Determinants of implanon discontinuation among women who ever used implanon in Shashamane district, West Arsi zone, Southern Ethiopia: Case-control study

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Abstract

Background: Despite tremendous work has been done on demand creation, capacity building and ensuring the logistics of Implanon; Implanon discontinuation rate remained high in Ethiopia. Risk factor of implanon discontinuation varies across different settings according to sociodemographic variations. However, there is a dearth of stronger evidences on those factors in the country and the study area in particular. Therefore, this study was designed to identify the determinants of Implanon discontinuation in Shashamane District, West Arsi Zone, Southern Ethiopia.

Methods: A Community based unmatched case-control study was carried out in Shashamane district from April 12 to May 18, 2021 among 88 cases and 176 controls selected using systematic random sampling technique. A pretested, structured questionnaire with face to face interview was used. The collected data were entered using the EPI-INFO7.2.2 and analysed using Statistical Package for the Social Science (SPSS) version 25.0. Bi-variable and multivariable logistic regression analysis was performed and P-value of less than 0.05 was used to declare significance. Crude and adjusted odds ratio with respective confidence interval of 95% was used to show strength of association between variables.

Result: The odds of Implanon discontinuation were more among women who can't read and write [AOR:3.09(1.20- 8.00)], had < 4 living children [AOR:2.47(1.20-5.08)], no history of abortion [AOR:2.84(1.25-6.46)], not ever used contraceptive before Implanon [AOR:2.14(1.02-4.49)], counselled for <15 minutes [AOR:2.47(1.29-4.70)], had no discussion with her partner [AOR:2.88(1.42- 5.84)], experiencing side effects after insertion [AOR:0.35(0.17-0.71)] as compared to their counterparts.

Conclusion: This study found out that women educational status, number of living children, history of abortion, ever use of any contraceptive, duration of counselling, discussion with partner, and side effects were determinants of Implanon discontinuation. Thus, ensuring counselling before insertion of implanon, managing side effects would improve retention of implanon use. In addition, implanon discontinuation intervention should target partners, new acceptors and those with no formal education.

Background

Implanon is a long term reversible single-rod progestogen-only implant containing 68 mg of Etonogestrel which is placed sub dermally in the inner upper non-dominant arm and licensed for up to 3 years of use(1–3). It prevents pregnancy by inhibiting ovulation, causing thickening of the cervical mucus to prevent sperm penetration, and altering the endometrium; and highly effective methods with a pregnancy rate of 0.01-0.1% per year in typical use (1,4).

Globally in 2019, 23 million of women are using implants which account 2% of all method users(5). In Sub-Saharan Africa long-acting reversible contraceptive methods (LARC) have been under-utilized despite their effectiveness and low cost(6). Evidences from studies conducted in 21 low income countries show that, Implant discontinuation ranges from 23 % in Liberia to 69 % in Yemen(7). Ethiopian mini-

demographic and health survey (EMDHS) 2019 reported that the implant users are about 9% and 7.4% in Ethiopia and Oromia among all method users respectively(8).

Contraceptive discontinuation is a poorly understood phenomenon that has significant implications, not just for family planning and maternal and child health, but also for population growth and countries' overall economic development(9). High contraceptive discontinuation results in millions of women having an unmet need for contraception(10). Evidences from different studies shows that contraceptive discontinuation accounted for about one-third of unintended births, 15 - 20 % of long-acting reversible contraceptives users are at risk of an unwanted pregnancy 3 months after discontinuing, 85% of women who stopped using contraception became pregnant during the first year which led to 1 in 4 pregnancies being unintended and 5 - 20% pregnancies end in miscarriage, stillbirth or abortion after contraceptive discontinuation(7,11,12).

The Government of Ethiopia is committed to improve and maintain the reproductive health status of women, men and young people in Ethiopia through the three-tiered health care delivery system(13). The Federal ministry of health (FMOH) has made unreserved efforts to expand access to family planning information, counselling services and method mix mainly through the health extension program(14). In addition, in 2009 the Government of Ethiopia initiated the Implanon scale-up initiative, which facilitated greater Implanon access by allowing health extension workers to insert the implant(15). Despite tremendous work has been done on demand creation, capacity building and ensuring the logistics of Implanon; implanon discontinuation rate remained high which ranges from 16% in Ofla district of Tigray to 65% in Debre Tabor town of Northwest Ethiopia(16–19).

Various factors have been reported to be associated with discontinuation of implanon; side effects(20), discussion with partner(21), previous history of abortion(22), having no children(19), women's educational level(22), pre-insertion counselling(23) are the most common associated factors for unscheduled discontinuation of implanon. Despite many studies have been conducted on the discontinuation of implanon, existing evidence has revealed that the discontinuation of contraception varies according to the type of contraceptive used, age, race, ethnic background, and time when the contraception was initially used(24–26). Since there are socio-economic and demographic variations in the different regions of Ethiopia; there are also variations in the determinants of implanon discontinuation across settings among these diverse groups. Hence, there is need for stronger evidences as studies employing stronger designs are limited in the country and in the study area in particular. Therefore, this study was aimed to identify the determinants of implanon discontinuation among women in Shashamane district, Southern Ethiopia.

Methods

Study design, area and period

Community based unmatched case-control study was conducted in Oromia regional state, West Arsi zone, Shashamane district from April 12 to May 18, 2021. It is located at 250 km south to main city of

Ethiopia, Addis Ababa. Shashamane district has 281,247 populations, 58,593 households and 61,874 women of reproductive age group residing in 37 rural kebeles. There are 7 health centers and 38 Health posts that provide health service for the community by 91 health extension workers and 144 health workers. In addition, there were 11 private clinics. All health centers and health posts provide implanon insertion and removal service. The prevalence of long-acting family planning utilization according to annual report in 2019/2020 was 17.4% and 26.8% in West Arsi Zone and Shashamane District respectively. Similarly, according to this report among women who have utilized long acting family planning in 2019/20; 23% of them in West Arsi Zone and 31% of them in Shashamane district have discontinued service before intended time(27).

Source population

All women of child bearing age group (15-49) who ever used implanon in Shashamane district were the source population for this study.

Study population

Cases: Were all women of child bearing age group in the selected kebeles who have discontinued their implanon before 3 years of insertion.

Controls: Were all women of child bearing age group who used implanon for the complete 3 years in the selected kebeles.

Inclusion and exclusion criteria

Women of child bearing age group, who are eligible for cases and controls and residing in the study district were included as study participants. Women of reproductive age group, who had discontinued the implanon due to life threatening medical complications, method failure and who were critically ill at the time of the interview were excluded from the study.

Sample size determination and sampling procedure

The sample size was calculated using two population proportions for unmatched case control study by STATCALC Epi info version 7.2.2. Discussion with partner, side effects and previous history of abortion were the strongest determinant factors of Implanon discontinuation in the previous studies conducted in Bahir Dar town, Mekelle City and Wolaita Zone(20–22). Sample size was computed for each factors and previous history of abortion was chosen as main exposure variable to calculate optimal sample size. Hence, With the assumption of level of significance 5%, power 80%, case to control ratio of one to two (1:2), odd ratio 2.3 and percent of controls with previous history of abortion 28.6 (the main exposure variable of the study that gave optimum sample size) and finally considering 10% no-response rate the final sample size was 264 (88 cases and176 controls).

There are 37 kebeles in Shashamane district, lowest administrative unit in Ethiopia, and one third of the district kebeles (thirteen kebeles) were selected by lottery method. To select the samples, lists of women were obtained from implanon removal registration book of health posts and health centers from selected kebeles. First, the sampling frame was prepared based on the client's serial number recorded on implanon removal registration book of health posts and health centers for cases and controls respectively. After preparing the sampling frame the total sample sizes of the cases and controls were allocated for each kebeles proportionally. Finally, cases and controls selected by systematic random sampling method to select study participants [Figure 1].

Variables of Study

The dependent variable of the study was Implanon discontinuation. The independent variables were socio-economic and demographic variables (age, educational level, income, occupation, religion, marital status, ethnicity, husband support, husband opposition, family planning service accessibility), obstetric factors (previous abortion, number of deliveries (parity), desire for pregnancy, number of living children) ,counselling related factors(pre-insertion counselling, follow-up, discussion with their partners, place of insertion, satisfaction to service, informed choice, decision making and exposure to family planning messages), method related factors (side effects, health concern, method failure, past contraceptive utilization, method shift, and inconvenience to use)

Operational Definitions

Implanon discontinuation: It is discontinuation of the use of Implanon before completion of three years(28).

Cases- All women of reproductive age group who were discontinued their implanon before 3 years of its expiring date(21,22).

Controls- All women of reproductive age group who had removed their implanon after using three completed years(21,22).

Counselling: includes making the women aware of its long protection, effectiveness, and side effects due to insertion and removal.

Side Effects: It is the development of at least one of the following conditions: menstrual disruption, headache, weight gains, insertion arm pain, insertion site infection, back pain and expulsion.

Health Concerns: Known medical condition which may result fear of the use of Implanon contraceptive methods.

Data Collection procedure (instruments, personnel)

The study used quantitative method to collect pertinent information to attain its objectives by structured questionnaires, which was adapted from different studies (18,21,22,29). Data collection was carried out

home to home in selected kebeles of Shashamane district by five diploma nurses as data collectors and two-degree holder nurses as supervisors. The data were collected from women of child bearing age group by face to face interview. The questionnaire has five parts: The first part addresses socio-economic and demographic characteristics of mothers, the second part of the questionnaire is Obstetric history, the third part covers past knowledge and utilization of contraceptive methods, the fourth part contains counselling related factors and fifth part is reasons for removal of Implanon .

Data Quality Assurance

The research questionnaire was prepared in English version and translated into local language (Afan Oromo). Before data collection, one day training was given for data collectors and supervisors by the principal investigator about the purpose of the study and how to interview the subjects. The questionnaire was pre tested on 5% (4 cases and 8 controls) of the calculated sample size in nearby kebele (Abaro Kebele) which is preceding the actual data collection period in order to test and clarify tools and estimation of interview time. The result of this pre-test study was used to correct any necessary amendments before carrying out the remainder of the study.

The collected data were checked by the supervisors daily for completeness, inconsistencies, and cleanness and finally the principal investigator monitored the overall quality of data collection and handling. The fieldwork was supervised; and re- interview of randomly selected study participants was done and was compared against the questionnaires filled by the data collectors to ensure validity of the data. Participants were requested kindly to give honest responses during the interview. Any error found during the process was corrected immediately.

Data Processing and Analysis

The data were checked for completeness, consistency, cleaned, coded, entered into Epi info version 7.2.2 and exported to statistical package for social science (SPSS) version 25.0 for analysis. Descriptive statistics including frequency and percentage was computed to describe the data. Bi-variate and multivariable logistic regression analysis was performed to see the association between outcome and explanatory variables. Variables that were found to be less than 0.2 P-value in the bivariate analysis was entered in to multivariable logistic regression model. Finally, multivariable logistic regression analysis was done to identify factors associated with implanon discontinuation. During multivariable analysis, model fitness was checked using the Hosmer and Lemeshow`s goodness of fitness test ($p = .412$). Adjusted odds ratio along with, 95% Confidence Interval (CI) was used to assess the association between explanatory variables and implanon discontinuation. Level of statistical significance was declared at p-value less than 0.05.

Results

Socio demographic characteristics of the participants:

A total of 264 women (88 cases and 176 controls) were participated in the study giving a response rate of 100 % for both cases and controls. The mean age of respondents was 28.23 (± 5.465) years: 27.27(± 5.387) for cases and 28.70(± 5.525) years for controls; and 28(31.8%) of cases and 63(35.8%) controls were found to be in the age category of 25-29 years. Most women, 173(98.3%) of controls and 83(94.3%) of cases were married. About 39.2 % controls and 34.1% cases have attained primary school and majority of them 151(85.8%) controls and 80(90.9%) cases were housewives [Table-1].

Table 1: Socio-Demographic characteristics of study participants among women who ever used Implanon Shashamane district, South Ethiopia May, 2021

Variables	Categories	Cases(n= 88)	Control (n =176)
		n (%)	n (%)
Age	<20	12(13.6%)	11(6.3%)
	20-24	15(17.0%)	27(15.3%)
	25-29	28(31.8%)	63(35.8%)
	30-34	22(25.0%)	48(27.3%)
	>=35	11(12.5%)	27(15.3%)
Place of Residence	Rural	80(90.9%)	165(93.8%)
	Semi-urban	8(9.1%)	11(6.3%)
Marital status	Married	83(94.3%)	173(98.3%)
	Others *	5(5.6%)	3(2.7%)
Ethnic Group	Oromo	81(92.0%)	159(90.3%)
	Sidama	4(4.5%)	10(5.7%)
	Others**	3(3.4%)	7(4.0%)
Religion	Muslim	80(90.9%)	158(89.8%)
	Orthodox	3(3.4%)	9(5.1%)
	Protestant	5(5.7%)	9(5.1%)
Women`s Occupational status	House wife	80(90.9%)	151(85.8%)
	Farmer	2(2.3%)	17(9.7%)
	Others***	6(6.8%)	2(1.1%)
Partner`s Occupation	Farmer	66(75.0)	136(77.3%)
	Merchant	16(18.2%)	35(19.9%)
	Others****	6(6.8%)	5(2.8%)
Maternal Educational status	Can`t read and write	27(30.7%)	34(19.3%)
	Read and write	15(17%)	27(15.3%)
	Primary	30(34.1%)	69(39.2%)
	Secondary	16(18.2%)	46(26.1%)
Partner`s Educational level	Can`t read and write	18(18%)	13(7.4%)
	Read and write	37(42.0%)	89(50.6%)

Primary	20(22.7%)	48(27.3%)
Secondary and above	11(12.5%)	23(13.1%)
College and above	2(2.3%)	3(1.7%)

* Single, Widowed, ** Amhara, Wolaita, *** Merchant, Student, ****Government employee, Daily labourers

Obstetric history Related Characteristics of Study Participants:

This study found that 167(94.9%) controls and 81(92.0%) cases had children before insertion of the Implanon. This study also showed that 45 (51.1%) of cases and 71 (40.3%) controls had < 4 children. Majority of the respondents, 161(91.5%) controls and 82(93.2%) cases have future intention to have children. Among the total study participants, 125 (71.0%) cases and 75 (85.2%) controls had no history of abortion [Table-2].

Table 2: Obstetric characteristics of study participants among women who ever used Implanon Shashamane district, South Ethiopia May, 2021

Variables	Categories	Cases(n= 88)	Control (n = 176)
		n(%)	n(%)
Have children before insertion	Yes	81(92.0%)	167(94.9%)
	No	7(8.0%)	9(5.1%)
Number of children	<4	45(51.1%)	71(40.3%)
	>=4	43(48.9%)	105(59.7%)
Future intention	Yes	82(93.2%)	161(91.5%)
	No	6(6.8%)	15(8.5%)
History of abortion	No	75(85.2%)	125(71.0)
	Yes	13(14.8%)	51(29.0)

Past knowledge and utilization of contraceptive methods by participants:

According to finding of this study, majority of the respondents, 160(90.9%) controls and 75(85.2%) cases obtained information about contraceptive methods from health extension workers. Most of the respondents, 141(80.1%) controls and 54(61.4%) cases have used other contraceptives before taking Implanon. The most common contraceptive method ever used before implanon was Injectable 93(52.8%) for controls and 34(38.6%) for case respondents [table-3].

Table 3: Past knowledge and utilization of contraceptive related characteristics of study participants among women who ever used Implanon Shashamane district, South Ethiopia May, 2021

Variables		Categories	Cases(n=88)	Control (n=176)
			n(%)	n(%)
Information source		Health Extension Workers	75(85.2%)	160(90.9%)
		Health Workers	9(102%)	13(7.4%)
		Others*	4(4.6%)	3(1.7%)
Type of information obtained about contraceptives	Effectiveness	No	47(53.4%)	91(51.7%)
		Yes	41(46.6%)	85(48.3%)
	Side effects	No	49(55.7%)	93(52.8%)
		Yes	39(44.3%)	83(47.2%)
	Duration of action	Yes	70(79.5%)	129(73.3%)
		No	18(20.5%)	47(26.7%)
	Benefits	Yes	63(71.6%)	119(67.6%)
		No	25(28.4%)	57(32.4%)
	Ever used contraceptive before		Yes	54(61.4%)
No			34(38.6%)	35(19.9%)
Last method used before insertion of Implanon		Injection	34(38.6%)	93(52.8%)
		Pills	20(22.7%)	47(26.7%)
		Other**	0	1(0.6%)
Reason for not utilizing before insertion		Fear of side effects	25(28.4%)	22(12.5%)
		Need more children	6(6.8%)	11(6.3%)
		Others***	3(3.4%)	1(0.6%)

*Friends, Media Television/Radio, **Intrauterine contraceptive device, *** Marital dissolution, Husband opposed

Counselling related characteristics of participants:

About 83(47.2%) of controls and 60(68.2%) cases were counselled for less than fifteen minutes. Among those who have used Implanon, 54 (61.4%) cases and 140 (79.5%) controls had discussion with their partners; and 173(98.3%) of controls and 79(89.8%) of cases decided by themselves to use implanon. Majority of the women, 147(83.5%) of controls and 78(88.6%) of cases got implanon insertion service by health extension workers. According to this study, 54(30.7%) of controls and 59(67%) of cases were experienced side effect, and most of the respondents 137(77.8%) controls and 59(67.0%) cases had follow-up after insertion of implanon. From 88 cases that discontinued their implanon before 3 years, 14(15.9%) said that their pregnancy was unintentional [Table-4].

Table 4: Counselling related characteristics of study participants among women who ever used Implanon Shashamane district, South Ethiopia May, 2021

Variables		Categories	Cases(n=88) n(%)	Control (n=176) n(%)
Types of Counselling		Individual	70(79.5%)	140(79.5%)
		With husband	9(10.2%)	20(11.4%)
		Mass	9(10.2%)	16(9.1%)
Duration of counselling		< 15 minutes	60(68.2%)	83(47.2%)
		>= 15 minutes	28(31.8%)	93(52.8%)
Information obtained during counselling	About advantage	Yes	82(93.2%)	169(96%)
		No	6(6.8%)	7(4.0%)
	About side effects	Yes	75(85.2%)	153(86.9%)
		No	13(14.8%)	23(13.1%)
	When to insert and remove	Yes	81(92.0%)	164(93.2%)
		No	7(8.0%)	12(6.8%)
	Duration of action	Yes	64(72.7%)	131(74.4%)
		No	24(27.3%)	45(25.6%)
	Effectiveness	Yes	56(63.6%)	100(56.8%)
		No	32(36.4%)	76(43.2%)
	Presence of alternative	No	67(76.1%)	137(77.8%)
		Yes	21(23.9%)	39(22.2%)
Discussed with partner to use implanon		No	34(38.65)	36(20.5%)
		Yes	54(61.4%)	140(79.5%)
Decision maker to use Implanon		Her-self	79(89.8%)	173(98.3%)
		Husband	8(9.1%)	3(1.7%)
		Other*	1(1.1%)	
Implanon provided by		HEW	78(88.6%)	147(83.5%)
		HW	10(11.4%)	29(16.5%)
Experienced side effects after insertion		No	59(67%)	54(30.7%)

	Yes	29(33.0%)	122(69.3%)
Menstrual cycle pattern after insertion	Regularly	15(17.0%)	73(41.5%)
	Irregular	39(44.3%)	25(14.2%)
	It already stops	34(38.6%)	78(44.3)
Follow-up after insertion	No	29(33.0%)	39(22.2%)
	Yes	59(67.0%)	137(77.8%)
Satisfied by service given	No	6(6.8%)	3(1.7%)
	Yes	82(93.2%)	173(98.3%)
Unintended pregnancy after removal of implanon before expire date	No	74(84.1%)	
	Yes	14(15.9%)	

* Service provider

Determinants of Implanon discontinuation of study participants:

In the binary logistic regression, cases were coded with 1 and controls with 0. Age less than 20, maternal educational status, number of children, history of abortion, ever-used contraceptive before, duration of counselling, discussion with partner, side effects after insertion, menstrual bleeding pattern after insertion, follow-up appointment were found to be candidate variables for multivariable analysis in bivariate model at p-value less than 0.2.

After adjusting variables in a multivariable logistic regression analysis, women`s educational status, number of living children less than four (<4), history of abortion, ever use of any contraceptive before insertion of implanon, duration of counselling, discussion with their partner and experiencing side effects after insertion were determinants of Implanon discontinuation.

Women who can`t read and write were 3.09 times more likely to discontinue their implanon use as compared to women who attended secondary school, [AOR= 3.09(1.20- 8.00)]. The study also showed that women who had living children less than 4 were 2.47 times more likely to discontinue their implanon use when compared to those who had four and more children at time of insertion, [AOR = 2.47(1.20- 5.08)]. The odds of implanon discontinuation was 2.84 times higher among women who had no history of abortion when compared to their counterpart, [AOR=2.84(1.25-6.46)]. According to this study, the odds of implanon discontinuation among women who had not ever used any contraceptive before insertion of implanon were 2.14 times than those who had ever used any contraceptive before, [AOR = 2.14(1.02- 4.49)]. The analysis showed that women who had counselled for less than fifteen minutes were 2.47 times more likely discontinue their implanon use when compared to those who had counselled for fifteen minutes and more, [AOR = 2.47(1.29-4.70)]. The odds of implanon discontinuation among who had not

discussed with their partners were 2.88 times than those who had discussed with their partners, [AOR = 2.88(1.42-5.84)]. This study also showed that women who had no side effects after insertion of implanon were 65 % less likely to discontinue their implanon use as compared to women who had experienced side effects after insertion of implanon, [AOR =0.35(0.17-0.71)]. [Table-5]

Table 5: Determinant of Implanon discontinuation of study participants among women who ever used Implanon Shashamane district, South Ethiopia May, 2021

Variables	Categories	Cases (n, %)	Controls (n, %)	COR[95%CI]	AOR [95%CI]	PV
Age	<20	12(13.6%)	11(6.3%)	2.68(0.91-7.86)*	1.95(0.36-10.61)	0.439
	20-24	15(17.0%)	27(15.3%)	1.36(0.53-3.50)	1.17(0.26-5.30)	0.842
	25-29	28(31.8%)	63(35.8%)	1.09(0.48-2.50)	1.31(0.41-4.21)	0.646
	30-34	22(25.0%)	48(27.3%)	1.12(0.47-2.67)	1.54(0.52-4.53)	0.434
	>=35	11(12.5%)	27(15.3%)	1	1	
Maternal Educational status	Can't read and write	27(30.7%)	34(19.3%)	2.28(1.07-4.89)*	3.09(1.20-8.00)**	0.020
	Read and write	15(17%)	27(15.3%)	1.60(0.68-3.74)	2.28(0.79-6.54)	0.126
	Primary	30(34.1%)	69(39.2%)	1.25(0.61-2.55)	1.39(0.59-3.27)	0.454
	Secondary	16(18.2%)	46(26.1%)	1	1	
Number of children	<4	45(51.1%)	71(40.3%)	1.55(0.92-2.59)*	2.47(1.20-5.08)**	0.014
	>=4	43(48.9%)	105(59.7%)	1	1	
History of abortion	No	69(78.4%)	162(92.0)	2.35(1.20-4.61)*	2.84(1.25-6.46)**	0.013
	Yes	19(21.6%)	14(8.0)	1	1	
Ever used contraceptive before	No	34(38.6%)	35(19.9%)	2.54(1.44-4.47)*	2.14(1.02-4.49)**	0.043
	Yes	54(61.4%)	141(80.1%)		1	
Duration of counselling	< 15 minutes	60(68.2%)	83(47.2%)	2.40(1.40-4.11)*	2.47(1.29-4.70)**	0.006
	>=15 minutes	28(31.8%)	93(52.8%)		1	
Discussed with partner to use	No	34(38.6%)	36(20.5%)	2.45(1.39-4.30)	2.88(1.42-5.84)**	0.003
	Yes	54(61.4%)	140(79.5%)		1	
Side effects after insertion	No	29(33%)	122(69.3%)	0.22(0.13-0.38)*	0.35(0.17-0.71)**	0.004

	Yes	59(67%)	54(30.7%)	1	1	
Menstrual bleeding pattern after insertion	Regularly	15(17.0%)	73(41.5%)	0.47(0.24-0.94)*	0.46(0.21-1.03)	0.059
	Irregular	39(44.3%)	25(14.2%)	3.58(1.88-6.81)	2.25(0.99-5.07)	0.052
	It already stops	34(38.6%)	78(44.3)	1	1	
Follow-up appointment	No	29(33%)	39(22.2%)	1.73(0.98-3.05)*	1.11(0.54-2.27)	0.782
	Yes	59(67%)	137(78.8%)	1	1	

*Candidate variables for multivariable analysis at p-value < 0.2. **statistically significant at p< 0.05 in multivariable logistic regression; 1= used as reference category.

Discussion

This study aimed to identify the determinants of Implanon discontinuation and address the most relevant factors resulting in the discontinuation of implanon in Shashamane District, West Arsi Zone, Southern Ethiopia. This study found that, women educational status, number of living children, history of abortion, ever use of any contraceptive before insertion of implanon, duration of counselling, discussion with their partner and experiencing side effects after insertion were important determinants of Implanon discontinuation among women who ever used implanon.

This study revealed that educational status of women was significantly associated with the discontinuation of implanon; women who can't read and write were three times more likely to discontinue their Implanon as compared to women who attended secondary level education. This result was supported by studies done in Wolayta Zone(22), Mekelle town(20) and study done in Ilorin, Nigeria which strongly agreed that accepting and continuation of Implanon was influenced by the educational attainment(30). This might be due to women with higher level of education appear to discontinue less frequently as presumably they may have better knowledge and able to seek out and understand information from providers or from other information access when side effects occur and observed any physiological change on their body.

The other determinant associated with discontinuation implanon was having living children less than four. Women had living children less than 4 were 2.47 times more likely to discontinue their implanon than when compared to their counterpart. This finding was supported by studies done in Duguna Fango woreda(22) and Agarfa district(31). The reason could be that women may need to have children to attain their desired number of children; thus they might prefer to discontinue contraceptives.

The odds of implanon discontinuation were 2.84 times higher among women who had no history of abortion when compared to their counterpart. This finding is supported by the study conducted in

Andabet district(32). This might be due to women ever experienced abortion had better understanding about its complications, emotional and physical consequences of abortion; and also might be due to knowledge acquired after post abortion care and fear of recurrence of abortion. However, this finding is different from the research done in Duguna fango woreda, wolayta Zone where women who had previous history of abortion were 2.3 times more likely to discontinue their implanon when compared to those women had not experienced abortion(22). This might be due to socio-demographic differences.

According to this study, the odds implanon discontinuation among women who had not ever used any contraceptive before insertion of implanon were 2.14 times than those who had ever used any contraceptive before. This study supported by study done Kucha district Gamo gofa Zone(33). This might be due to repeatedly exposure to contraceptive use make them to acquire knowledge about contraceptives.

This study also showed that women who had counselled for less than fifteen minutes were 2.47 times more likely to discontinue their implanon use when compared to those who had counselled for fifteen minutes and more. This might be due to incomplete comprehensive counselling to ensure that clients are fully informed about the use of the method including potential side effects.

Women who did not discussed with their partners are 2.88 times more likely to discontinue Implanon as compared to those who discussed with their partners. This is line with studies conducted in Bahir Dar Town(21), Kucha District Gamo Gofa Zone(33) and Bale Zone(31). This might be due to fear of menstrual disruption which make their husband aware of their contraceptive use and fear of violence because of disobeying her husband. This implies that males are predominant decision-makers on contraception use in Ethiopia.

Presence of side effects was associated with Implanon discontinuation. Women who had no side effects after insertion of implanon were 65 % less likely to discontinue their implanon use as compared to women who had experienced side effects after insertion of implanon. This result is in line with the study conducted in Buffalo City of South Africa(34), Kinshasa, DRC(35), Upper Egypt(36), Ofla District(18), Debre Markos(37), Andabet District(32), Mekelle town(20), Ambo Town(38). This might be due to women not informed about possible side effects during counselling by providers; they may be concerned and frightened by unanticipated changes in their mood, menstruation patterns, or weight.

Limitation of the study

- Because of the nature of the design, there might be recall bias. To reduce recall bias target women who had been discontinued implanon in the last three years prior to the data collection were used.
- Since data collection method was face-to-face interview, there might be possibility of social desirability bias.

Conclusion And Recommendation

This study found out that women educational status, number of living children, history of abortion, ever use of any contraceptive before insertion of implanon, duration of counselling, discussion with partner, and experiencing side effects after insertion were determinants of Implanon discontinuation among the target women. Thus, ensuring counselling before insertion of implanon, managing side effects would improve retention of implanon use. In addition, implanon discontinuation intervention should target partners, new acceptors and those with no formal education. Also further research should be undertaken by mixing with qualitative study to identify more determinants of implanon discontinuation.

Abbreviations

AOR, adjusted odds ratio; CI, confidence interval; COR, crude odds ratio; EMDHS, Ethiopian mini-demographic and health survey ; FMOH, federal ministry of health; LARC, long-acting reversible contraceptive methods ; PV, P-value; SPSS, statistical package for social science; WHO, world health organization

Declarations

Ethical approval and consent to participate

Ethical clearance was obtained from Madda Walabu University College of health science institutional review board. Permission for conducting the study was secured from Oromia Regional health Bureau (Ref.NO: BEFO/HBTR1/1-16/1080). Then official letter was submitted to West Arsi Zone Health Department. A written informed consent was obtained from all study participants after explaining the objective of study. Confidentiality of the information gathered was assured to the interviewee.

Consent for publication

Not applicable

Availability of data and materials

The necessary data and material of this study are available from the corresponding author whenever needed.

Competing interest

All authors declare that they have no competing interest.

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No fund was obtained for this research. All costs of data collection and analysis were covered by the authors.

Authors' contributions

SG and BL involved in the proposal development, study design, statistical analysis and interpretation of the data and prepared the manuscript. All authors contributed to the data analysis. JA, LG, HG and AW involved in the preparation of manuscript and reviewing the paper. All authors read and approved the final manuscript.

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References

1. Australia KEMH for W-W. A.9.5 Etonogestrel Implant- Implanon NXT. 2018;1.
2. Organization WH. WHO statement on progestogen-only implants [Internet]. Geneva PP - Geneva: World Health Organization; 2015. Available from: <https://apps.who.int/iris/handle/10665/190063>
3. & F of S, Healthcare R, Guidance C. Progestogen-only Implants. 2014;32. Available from: <https://www.fsrh.org/documents/cec-ceu-guidance-implants-feb-2014/2fsrh-guideline-progestogen-only-implant-feb-2021.pdf>
4. Weisberg E. Promoting the use of long-acting reversible contraceptives. Austin J Obs Gynecol. 2014;1(6):6–11.
5. United Nations Population Division D of E and SA. Contraceptive Use by Method 2019: Data Booklet (ST/ESA/SER. A/435). United Nations, Department of Economic and Social Affairs, Population Division; 2019.
6. Ngo TD, Nuccio O, Reiss K, Pereira SK. Expanding long-acting and permanent contraceptive use in sub-Saharan Africa to meet FP2020 goals. London Marie Stopes Int Res Br Ser. 2013;1–6.
7. Staveteig S, Mallick L, Winter R. Uptake and Discontinuation of Long-Acting Reversible Contraceptives (LARCs) in Low-Income Countries. 2015.
8. ICF EPHI (EPHI)[Ethiopia] and. Ethiopia mini demographic and health survey 2019: key indicators. Rockville, Maryland, USA EPHI ICF. 2019;
9. Castle SE, Askew I. CONTRACEPTIVE DISCONTINUATION: REASONS, CHALLENGES, AND SOLUTIONS. In 2015.
10. Jain AK, Winfrey W. Contribution of contraceptive discontinuation to unintended births in 36 developing countries. Stud Fam Plann. 2017;48(3):269–78.
11. Bellizzi S, Mannava P, Nagai M, Sobel HL. Reasons for discontinuation of contraception among women with a current unintended pregnancy in 36 low and middle-income countries. Contraception. 2020;101(1):26–33.
12. Ali M, Cleland J, Shah I. Causes and consequences of contraceptive discontinuation: evidence from 60 demographic and health surveys, 2012. World Heal Organ ISBN. 2013;978(92):4.

13. Federal Ministry of health. National Reproductive Health strategy 2016-2020. 2016; Available from: <https://www.prb.org/wp-content/uploads/2020/06/Ethiopia-National-Reproductive-Health-Strategy-2016-2020.pdf>
14. Ethiopia. , Y tebaqa minist??r. HSTP: Health Sector Transformation Plan: 2015/16 - 2019/20 (2008-2012 EFY). 2015.
15. Tilahun Y, Lew C, Belayihun B, Hagos KL, 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 Heal Sci Pract*. 2017;5(4):592–602.
16. Weldemariam KT, Gezae KE, Abebe HT. Reasons and multilevel factors associated with unscheduled contraceptive use discontinuation in Ethiopia: evidence from Ethiopian demographic and health survey 2016. *BMC Public Health*. 2019;19(1):1–15.
17. McDowell M, Assefa B, Costenbader E, Tejeji MY, Tenaw E, Gemech G, et al. A mixed-methods study of factors associated with Implanon removal in Ethiopia. A Mix study factors Assoc with Implanon Remov Ethiop Final Report. 2017;
18. Birhane K, Hagos S, Fantahun M. Early discontinuation of implanon and its associated factors among women who ever used implanon in Ofla District, Tigray, Northern Ethiopia. *Int J Pharma Sci Res*. 2015;6(3):544–51.
19. Melkamu Asaye M, Syoum Nigussie T, Mequannt Ambaw W. Early Implanon discontinuation and associated factors among Implanon user women in Debre Tabor town, public health facilities, Northwest Ethiopia, 2016. *Int J Reprod Med*. 2018;2018.
20. Gebrekidan KG, Nerea MK, Gereziher H, Haftu M. Early Implanon discontinuation rate and its associated factors in health institutions of Mekelle City, Tigray, Ethiopia 2016/17. *BMC Res Notes*. 2019;12(1):1–6.
21. Yehuala T, Melese E, Bogale KA, Dagneb B. Determinants of Implanon Discontinuation among Women Who Use Implanon at Bahir Dar Town Health Institutions, Northwest Ethiopia, 2019: A Case-Control Study. *Evidence-Based Complement Altern Med*. 2020;2020.
22. Tadesse A, Kondale M, Agedew E, Gebremeskel F, Boti N, Oumer B. Determinant of Implanon discontinuation among women who ever used Implanon in Diguna Fango District, Wolayita zone, southern Ethiopia: a community based case control study. *Int J Reprod Med*. 2017;2017.
23. Nageso A, Gebretsadik A. Discontinuation rate of Implanon and its associated factors among women who ever used Implanon in Dale District, Southern Ethiopia. *BMC Womens Health*. 2018;18(1):1–9.
24. Jones AE, Kaul S, Harding J, Weldon DLM, Akers AY. Follow-up care and 6-month continuation rates for long-acting reversible contraceptives in adolescents and young adults: a retrospective chart review. *J Pediatr Adolesc Gynecol*. 2020;33(1):39–44.
25. Thobani R, Jessani S, Azam I, Reza S, Sami N, Rozi S, et al. Factors associated with the discontinuation of modern methods of contraception in the low income areas of Sukh Initiative Karachi: A community-based case control study. *PLoS One*. 2019;14(7):e0218952.

26. Cohen R, Sheeder J, Teal SB. Predictors of discontinuation of long-acting reversible contraception before 30 months of use by adolescents and young women. *J Adolesc Heal*. 2019;65(2):295–302.
27. West Arsi zone health department. Materna and child health annual report,2019/2020, unpublished.
28. Burusie A. Reasons for premature removal of Implanon among users in Arsi zone, Oromia region, Ethiopia, 2013. *Reprod Syst Sex Disord Curr Res*. 2015;4(1):1–6.
29. Wondie AG. Implanon Discontinuation Rate and It's Associated Factors in Debre Tabor Town, North Central Ethiopia. *Science (80-)*. 2019;8(2):6–12.
30. Balogun OR, Olaomo N, Adeniran AS, Fawole AA. Implanon sub-dermal implant: an emerging method of contraception in Ilorin, Nigeria. *J Med Biomed Sci*. 2014;3(1):1–5.
31. Bekele T, Gebremariam A, Tura P. Factors associated with contraceptive discontinuation in Agarfa district, Bale Zone, south east Ethiopia. *Epidemiol Open Access*. 2015;5(1).
32. Dagnew GW, Gelaw YM, Asresie MB, Anteneh ZA. Level and timing of Implanon discontinuation and associated factors among women who used Implanon in Andabet District, public health facilities, North-West Ethiopia, 2017. 2019;
33. Mesha M, Alemayehu A, Daka D. 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. *BMC Womens Health*. 2020;20(1):1–7.
34. Mrwebi KP, Ter Goon D, Owolabi EO, Adeniyi 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):113–9.
35. Akilimali PZ, KP K. Incidence and determinants of Implanon discontinuation: Findings from a prospective cohort study in three health zones in Kinshasa, DRC. *PLoS One*. 2020;15(5):e0232582.
36. Aziz MM, El-Gazzar AF, Elgibaly O. Factors associated with first-year discontinuation of Implanon in upper Egypt: clients' and providers' perspectives. *BMJ Sex Reprod Heal*. 2018;44(4):260–6.
37. Siyoum 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 town, Northwest Ethiopia, 2016, cross sectional study. *ARC J Public Heal Community Med*. 2017;2(1):8–16.
38. Mamo K, Desta M. Premature Implanon Discontinuation and Associated Factors Among Implanon User Women in Ambo town, Central Ethiopia, 2018. 2018 Mar 18;

Figures

Figure 1

Schematic Representation of Sampling Procedure on Determinant of Implanon Discontinuation among Women Who Ever Used Implanon in Shashamane District, 2020/21

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