ORIGINAL ARTICLE

Reasons and Associated Factors of Early Discontinuation of Implanon: A Follow-up Study from Lahore, Pakistan

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Abstract

Background: Family planning is needed at this time when the world population is rapidly increasing. Etonogestrel sub-dermal implant is a highly effective long-acting and reversible sub-dermal contraceptive implant. Despite its success and enhancement in usage, it is stopped by a proportion of users prior to its expiration date.

Objective: To ascertain the frequency of discontinuation of Implanon during one year period and uncover its reasons and associated factors among women consulting obstetrics and gynecological clinics for contraception methods and opting for Implanon among the available options.

Methodology: This prospective observational study was conducted in Services Hospital, Lahore. All of the women who underwent Implanon insertion from July to December 2020 were enrolled in the study. The outcome variable is early discontinuation of the inserted implant within one year of its insertion.

Results: 350 women receiving sub-dermal Implanon for contraception purposes were included in this study. Their median age and BMI were 28(IQR= 25.8-31) years and 24.3 (IQR=23.6-25) Kg/m^2 respectively. The early discontinuation rate was 49.1%. Reasons for removal were menstrual problems (100%), headache (19%), weight gain (12%), pain in the arm (5%), desire to conceive (1.7%) and spouse death (0.3%). Younger age, increasing body mass index, rural residence and shorter marriage duration were found to be significantly associated with early removal.

Conclusion: This study found a high early discontinuation rate. Premature removal was most commonly caused by menstrual issues. Early removal was independently predicted by an early age, length of the marriage, rising BMI, and residence in a rural location. An awareness campaign should be created specifically for rural areas to address their concerns and reduce the early discontinuation rate. Further research should be conducted to understand the menstrual problems in women undergoing implanon insertion.

Keywords: *Contraception, family planning, pregnancy, implanon, discontinuation.*

INTRODUCTION

Family planning is needed at this time when the world population is rapidly increasing, as it brings benefits to maternal and fetal health and the potential to reduce maternal mortality [1, 2]. Nowadays, there is increasing use of modern contraception methods of long-acting reversible contraceptives including sub-dermal implants and intrauterine devices [3]. Etonogestrel sub-dermal implant is a highly effective long-acting and reversible sub-dermal contraceptive implant with a length of 40mm and a diameter of 2mm delivering 68mg of etonogestrel at a dose sufficient to suppress ovulation in every cycle within 1 year of insertion throughout the 3 years of use [4].

This device is considered a promising contraceptive approach, particularly for females belonging to developing countries because of its lower expense, longer duration, suitability and safety of use during the breastfeeding period as well [5, 6]. It demands little consumer obedience and is associated with rapid fertility return following elimination [7]. Contraceptive cessation is actually beginning a contraceptive technique and then withdrawing it during one year of its use. 20–50% of alterable contemporary techniques are ceased within the first 12 months of use; an additional 7–27% discontinue using a contraceptive method for causes linked to the service quality causing user dissatisfaction, inaccessibility of preferred method and inefficient referral system through which patients consulting physicians not expert in family planning methods [8]. Contraceptive termination is a worldwide issue that may be related to low incentives to prevent pregnancy.

Despite the great success of the implanon technique and enhancement in usage, it is stopped by a considerable number of users prior to its cessation time (3 years). Literature reports a similar cessation rate for implanon devices in developed and developing countries ranging from 13.5-28% [9]. In developed and developing countries, various factors including age, marital status, previous use of contraception methods, education level of sexual partner and parity have been reported as correlates of early cessation of implanon [10-13].

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Cessation rate should be assessed because implanon is usually opted by women pursuing long-term contraception. Further, early withdrawal amplifies the risk of unplanned pregnancy, which is expensive both to individual women and to society [11]. Regarding an implanon discontinuation, a study was conducted in Pakistan which was only focused to uncover the reasons for discontinuation and did not assess the responsible factors [14]. A community-based study was conducted in Pakistan investigating the reasons for the discontinuation of modern contraceptive methods including IUD, injectable, implant, pills, condoms, tubal ligation, male sterilization and lactational amenorrhea. In this study, a particular population using implants for contraception was not targeted and hence the estimated frequency of discontinuation of implants needs validation [15]. Keeping in viewing all these gaps in Pakistani published literature and the criticality of discontinuation of opted contraception method, we intended to conduct this study to ascertain the frequency of discontinuation of implanon during one year period and uncover the reasons and associated factors among women consulting to obstetrics and gyneacological clinics for contraception method and opting implanon among the available options.

METHODS

This prospective observational study was conducted in Services Hospital Lahore after obtaining approval from the ethical committee of the hospital. Patients visiting family planning clinics and getting insertion of implants from July to December 2020 were included. Patients who were lost to follow-up and whose status of early discontinuation was not known were excluded from this study. Patients were followed-up from the time point of insertion of the device till its removal within a year. Patients who did not remove the device were followed up for one year. A previously conducted study in Pakistan reported that 34%, 35%, 16% and 15% of women got the implanted removed because of abnormal uterine bleeding, encountered side effects (such as weight gain, abnormal hair growth, body ache), hypertension and ovarian cysts respectively [14]. Sample size calculation was performed on the online available calculator Open-Epi using a 95% confidence interval and 5% precision for all of the frequencies and the bigger sample size was chosen. The larger sample size of 350 participants was calculated for the frequency of side effects (35%).

The outcome variable is early discontinuation of the inserted implant which was defined as the removal of an implant within one year of its insertion. Predictors variables were patients' demographics including their age (in years), residence (rural/urban), satisfaction with monthly income (yes/no), marriage duration, family system (nuclear or joint), education of user and husband, body mass index (in Kg/m^2), last delivery was planned or unplanned, gravid, parity, opting reason, ever heard about implanon. Gravida indicated all previous pregnancies including abortion and stillbirths. Parity indicates the number of live birth ever born to a woman. The duration for which the implant remained inserted was noted as <6 months and 6-12 months. Self-reported reasons for implanon removal were also recorded. Patients who did not visit back the clinic during one year period were contacted on phone calls to figure out the current status of their implant. But some of them did not pick up calls and were considered lost to follow-up. All of the study variables were timely recorded in a pre-designed structured proforma.

Data were entered into SPSS version 21 for statistical analysis. Frequencies and percentages were computed for categorical variables where numerical variables were expressed in terms of the median with inter-quartile range (IQR) after assessing normal distribution with Shapiro-Wilk test. Binary logistic regression was applied and crude odds ratios with a 95% confidence interval were computed to determine the association of patients' factors with early discontinuation of the implant. Variables with p-values less than 0.25 were used to build the final regression model to compute odds ratios and their 95% confidence interval adjusted for the effects of other covariates. P-value less than or equal to 0.05 was taken as statistically significant on the final regression model.

RESULTS

Socio-demographic and Clinical History of Study Participants

A total of 395 patients underwent the procedure of sub-dermal implant insertion. 45 females were lost to follow-up so data were analyzed for 350 women receiving sub-dermal implants for contraception purposes. Their median age, BMI, gravida and parity were 28 (IQR= 25.8-31) years, 24.3 (IQR=23.6-25) Kg/m^2, 3 (IQR=3-4) and 2 (IQR=2-3) respectively. Out of the females who reported prior use of the contraception method (24.9%), 40.2% of them were using the injection method, 22.9% were using an intra-uterine device, 19.5% were using barriers and 16.1% were using the pull-out method. Table **1** shows the demographic and gynecological history of study participants.

The Early Discontinuation Rate of Implanon and Its Reasons

Only a quarter of the females ever heard about implanon devices before insertion (27.1%). Before implanon insertion, counseling was given to all females. The majority received individual counselling (92.3%) whereas few received group counselling (4.3%) and counselling with husbands (3.4%). 49.1% of females asked to remove the implanon device within a year of its insertion. Reasons for implanon removal are depicted in **Fig. (1)**. Following menstrual complaints were received; amenhorria (37.2%), irregular bleeding (29.1%), spotting (17.4%) and prolonged bleeding (16.3%).

Table 1: Descriptive statistics for the demographic and gynecological history of study participants.

Variable	Groups	Frequency	Percentage
Age (in years)	20-25	58	16.6
	25-29	166	47.4
	30 and above	126	36.0
Body mass index	Normal	45	12.9
	Overweight	214	61.1
	Obese	91	26.0
Residence	Rural	135	38.6
	Urban	215	61.4
Patient's education	No formal	102	29.1
	Primary	95	27.1
	Secondary	84	24.0
	Matric	44	12.6
	Graduate and above	25	7.1
Husband's education	No formal	12	3.4
	Primary	101	28.9
	Secondary	157	44.9
	Matric	73	20.9
	Graduate and above	7	2.0
Family system	Joint	185	52.9
	Nuclear	165	47.1
Income	<25,000 PKR	76	21.7
	25,000-50,000 PKR	181	51.7
	>50,000 PKR	93	26.6
Satisfied with income	Yes	184	52.6
	No	166	47.4
Marriage duration	<5 years	195	55.7
	5-10 years	133	38.0
	>10 years	22	6.3
Husband occupation	Labor	107	30.6
	Businessman	151	43.1
	Office job	92	26.3
Prior use of contraception	Yes	87	24.9
	No	263	75.1
Opting reason	birth spacing	195	55.7
	birth limiting	155	44.3
Insertion period	Immediate post-partum	331	94.6
	after abortion	19	5.4
Last delivery	Planned	172	49.1
	Unplanned	178	50.9

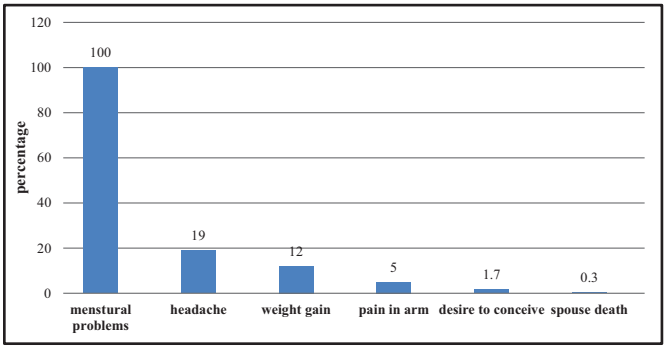

Fig. (1): Frequency of reasons due to which implanon devices were removed early.

Table 2: Factors associated with early removal of implanon.

Variables	OR	95% CI	p-value
Age			
20-25 years	0.61	0.63-2.2	0.611
26-29 years	0.01	0.32-0.82	**0.005
30 years and above	Ref		
Body mass index (in Kg/m^2)	1.2	1-1.4	*0.030
Gravida	0.88	0.70-1.10	0.266
Parity	0.91	0.73-1.14	0.413
Residence			
Rural	3.1	1.2-4.8	**<0.001
Urban	Ref		
User education			
No formal education	1.91	0.52-7.06	0.330
Primary	0.67	0.18-2.46	0.543
Secondary	0.56	0.15-2.07	0.382
Matric	1	0.19-5.36	1.000
Intermediate	1.24	0.32-4.86	0.759
Graduate and above	Ref		
Husband's education			
No formal education	2.50	0.34-18.33	0.367
Primary	2.36	0.44-12.71	0.319
Secondary	3.03	0.57-16.18	0.194
Matric	1.99	0.36-10.95	0.430
Intermediate	1.67	0.27-10.33	0.583
Graduate and above	Ref		
Monthly income			
<25,000 PKR	1.17	0.64-2.15	0.605
25,000-50,000 PKR	1.08	0.65-1.78	0.771
>50,000 PKR	Ref		
Satisfied with monthly income			
Yes	0.82	0.54-1.2	0.344
No	Ref		
Family system			
Joint	1.1	0.69-1.6	0.816
Nuclear	Ref		
Marriage duration			
<5 years	0.01	0.02-0.4	**0.002
5-10 years	0.08	0.01-0.31	**0.001
>10 years	Ref		
Prior use of other methods during last years			
Yes	0.80	0.5-1.3	0.353
No	Ref		
Ever heard about implanon			
Yes	1.2	0.8-1.9	0.426
No	Ref		
Opting reason			
Birth spacing	1	0.6-1.5	0.971
Birth limiting	Ref		

CI: Confidence interval, Ref: Reference category, OR=Odds ratio, *Significant at p<0.05, **Significant at p<0.01

Association of Factors with Early Discontinuation of Implanon

Table **2** shows the associated factors with early removal. On univariate analysis, the risk of early removal was significantly higher among females in the age group 26-29 years than 30 years and above. Females living in rural areas were more likely to have early implanon

removed than females of urban areas. In comparison to couples with marriages lasting more than 10 years, those with shorter marriages (5 years and 5–10 years) were more likely to stop using the implanon within a year following its insertion.

In a multivariable model, when adjusting effects of body mass index, residence and marriage duration, age was found to be significantly associated with early removal with significantly lower odds among women of age 26-29 years as compared to women of age 30 years and above (aOR=0.39, 95% CI: 0.20-0.76, p=0.009). Increasing body mass index was also found to be a predictor of early removal when the effects of other covariates were adjusted (aOR=1.21, 95% CI: 1.04-1.42, p=0.028). The risk of early removal was higher among rural residents than urban ones even on a multivariable model (aOR=3, 95% CI: 1.86-4.82, p<0.001). The likelihood of early implanon removal was found to be significantly lower among couples with a marriage duration of <5 years (aOR=0.90, 95% CI: 0.02-0.41, p=0.002) and 5-10 years (aOR=0.06, 95% CI: 0.01-0.26, p<0.001).

DISCUSSION

Literature reports that no single approach has been proven superior from a contraception perspective. Presently, there is a wide variety of contraception methods with no significant cost. However, there is a controversy regarding the high discontinuation rate and huge expectations that give indications of dissatisfaction with the contraception approach [16]. Early discontinuation is associated with unintended pregnancies. Due to the rapid population growth rate, it is a high need for time to uncover the rate of early removal, its causes and factors, which was the purpose of this study.

We observed that the median age of women seeking implant insertion was 28 years. Another Pakistani study presenting the data related to subdermal contraceptive devices reported a higher proportion of females in the age group of 25-30 years (42%) [14]. An in-depth survey, conducted in Pakistan and Uganda, enrolling the women who received modern contraceptive methods delineate that a major percentage of females were in age ranges of 25-34 years (54.5% in Pakistan, 44.8% in Uganda) [17]. The study of the same concept from Ethiopia also depicted that 57.2% of females had an age category of 20-29 years [18]. Different cultures and customs make it possible for age ranges to vary throughout nations.

In our study, the early discontinuation rate was seen in about half of the women included in study. However, this rate is conflicting with a similar investigation from Pakistan demonstrating only one-fifth of 260 women who were part of the study, had early implant removal, which is comparable to early removal of IUCD in Pakistan [19, 20]. One reason for this considerable difference could be improper methodology as women were not followed up in a proper scientific manner. The researcher enrolled women presenting in a clinic for follow-up of implants inserted for less than one year and asked them to report if they discontinued the implant [19]. In contrast to our findings, a lower rate of early implanon discontinuation has been reported from Egypt (13.5%) [11], Thailand (21%) [21], Dhaka (34.6%) [22] and India (37%) [23]. A higher early removal rate during one year period of insertion (65%) was reported in Ethiopia [12]. Interestingly, another study of similar nature from Ethiopia revealed a 23.4% early discontinuation rate [13]. Reasons for variable discontinuation rates could be attributed to the choice of different study designs such as follow-up studies or cross-sectional investigations, pre-insertion counseling methods and recipients' related factors including their cultural and social values and their educational status.

Surprisingly all of the women in the current investigation reported menstrual problems as a cause of early removal with major reasons of amenorrhea (37.2%), and irregular bleeding (29.1%). Qamar and Mustafa reported intrauterine bleeding as a cause of implant removal among 34%. However, they did not specify the time duration of this removal which was a major drawback of their study [14]. Unlike, our finding, another Pakistani study reported that menstrual problems were seen as reason of removal in nearly quarter of the studied sample (26.9%). 13.1% had cycle disturbance and 13.8% had irregular spotting [19]. Nageso and his coworker found the complaint of irregular bleeding (43.1%) only among the women who early discontinued the implanon [24]. Heavy bleeding was seen as a menstrual difficulty reported by 30% of women in a study by Akilimali PZ *et al.* [25]. Irregular bleeding was reported as the most frequent reason for early discontinuation in Dhaka [24]. Besides menstrual problems, less frequent causes of removal were headache [8, 12], weight gain [14, 26], pain in the arm [11, 27], desire to conceive [14, 23] and spouse death which are consistently reported as less frequent reasons in other similar studies [11, 18, 28].

The present study analyzed that the older age group was associated with a significantly lower risk of early removal as compared to the younger age group, which is a consistent finding that is in line with the study of Abraha *et al.* [18] who reported the likelihood of early removal was 58% lower among women of age 20-24 years as compared to women of age <20 years.

The residence was found as an independent predictor in our study. However, Abraha *et al.* [18] and Asaye *et al.* [26] did not find the association of residence with early implanon removal. The explanation of significant findings in our study is that women getting married in local rural areas are younger than newly married females in the urban area. In rural areas due to the influence of extended families, women and girls sometimes lack control over decisions relating to family planning and fertility, such as when to get pregnant, how many children to have, and how to use contraception. However, this explanation doesn't hold for the Asaye [26] study may be they have a different culture in Ethiopia.

User education was not significant in our study which is in line with another Ethiopian study [18, 26]. However, some studies reported user education as a significant predictor of early discontinuation with greater odds of early removal among illiterate women who had an education of any level [27]. Lower education of husbands was reported as a significant factor of early implanon removal in other studies [18, 28]. The difference in findings could be due to different regions and population characteristics.

In our study, all of the women had a side effect of menstrual problems so side effect was not taken as a predictor in the regression model. Other studies reported patients with side effects were likely to remove implanon early [4, 24, 29]. Abraha *et al.* [19] reported that women who did not use any of the contraception methods previously were more likely to remove the device early but in our study, we did not find this association.

In our study, early marriage duration was also associated with early removal rate but many studies did not evaluate this factor [9, 18, 24]. In our view, marriage duration is an important factor for early implanon removal in Pakistan culture as the pressure is high for newly wedded couples to early conceive and complete their families. However, in other countries particularly in the West, the customs are different and there is free will of couples regarding their family plans. Further research is needed to gain a more complete understanding of the impact of marriage duration on the early discontinuation rate.

The present study is useful for taking insights into the early implanon discontinuation rate and its impacts on the health of a user in the Pakistani population. However, this study is a single-center experience from the city of Lahore with a limited sample size, which limits the generalizability of the results to the whole population. A future multi-center study with a larger sample size would be more appropriate to estimate the true rate of early removal and incidence of complications in the Pakistani population and its associated factors. Further, the findings of the link between increasing body mass index and menstrual problems because of implanon use should be validated in future cohort studies.

CONCLUSION

This study found a high early discontinuation rate. Premature removal was most commonly caused by menstrual issues. Early removal was independently predicted by an early age, length of the marriage, rising BMI, and residence in a rural location. An awareness campaign should be created specifically for rural areas to address their concerns and reduce the early discontinuation rate. Further research should be conducted to understand the menstrual problems in women undergoing implanon insertion.

ETHICAL APPROVAL

This study was approved by the Ethics committee of the hospital (IRB#: 351/17/SIMS). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki declaration.

CONSENT FOR PUBLICATION

Written infomred consent was taken from all the participatns.

AVAILABILITY OF DATA

The data will be available from the corresponding author upon a reasonable request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

AUTHORS' CONTRIBUTION

NA gave the study concept. NA and MS designed the study protocol and data collection tool. IH and NN drafted the initial version of the manuscript. AA and BA collected the data, analyzed it and wrote the study results. NA critically reviewed and revised the initial draft of the manuscript. All authors read and approved the manuscript.

REFERENCES

1. Crespi S, Hanisch M. Implanon (etonogestrel implant) application for WHO Eml. Geneva: WHO; 2014.
2. Rowlands S, Searle S. Contraceptive implants: current perspectives. Open Access J Contracept 2014; 5: 573-84. https://doi.org/10.2147/OAJC.S55968
3. PMA DataLab. Contraceptive Method Mix (All Women) (2021). Available online at: https://datalab.pmadata.org/data/indicators
4. Yimer Y, Cherie N, Damtie Y. Determinants of early discontinuation of etonogestrel sub-dermal implant among reproductive-age women in Legambo district, Northeast Ethiopia: An unmatched case–control study. SAGE Open Med 2022; 10: 20503121221088102. doi: 10.1177/20503121221088102
5. Roberts AO, Morhason-Bello IO, Okunlola MA, Adekunle AO. Profile of Implanon® acceptors and pattern of side effects. J Reprod Contracept 2015; 26: 46-52. https://doi.org/10.7669/j.issn.1001-7844.2015.01.0046
6. Hubacher D, Olawo A, Manduku C, Kiarie J. Factors associated with uptake of subdermal contraceptive implants in a young Kenyan population. Contraception 2011; 84: 413-7. DOI: 10.1016/j.contraception.2011.02.007
7. Ladipo OA, Akinso SA. Contraceptive implants. Afr J Repod Health 2003; 9: 16-23. doi: 10.2307/3583156
8. Vadnais D, Kols A, Abderrahim N. Womens lives and experiences: changes in the past ten years. Research findings from the Demographic and Health Surveys. 2006. Available from: https://dhsprogram.com/publications/publication-od40-other-documents.cfm
9. United Nations Department of Economic and Social Affairs, Population Division. Estimates and Projections of Family Planning Indicators 2018. Available from: https://www.un.org/en/development/desa/population/publications/pdf/family/Figure_Model-based_estimates_Countries_2019.pdf

10. Peterson AM, Brown A, Savage A, Dempsey A. Prevalence of early discontinuation and associated factors among a retrospective cohort of etonogestrel contraceptive implant users. Eur J Contracept Reprod Heal Care (Internet) 2019; 24(6): 475-9. DOI: 10.1080/13625187.2019.1666361

11. 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 Health 2018; 44(4): 260-6. http://dx.doi.org/10.1136/bmjsrh-2017-101860

12. Nageso A, Gebretsadik A. Discontinuation rate of Implanon and its associated factors among women who ever used Implanon in Dale District, Southern. BMC Womens Health (Internet) 2018; 18(1): 1-9. https://doi.org/10.1186/s12905-018-0678-x

13. Law A, Liao L, Lin J, Yaldo A, Lynen R. Twelve-month discontinuation rates of levonorgestrel intrauterine system 13.5 mg and subdermal etonogestrel implant in women aged 18–44: a retrospective claims database analysis. Contraception (Internet) 2018; 98(2): 120-4. https://doi.org/10.1016/j.contraception.2018.04.006

14. Qamar H, Mustafa R. Rise of discontinuation of the subdermal contraceptive: a randomized cross sectional study in Korangi. J Soc Obstet Gynaecol Pak 2019; 9(3): 125-30.

15. 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.

16. Geja E, Belayneh F, Legesse D, Tsegaw D, Abuka T, Gebremariam A, *et al.* Prevalence of early removal of long-acting contraceptive methods and its associated factors in Sidama Regional State, Ethiopia. Open Access J Contracept 2021; 12: 35-44. doi: 10.2147/OAJC.S280405

17. Chakraborty NM, Chang K, Bellows B, Grépin KA, Hameed W, Kalamar A, *et al.* Association between the quality of contraceptive counseling and method continuation: findings from a prospective cohort study in social franchise clinics in Pakistan and Uganda. Glob Health Sci Pract 2019; 7(1): 87-102. DOI: 10.9745/GHSP-D-18-00407

18. Abraha HE, Gezae KE, Kahsay AB, Tequare MH. Incidence and predictors of first-year unplanned discontinuation of Implanon at Ayder comprehensive specialized hospital, northern Ethiopia: a retrospective follow-up study. PLoS One 2022; 17(1): e0259234. doi: 10.1371/journal.pone.0259234.

19. Waris N, Fatima RM. Frequency of various side effects and early removal of progesterone implant among females attending family planning clinics. Pak J Med Health Sci 2022; 16(1): 637-8.

20. Hameed W, Azmat SK, Ishaque M, Hussain W, Munroe E, Mustafa G, *et al.* Continuation rates and reasons for discontinuation of intra-uterine device in three provinces of Pakistan: results of a 24-month prospective client follow-up. Health Res Policy Syst 2015; 13 Suppl 1(Suppl 1): 53.

21. Parkpinyo N, Panichyawat N, Sirimai K. Early removal of the etonogestrel contraceptive implant and associated factors among users at the urban family planning clinic in Siriraj Hospital, Bangkok, Thailand. Siriraj Med J 2021; 73(6): 399-405. https://doi.org/10.33192/Smj.2021.53

22. Mehzabin S, Kutubi A, Elahi MM, Bar D, Manni UJ, Islam M. Factors responsible for premature discontinuation of long acting reversible contraceptives a study conducted in Model Family Planning Clinic of Dhaka Medical College Hospital over a period of one year. J Dhaka Med Coll 2019; 28(1): 112-8.

23. Bhatia P, Nangia S, Aggarwal S, Tewari C. Implanon: subdermal single rod contraceptive implant. J Obstet Gynaecol India 2011; 61(4): 422-5. doi: 10.1007/s13224-011-0066-z.

24. 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): 189. doi: 10.1186/s12905-018-0678-x.

25. Akilimali PZ, Hernandez J, Anglewicz P, Kayembe KP, Bertrand J. 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. doi: 10.1371/journal.pone.0232582.

26. 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: 3597487. doi: 10.1155/2018/3597487

27. G/Medhin T, Gebrekidan KG, Nerea MK, Gerezgiher 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): 8. doi: 10.1186/s13104-018-3992-3.

28. 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: 2861207. doi: 10.1155/2017/2861207

29. Tesfaye H, Negara E, Bayisa K. Early implanon discontinuation and associated factors among women ever used implanon in Mettu district, Oromia regional state, southwest Ethiopia, 2021. Reprod Health 2021; 18(1): 176. doi: 10.1186/s12978-021-01222-8.