes of modern contraceptive use because of the interrupted cross-sectional design of the survey; causality could not be established. In addition, the prevalence figures in this analysis are higher than in other community-based analyses, because this analysis focused only on project-intervention areas, while other data consider non-project areas, and it lacked a comparison group (from a non-project area).

Conclusions

Modern contraceptive use among women of reproductive age showed a remarkable increase between 2011 and 2019 in the regions where IFHP and USAID Transform: Primary Health Care Activity were implemented. This might be due to integration of FP into other primary health care services, which improved service availability and readiness as well as method choice in the project's intervention areas. The projects seem to have contributed to contraceptive uptake by improving access to FP services and expanding method choice so that LARCs, particularly implants, were added to the mix of FP options provided at the community level by community health extension workers. Most importantly, this analysis provided empirical evidence that aligning a program's monitoring system with national priorities can provide information to foster timely subnational decision making, document contributions of organizations to national programs, and generate scalable lessons. The trends in mCPR and unmet need for FP and the project contributed to the number of potential contraceptive users indicate that increase FP investment is necessary to meet demand for contraceptive methods and improve reproductive health status of its population.

Declarations

Competing Interests:

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this article. Authors have declared that they have no competing interests.

Availability of data and materials:

The data sets used in this study are not publicly available to ensure individual privacy. All information related to the processed data is underlying the results section. The raw data used in this analysis is available from the corresponding author through reasonable request.

Funding:

This analysis was funded by United States Agency for International Development (USAID) under cooperative agreement number of AID-663-A-17- 00002. All opinions expressed herein are of the authors and do not necessarily reflect the views of Pathfinder International or USAID. The funder provided support in the form of salaries to authors but did not have any additional role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Acknowledgment:

The Authors would like to acknowledge the contribution of Ismael Ali, Habtamu Zerihun, Yewondwossen Tilahun, regional monitoring and evaluation officers, FP/SRH program officers and project regional managers and cluster staff.

References

1. Alkema L, Kantorova V, Menozzi C, Biddlecom A. National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. The Lancet. 2013 May;381(9878):1642–52.
2. Fiato N. Family planning in sub-Saharan Africa: a review of interventions in promotion of long-acting reversible contraception [Internet]. University of Pittsburgh; 2016. Accessed April 2019, and Available from: http://d-scholarship.pitt.edu/27371/
3. Family Planning 2020 Data Dashboard [Internet]. [cited 2020 Aug 18]. Available from: http://www.familyplanning2020.org/data-dashboard
4. Family Planning 2020 Commitment of the Government of Ethiopia [Internet]. [cited 2020 Aug 18]. Available from: https://www.family planning 2020.org/Ethiopia
5. Ethiopia Ministry of Health. National Guideline for Family Planning Services in Ethiopia; 2011.Available from: https://www.prb.org/wp-content/uploads/2018/05/National-Guideline-for-Family-Planning-Services-in-Ethiopia-2011.pdf
6. Worku AG, Tessema GA, Zeleke AA. Trends of Modern Contraceptive Use among Young Married Women Based on the 2000, 2005, and 2011 Ethiopian Demographic and Health Surveys: A Multivariate Decomposition Analysis; PLoSONE 10(1):e0116525. https://doi.org/10.1371/journal.pone.0116525
7. Asnake M, Henry EG, Tilahun Y, Oliveras E. Addressing unmet need for long-acting family planning in Ethiopia: Uptake of single-rod progestogen contraceptive implants (Implanon) and characteristics of users. International Journal of Gynecology & Obstetrics. 2013 Nov;123:e29–32.
8. African Institute for Development Policy. Assessment of Drivers of Progress in Increasing Contraceptive Use in Sub-Saharan Africa: Case Studies from Eastern and Southern Africa; 2013. Available from: https://www.afidep.org/publication/drivers-of-progress-in-increasing-contraceptive-use-in-sub-saharan-africa-case-studies-from-eastern-and-southern-africa/
9. Kassie G, David P, Asnake M, Zerihun H, Ali I. Integrated Family Health Program: End line Household Survey Summary Report [Internet]. Pathfinder International; 2015. Available from: https://www.pathfinder.org/publications/integrated-family-health-program-endline-household-survey-summary-report/

10. Ethiopian Public Health Institute (EPHI) [Ethiopia] and ICF. Ethiopia Mini Demographic and Health Survey 2019: Key Indicators. Rockville, Maryland, USA: EPHI and ICF, 2019
11. United Nations Population Division. World Population Prospects: 2019 Revision [Internet]. Available from: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ET
12. Afework Te, Dessie A., Rahma A. Predictors of unmet need for family planning among all women of reproductive age in Ethiopia. Contraception and Reproductive Medicine ; 2019, 4(6),
13. Tilahun Y, Lew C, Belayihun B, Lulu Hagos K, Asnake M. Improving Contraceptive Access, Use, and Method Mix by Task Sharing Implanon Insertion to Frontline Health Workers: The Experience of the Integrated Family Health Program in Ethiopia. Glob Health Sci Pract. 2017 Dec 28;5(4):592–602.
14. Kassie G, Kibret MA, Tefera BB, Hagos KL, Zerihun H, Ali I. The use of continuous household surveys to generate timely data for annual programme outcome monitoring: Experience from the Integrated Family Health Program in Ethiopia. Afr eval j [Internet]. 2018 Mar 28 [cited 2020 Dec 2]; 6(1). Available from: https://aejonline.org/index.php/aej/article/view/252
15. USAID Transform: Primary Health Care Activity Year 3 Annual Report. Addis Ababa, Ethiopia: Pathfinder International; 2019.
16. USAID/Africa Bureau, USAID/Population and Reproductive Health, Ethiopia Federal Ministry of Health, Malawi Ministry of Health, Rwanda Ministry of Health. Three Successful Sub-Saharan Africa Family Planning Programs: Lessons for Meeting the MDGs; 2012. Available from: https://pdf.usaid.gov/pdf_docs/PA00HQSV.pdf
17. Ethiopia Ministry of Health. Costed Implementation Plan for Family Planning in Ethiopia, 2015/16-2020; 2016 Jan. Available from: http://www.healthpolicyplus.com/ns/pubs/2021-2030_EthiopiaCIPNov.pdf
18. Belayihun B. Random Follow-up Visits to Generate Timely Data for Annual Program Outcome Monitoring. USAID; 2017; https://usaidlearninglab.org/library/random-follow-visits-generate-timely-data-annual-program-outcome-monitoring
19. Ethiopian Public Health Institute (EPHI) [Ethiopia] and ICF. Ethiopia Demographic and Health Survey 2016: Key Indicators. Rockville, Maryland, USA: EPHI and ICF, 2017; https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf
20. Box JF. Guinness, Gosset, Fisher, and Small Samples. Statist Sci. 1987 Feb;2(1):45–52.
21. Shiferaw S, Seme A, Zimmerman L. Performance Monitoring for Action Ethiopia: PMA Ethiopia Survey Results (2019) [Internet]. 2020 Apr 30. Available from: https://www.pmadata.org/sites/default/files/20200 4/PMAET%202019_Survey_result_Presentation.pdf
22. Imasiku ENS, Odimegwu CO, Adedini SA, Ononokpono DN. Variations in Unmet Need for Contraception in Zambia: Does Ethnicity Play a Role? J Biosoc Sci. 2014 May;46(3):294–315.
23. Adebowale SA, Adedini SA, Ibisomi LD, Palamuleni ME. Differential effect of wealth quintile on modern contraceptive use and fertility: evidence from Malawian women. BMC Women's Health. 2014 Dec;14(1):40.
24. Akinyemi A, Adedini S, Hounton S, Akinlo A, Adedeji O, Adonri O, et al. Contraceptive use and distribution of high-risk births in Nigeria: a sub-national analysis. Global Health Action. 2015 Dec;8(1):29745.
25. Gyimah SO, Adjei JK, Takyi BK. Religion, Contraception, and Method Choice of Married Women in Ghana. J Relig Health. 2012 Dec;51(4):1359–74.
26. Lipetz C, Phillips C, Fleming C. Actual cost of providing long-acting reversible contraception: a study of Implanon cost. Journal of family planning reproductive health care; 2009 Apr 1;35(2):75–9.
27. Medhanyie A, Spigt M, Kifle Y, Schaay N, Sanders D, Blanco R, et al. The role of health extension workers in improving utilization of maternal health services in rural areas in Ethiopia: a cross sectional study. BMC Health Serv Res. 2012 Dec;12(1):352.
28. Secura GM, Allsworth JE, Madden T, Mullersman JL, Peipert JF. The Contraceptive CHOICE Project: reducing barriers to long-acting reversible contraception. American Journal of Obstetrics and Gynecology. 2010 Aug;203(2):115.e1-115.e7.
29. Mbizvo MT, Phillips SJ. Family planning: Choices and challenges for developing countries. Best Practice & Research Clinical Obstetrics & Gynaecology. 2014 Aug;28(6):931–43.
30. United Nations, Department of Economic and Social Affairs, Population Division. Trends in contraceptive use worldwide, 2015. 2015.
31. Bikorimana E. Barriers to the Use of Long-Acting Contraceptive Methods Among Married Women of Reproductive Age in Kicukiro District, Rwanda. International Journal of Scientific and Research Publications. 2015 Dec;5(12):513–21.
32. Wado YD, Gurmu E, Tilahun T, Bangha M. Contextual influences on the choice of long-acting reversible and permanent contraception in Ethiopia: A multilevel analysis. PloS one. 2019. January 16;14(1): e0209602 10.1371/journal.pone.0209602
33. Teferra AS, Wondifraw AA. Determinants of long-acting contraceptive use among reproductive age women in Ethiopia: evidence from EDHS. Science Journal of Public Health; 2015;3(1):143–9. 10.11648/j.sjph.20150301.33