Prevalence and factors associated with early discontinuation rate of Implanon utilization among women who ever used Implanon in Kucha District Gamo Gofa Zone, Southern Ethiopia

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Abstract
Background: The promotion of contraception in countries with high birth rates has the potential to reduce poverty, hunger, maternal, and childhood deaths. Every year in sub-Saharan Africa approximately 14 million unintended pregnancies occurred and a sizeable proportion was due to poor use of short-term hormonal methods. Contraceptive hormonal implants are highly effective and suitable for almost all women at any stage of their reproductive lives. On the other hand, early discontinuation of the Implanon contraceptive method utilization is one of the foremost problems amid the family planning program. Early discontinuation of the Implanon contraceptive method and reasons for such discontinuation lingers the most significant anxiety for family planning programs. In unindustrialized countries, contraceptive discontinuation due to health concerns is generally higher; these complaints are often related to service quality. Hence, this study aimed to assess the prevalence and factors associated with early discontinuation of Implanon among women who ever used Implanon in Kucha district, Gamo Gofa Zone, Southern Ethiopia.

Methods: Implanon contraceptive device users were selected from the Kucha district using a cross-sectional community-based survey from January to March 2018. A total of 430 women were selected and data were collected through face-to-face interviews by using a pre-tested structured questionnaire. Data were cleaned, coded, and entered into Epi-Info version 7 statistical software. Factors that showed association in a bivariate analysis that has a $p$ value of less than 0.25 were entered into multiple logistic regression models for controlling confounding factors. The strength of statistical association was measured by adjusted odds ratio, at 95% confidence intervals, and $p$ value < 0.05 were considered as statistically significant variables.

Result: The result of this study revealed that the overall discontinuation rate of Implanon in the study was 34%. Variables having statistically significant association with Implanon discontinuation were women who never use a contraceptive method other than Implanon (AOR = 2.96, 95% CI 1.53–5.74), women who didn’t make discussion with a partner (AOR = 3.32, 95% CI 1.57–7.04), poor counseling and follow up (AOR = 9.23, 95% CI 4.7–18.13), fear of side effects (AOR = 0.12, 95% CI 0.058- 0.24) and poor satisfaction of service (AOR = 5.2, 95% CI 2.77- 9.76)
Background
Implants are long-acting, reversible, radiopaque, matchstick-sized, flexible, progestin-filled capsules that are placed just under the skin of the upper arm [1]. Early Implanon discontinuation is defined as discontinuation at less than two and a half years after the insertion of Implanon [2].

The promotion of contraception in countries with high birth rates has the potential to reduce poverty, hunger, maternal deaths, and childhood deaths [3]. Every year in sub-Saharan Africa approximately 14 million unintended pregnancies occurred and a sizeable proportion was due to poor use of short-term hormonal methods [4].

The most common contraception method in the world was female sterilization 19%, Intra-Uterine Contraceptive Device (IUCD) were 14% and pills were 9% among women aged 15 to 49 years who were married or in a union [5]. The Ethiopian Federal Ministry of Health (FMoH) developed a plan to expand the contraceptive method mix by providing Implanon at the community level since 2009 [6–8]. However, still there is low utilization in general, and even those who have started to use the method are discontinuing it [9].

A side effects, desire to become pregnant, menstrual disturbance, health concerns, spouse disapproval, and switching to another method are the major reasons that women discontinue using Implanon methods [10, 11].

An education, parity, side effects, and dissatisfaction of services and irregularity of menses were the major factors associated with early discontinuation of Implanon utilization among women aged between 15 and 49 years. Also, non-medical reasons such as planned pregnancy, plan to conceive in the near future and divorce, age, ethnicity, parity, socioeconomic factors were the common factor for Implanon discontinuation [10, 12, 13, 9, 14–16]. Therefore, this study aimed to assess the prevalence and factors associated with early discontinuation of Implanon among women who ever used Implanon in the reproductive age group (15–49) of the district was 44,091 and the coverage of Implanon utilization in 2017 was 23%.

Study design and period
Community-based cross-sectional study design was conducted from January 2018 to March 2018.

Study population
The study populations had been all randomly selected reproductive age group (age range of 15–49) women who are registered for Implanon use from Jan 1st, 2015 to Dec 31st, 2017 in Kucha district.

Sampling technique
There are thirty three kebeles in the woreda. From 33 kebeles, 19 kebeles were selected by a simple random sampling method. About 430 study participants had been allocated proportionally to kebeles after the number of clients identified from the family planning registration book of the health facility for the selected kebeles which has an individual address and full information. Among 10,141 women for whom Implanon was initiated in the last 1 year, since January 1st/2015 to Dec 31st/2017 in Kucha district, 430 participants were selected. Individual study participants were selected by systematic random sampling. The first client in each kebele was selected among the numbers from 1 to Kth by a simple random sampling lottery method. Then the next study subject was selected and interviewed at every “K” interval until the sample size was fulfilled. Data has been collected from the community using a well-trained interviewer with pre administered structured questionnaire format (Additional file 1).

The information collected from each study participants was kept in a secured file without a participant’s name and another meticulous revealing. Also, it was not out in the open to anyone except the investigators. At the end of the data analysis, the questionnaire was locked within the file box. The health information and other supporting advice were given to the women who are Implanon discontinuation.

The English version of the questionnaire has been translated to local (Gammoththo) language and back translated to English to ensure its consistency by two persons who have language and medical background.

Conclusion: The overall early discontinuation rate of Implanon in the study area was high. The main factors associated with early discontinuation of Implanon were contraceptive ever use, discussion with partner, poor follow-up of counseling, fear of side effects, and unsatisfaction by the services given during the insertion rate of Implanon.

Keywords: Implanon, Discontinuation rate, Kucha, Ethiopia
The quality of the data was maintained by cross-checking daily and entered, coded, and cleaned, in Epi-Info version 7, statistical software package then transported to SPSS windows version 20. Descriptive statistics were done to assess basic client characteristics and the prevalence of early Implanon discontinuation.

Bivariate analysis using a logistic regression technique was done to see the crude association between the independent and dependent variables separately. Variables with a $p$ value of less than 0.25 in the bivariate analysis had been entered into a multi-variable model as a candidate variable to determine independent predictors of early Implanon discontinuation among women who ever used Implanon by controlling confounding factors. The strength of statistical association was measured by adjusted odds ratio (AOR), at 95% confidence intervals (CI), and $p$ value $< 0.05$ was considered as a significant variable [17].

Results
Socio-demographic characteristics:
A total of 430 women have participated in this study with a 100% response rate. The age of the study participants was between 18 and 41 years with a mean and SD of $28.9 \pm 4.5$ years. Almost all 423 (98.4%) of the respondents were married and living with their partners. About three fourth of the respondents, 321 (74.7%) were protestant, and 388 (90.2%) were Gamo in an ethnic group. The client occupation of the participants was housewives, 408 (94.9%), and three fourth of 318 (74%) their husbands were a farmer. About 308 (71.6%) of the study participants had no formal education (Table 1).

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About 323 (75.1%) respondents had given birth three and above whereas 101 (23.5%) of participants given birth 1 to 2 times with a mean (± SD) number of children 4 (± 1.9) while 6 (1.4%) of the studied women were nulliparous. From the studied participants, 51 (11.9%) desire to have a child in near future.

| Variables                          | Frequency (n = 430) | Percentage (%) |
|------------------------------------|---------------------|----------------|
| Women’s age                        |                     |                |
| ≤ 30                               | 290                 | 67.4           |
| ≥ 31                               | 140                 | 32.6           |
| Religion                           |                     |                |
| Orthodox                           | 107                 | 24.9           |
| Protestant                         | 321                 | 74.7           |
| Muslim                             | 2                   | 0.5            |
| Ethnic group                       |                     |                |
| Gamo                               | 388                 | 90.2           |
| Goffa                              | 29                  | 6.7            |
| Wolayta                            | 10                  | 2.3            |
| Amhara                             | 3                   | 0.7            |
| Marital status                     |                     |                |
| Married                            | 423                 | 98.4           |
| Divorced                           | 2                   | 0.5            |
| Widowed                            | 3                   | 0.7            |
| Single                             | 2                   | 0.5            |
| Women’s occupation                 |                     |                |
| Housewife                          | 408                 | 94.9           |
| Government employee                | 7                   | 1.6            |
| Merchant                           | 12                  | 2.8            |
| Day labor                          | 3                   | 0.7            |
| Husband occupation                 |                     |                |
| Farmer                             | 318                 | 74             |
| Merchant                           | 31                  | 7.2            |
| Day labor                          | 39                  | 9.0            |
| Government employee                | 42                  | 9.8            |
| Women’s education                  |                     |                |
| No formal education                | 181                 | 42.1           |
| Read and write                     | 127                 | 29.5           |
| Grade 5–8                          | 76                  | 17.7           |
| Grade 9–12                         | 33                  | 7.7            |
| College diploma and above          | 13                  | 3.0            |
| Husband education                  |                     |                |
| No formal education                | 104                 | 24.2           |
| Read and write                     | 132                 | 30.7           |
| 5–8 grade                          | 113                 | 26.3           |
| 9–12 grade                         | 43                  | 10             |
| College diploma and above          | 38                  | 8.8            |
| Family size                        |                     |                |
| 5 and below                        | 167                 | 38.8           |
| 6 and above                        | 263                 | 61.2           |
| Distance from health facility (km)  |                     |                |
| Less than 5 km                     | 156                 | 36.3           |
| 5 km and above                     | 274                 | 63.7           |
All 430 (100%) of participants had heard about the modern contraceptive method before Implanon insertion. About 269 (62.6%) of the participant had ever used a modern contraceptive method before inserting Implanon (Table 2).

The continuation rate of the Implanon in the study area was 284 (66%) while; the early discontinuation rate of the Implanon utilization in the study area was 146 (34%). These women who discontinued had used Implanon for the duration of between 4 and 28 months with a mean (± SD) of 15 (± 6.6) and a median duration of 14 months use. About 14% of the study participants were used less than 24 months (Fig. 1).

**Factors associated with early Implanon discontinuation**

An early discontinuation rate of Implanon among women not used the modern contraceptive method before Implanon insertion were 3 times more likely than ever used [Adjusted Odds Ratio, AOR = 2.96, (95% CI 1.5, 5.7)]. An early discontinuation rate of Implanon utilization among women who are not discussing with

### Table 2 Past Contraceptive utilization history and Counseling Service of Implanon users in Kucha District Gamo Gofa Zone, Southern Ethiopia March 2018 (n = 430)

| Character                                           | Response | Number | Percent |
|-----------------------------------------------------|----------|--------|---------|
| Ever heard about contraceptive methods              | Yes      | 430    | 100     |
|                                                     | No       | 0      | 0       |
| Ever used modern contraceptive methods              | Yes      | 269    | 62.6    |
|                                                     | No       | 161    | 37.4    |
| Perceived Satisfaction on the service provision     | Yes      | 282    | 65.6    |
|                                                     | No       | 148    | 34.4    |
| Appointment for checkup                             | Yes      | 278    | 64.7    |
|                                                     | No       | 152    | 35.3    |
| Counseling service before insertion                 | Yes      | 422    | 98.1    |
|                                                     | No       | 8      | 1.9     |
| Follow up counseling                                | Yes      | 293    | 68.1    |
|                                                     | No       | 137    | 31.9    |
| Type of counseling                                  | Individual | 219 | 50.9    |
|                                                     | With husband | 113 | 26.3    |
|                                                     | Mass     | 91     | 21.2    |
|                                                     | With other relatives | 7 | 1.6     |
| Decision to use the method                          | Client   | 387    | 90.0    |
|                                                     | Provider | 43     | 10      |

**Fig. 1 Early Implanon discontinuation rate and duration of use in Kucha District Gamo Gofa Zone, Southern Ethiopia March 2018**
their partners was 3.3 times more likely than others, [AOR = 3.3 (95% CI 1.6, 7.0)] (Table 3).

Clients not getting follow-up counseling were 9.2 times more likely to early discontinuing Implanon as compared to those who got follow-up counseling service [AOR = 9.2, (95% CI 4.7, 18.1)]. Women not satisfied by the service provided during the insertion were 5.2 times more likely to discontinue Implanon as compared to who satisfied by the service provided [AOR = 5.2, (95% CI 2.8, 9.8)]. However, clients not developed side effects were 88% less likely to early discontinue Implanon as compared to clients who developed side effects [AOR = 0.22, (95% CI 0.1, 0.2)].

**Discussion**

The continuation rate of the Implanon in the study area was 284 (66%). The discontinuation rate of contraceptive Implanon in the study area was 146 (34%) with a mean

| Variables | Discontinuation of Implanon | COR (95% CI) | AOR (95% CI) | p value |
|-----------|-----------------------------|--------------|--------------|---------|
| Client age grouped | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| ≤ 30 | 93 (32.1) | 197 (67.9) | 1.290 (0.847, 1.966) | 1.211 (0.599, 2.449) | 0.59 |
| > 30 | 53 (37.9) | 87 (62.1) | 1 | 1 |
| Grouped annual income in Ethiopian Birr (ETB) | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| < 10,000 | 72 (52.2) | 66 (47.8) | 1 | 1 |
| 10,001–20,000 | 68 (27.5) | 179 (72.5) | 0.348 (0.225, 0.538) | 0.552 (0.281, 1.084) | 0.08 |
| 20,001–30,000 | 4 (12.1) | 29 (87.9) | 0.126 (0.042, 0.379) | 0.190 (0.047, 1.265) | 0.19 |
| > 30,000 | 2 (16.7) | 10 (83.3) | 0.183 (0.039, 0.868) | 0.060 (0.006, 1.112) | 0.18 |
| Partner education | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| No formal education | 46 (44.2) | 58 (55.8) | 1 | 1 |
| Read and write | 43 (32.6) | 89 (67.4) | 0.609 (0.358, 1.036) | 0.493 (0.223, 1.091) | 0.08 |
| 5–8 grade | 38 (33.6) | 75 (66.4) | 0.639 (0.369, 1.107) | 0.483 (0.204, 1.143) | 0.09 |
| 9–12 grade | 8 (18.6) | 35 (81.4) | 0.288 (0.122, 0.681) | 0.260 (0.071, 1.354) | 0.06 |
| Collage and above | 11 (28.9) | 27 (71.1) | 0.514 (0.231, 1.144) | 0.648 (0.193, 2.176) | 0.48 |
| Grouped number of children | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| ≤ 5 | 124 (36.6) | 215 (63.4) | 1 | 1 |
| > 5 | 22 (24.2) | 69 (75.8) | 0.553 (0.326, 0.938) | 0.750 (0.334, 1.684) | 0.48 |
| Contraceptive ever use other than Implanon | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| Yes | 59 (21.9) | 210 (78.1) | 1 | 1 |
| No | 87 (54) | 74 (46) | 4.185 (2.740, 6.392) | 2.962 (1.529, 5.740)* | 0.001 |
| Discussion with partner | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| Yes (discussing with a partner) | 83 (24.8) | 252 (75.2) | 1 | 1 |
| No (Not discussing with a partner) | 63 (66.3) | 32 (33.7) | 5.977 (3.653, 9.781) | 3.323 (1.568, 7.043)* | 0.002 |
| Method decider | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| My own decision | 118 (30.5) | 269 (69.5) | 1 | 1 |
| Professional decision | 28 (65.1) | 15 (34.9) | 1.255 (2.192, 8.261) | 1.244 (0.430, 3.594) | 0.68 |
| Follow-up counseling | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| Yes | 45 (15.4) | 248 (84.6) | 1 | 1 |
| No | 101 (73.7) | 36 (26.3) | 15.462 (9.420, 25.380) | 9.229 (4.700, 18.125)* | 0.001 |
| Fear of side effects | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| Yes | 123 (48.8) | 129 (51.2) | 1 | 1 |
| No | 23 (12.9) | 155 (87.1) | 0.156 (0.094, 0.257) | 0.118 (0.058, 0.241)* | 0.001 |
| Perceived service satisfaction | Yes (%) | No (%) | COR (95% CI) | AOR (95% CI) | p value |
| Yes | 58 (20.6) | 224 (79.4) | 1 | 1 |
| No | 88 (59.5) | 60 (40.5) | 5.664 (3.659, 8.770) | 5.199 (2.770, 9.759)* | 0.001 |

* Significant association in Multivariable logistic regression
duration of $15 \pm 6.6$ months. The finding of this study is lower than the report of Debre Markos town, Northwest Ethiopia, in 2016 which was 146 (46.5%) [16]. his might be due to inadequate follow-up counseling and unexpected side effects of the method. On the other hand, the result was higher than the studies conducted in Nigeria (26.1%), Tigray region (16%), and Malaysia (22.86%) [9, 14, 15]. This might be due to the educational status of the study participants [14, 15], low male partners’ involvement, and low practice of discussion with partners before the Implanon insertion [18].

Implanon as compared to women who developed side effects which is similar with the study done at Durame Town, Southern Ethiopia, Debre Markose, Northwest Ethiopia and Egypt [9, 16, 19, 20]. In this study, mothers who never used a modern contraceptive method previously were found 3 times more likely to early discontinue contraceptive Implanon than mothers who ever use it. This could be due to the fact that experienced mothers acquired the necessary knowledge and attitude towards the modern contraceptive method, while others could be influenced by false beliefs, myths, and misconceptions [13]. The other possible reasons could be fear of pregnancy delaying, side effects, and disagreement on the method used with a partner.

The probabilities of early discontinuation rates among inappropriate follow-up counseled women were 9.23 times more than those who get appropriate follow-up counseling. This finding was also supported by other studies done in Tigray, Northern Ethiopia, Debre Markos, Northwest Ethiopia [14, 16]. This is might be during follow up counseling time the women may get supplementary recommendation on side effects and supportive treatment information from service providers, consequently encouraged to continue their Implanon utilization. Moreover, those who suffer from menstrual commotion could get supportive treatment from health care providers during follow-up time, and hence they could lengthen the utilization of Implanon.

Women who were not satisfied perceptively by the service given during the insertion of Implanon were 3.3 times more likely to discontinue Implanon as compared to those who discussed it with male partners. This is also similar to the study conducted in Central and Northern Tigray, Ethiopia [9, 21]. This could be associated with a lack of good communication between partners.

### Limitation

This study is not a large-scaled sampled study. Moreover, recall bias was seen during data collection. This study is a quantitative method also it is another limitation.

### Conclusion

The overall early discontinuation rate of Implanon in the study area was high. The main factors associated with early discontinuation of Implanon were contraceptive ever use, discussion with partner, poor follow-up of counseling, fear of side effects, and un-satisfaction by the services given during the insertion rate of Implanon. The continuation rate of the Implanon might be increased when increasing the awareness of the utilization of Implanon, pre-service and in-service training, pre-insertion counseling, follow-up, and close monitoring is very important to women who use Implanon.

### Supplementary information

[Supplementary information](https://doi.org/10.1186/s12905-020-01096-1).

### Abbreviations

AOR: Adjusted odds ratio; COR: Crude odds ratio.

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### Authors’ contributions

MM: wrote the proposal, participated in data collection, analyzed the data and drafted the paper. DD: participated in design, and acquisition of data, analysis, and interpretation of data. AA: read the manuscript and finalized the analysis and conception, design, analysis, and interpretation of data. All authors read and approved the final manuscript.

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### Availability of data

The data used/analyzed during the current study available from the corresponding author on reasonable request.

### Ethics approval and consent to participate

The survey has been conducted after approval by the IRB (Institutional Review Board) of Hawassa University College of Medicine and Health Sciences. The information sheet that contained about the benefit and risk of participating of the respondents in this study with verbal informed consent was attached to each questionnaire and before enrolled any of the eligible study participants,

Supplementary information

Additional file 1. Questionnaire and participant information sheet with consent form.
the purpose and the confidential nature of the study were described and discussed for each participant. A written informed consent was obtained from participants whose age was greater than 16 and an assent form legal guardian or parent and additional consent were obtained from those less than 16 years old participants. Participants were anonymous and the information provided by each respondent was kept confidential. Also official permission and written informed consent was obtained from all parents/guardians for whom less than 16 years old.

**Consent for publication**

Not applicable.

**Competing interests**

The authors declare that we have no conflict of interests.

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**References**

1. DaVanzo J, Hale L, Razzaque A, Rahman M. Effects of inter pregnancy interval and outcome of the preceding pregnancy on pregnancy outcomes in Matlab, Bangladesh. Int J Obstet Gynecol. 2007;114(9):1079–87.
2. Harvey C, Charlotte S, Lucke J. Continuation rates and reasons for removal among Implanon® users accessing two family planning clinics in Queensland, Australia. Contraception. 2009;80(6):527–32.
3. Cleland J, Bernstein S, Ezeh A, Faundes A, Innis J. Family planning: the unfinished Agenda. Lancet. 2006;368(9549):1810–27.
4. David H, Iphigeneia M, Erin M. Unintended pregnancy in sub-Saharan Africa: magnitude of the problem and potential role of contraceptive implants to alleviate it. Contraception. 2008;78(1):73–8.
5. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. World contraceptive patterns. New York: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, United Nations; 2013.
6. Asnake M, Solter C, Tilahun Y, Vespià M. Strengthening health systems to ensure equitable access to implant removal services in Ethiopia. 2013.
7. Asnake M, Tilahun Y. Scaling up community-based service delivery of Implanon: the Integrated Family Health Program’s experience training health extension workers. 2010. http://www2.pathfinder.org/site/DocServer/LAFFFpdf?docID=18321.
8. 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. Int J Gynaecol Obstet. 2013;123 Suppl 1:e29–32. https://doi.org/10.1016/j.ijgo.2013.07.003.
9. Birhane K, Hagos S, Fantahun M. Early discontinuation of Implanon and its associated factors among women who ever used Implanon in Ofa District, Tigray, Northern Ethiopia. Int J Pharma Sci Res. UPSR. 2015;6(3):544–51.
10. Mastor A, Khangal S, Omar S  ⋅. Users’ perspectives on Implanon in Malaysia, a multicultural Asian country. Open Access J Contraception. 2011;2:79–84.
11. Teunissen AM, Grimm B, Roumen F. Continuation rates of the subdermal contraceptive implant (R) and associated influencing factors. Eur J Contracept Reprod Health Care. 2014;19(1):115–21.
12. Burusie A. Reasons for premature removal of Implanon among users in Arsi Zone, Oromia Region, Ethiopia. Reprod Syst Sex Disord. 2015;4:1.
13. Chaovisitasee A, et al. One year study of Implanon on the adverse events and discontinuation. J Med Assoc Thai. 2005;88(3):314–7.
14. Madden T, Eisenberg DL, Zhao Q, Buckel C, Secura GM, Peipert JF. Continuation of the etonogestrel implant in women undergoing immediate postabortion placement. Obstet Gynecol. 2012;120(5):1053–59.
15. Mastor A, Khangal S, Omar S. Users’ perspectives on Implanon in Malaysia, a multicultural Asian country. Open Access J Contraception. 2011;2:79–84.
16. Siyomu M, Mulaw Z, Abuhay M, Kebebe H. Implanon discontinuation rate and associated factors among women who ever used Implanon in the last three years in Debre Markos Township, North Ethiopia. ARC J Public Health Community Med. 2017;2(1):8–16.
17. Nageso A, Gebretsadik A. Discontinuation rate of Implanon and its associated factors among women who ever used Implanon in Dale District, Southern Ethiopia. BMC Women’s Health. 2018;18:189.
18. Mrwebi KP, Ter Goon D, Owolabi EO, Adenisi OV, Seekoe E, Ajayi AI. Reasons for discontinuation of Implanon among users in Buffalo City Metropolitan Municipality, South Africa: a cross-sectional study. Afr J Reprod Health. 2018;22(1):113–119.
19. Abdel-Razik M, Said M. Implanon use pattern among ministry of health and population clients 2008–2012. Cairo: Faculty of Medicine, Cairo University; 2012.
20. Tamirie YE, Gebre E, Mesele H, Argaw D. Determinants of long acting reversible contraception method use among mothers in extended postpartum period, Durame Town, Southern Ethiopia: a cross sectional community based survey. J Health Res. 2015;7:1315–26.
21. Gebremedhin M, Tesfaye G, Belachew A, Desta D. Factors influencing modern contraceptive method preference among women of reproductive age in central zone of Tigray Region, Northern Ethiopia. Int J Healthc. 2016;2(1):82.

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