



# The Effectiveness of Postpartum IUD Compared to Interval IUD in 'Aisyiyah Hospital Klaten

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## Abstract

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**BACKGROUND:** Postpartum IUD (PPIUD) insertion is performed 10 min after the placenta is born until 48 h postpartum, interval method is installed after 4 weeks postpartum. The use of this contraception will provide a distance between pregnancies not to be too close.

**AIM:** To assess the effectiveness of PPIUD and the interval on complaints and complications in acceptors.

**METHODOLOGY:** This study used a cross-sectional design. The subjects were women who gave birth vaginally and cesarean section at the 'Aisyiyah Hospital Klaten with PPIUD and interval acceptors installed. Complaint data obtained through history taking, complications obtained from ultrasound, inspeculo examination, and vaginal swab. Data were analyzed by univariate, bivariate, and multivariate analysis.

**RESULTS:** One hundred and twenty-nine subjects consisted of 82 (63.6%) PPIUD and 47 (36.4%) interval. On ultrasound examination, 126 (97.7%) subjects had no abnormalities, two (1.6%) had abnormalities, and one (0.8%) found ovarian cysts. On inspeculo examination, 89 (69.0%) subjects found no erosion, and 40 (31.0%) did not find abnormalities. Vaginal swab examination showed that 119 (92.2%) subjects had pathogenic bacteria, ten (7.8%) were normal. The fungus was positive in 75 (58.1%) subjects, and no fungus was in 54 (41.9%), while in NGO, positive was 18 (14.0%) subjects, and negative was 111 (86.0%). There was a significant relationship that the type of IUD insertion had husband's complaints ( $p = 0.021$ ), the erosion incidence ( $p = 0.011$ ), the presence/absence of threads ( $p = 0.01$ ), and the presence of fungus (0.00). PPIUD is more effective than interval IUD.

**CONCLUSION:** PPIUD is more effective in terms of the lack of complaints from the husband, the incidence of erosion, the presence or absence of threads, and found of fungus on the vaginal swab than interval IUD.

## Introduction

During this pandemic, long-term family planning methods are preferred because the schedule for visiting health facilities is not as frequent as short-term family planning methods. In this case, Intra-uterine device (IUD) is one of the long-term contraceptive methods besides implants. Intrauterine devices and implants, as long-term contraceptive methods, show lower pregnancy rates than short-term methods [1]. The advantages of IUD insertion and postpartum implants are that they have both high efficacy and reversibility, also easy to insert by trained health personnel [2]. Postpartum IUD (PPIUD) insertion is performed ten minutes after the placenta is born until 48 hours postpartum, while the interval insertion method is not associated with delivery. What is meant by the interval period is the insertion of the IUD after four weeks after delivery. Insertion of the IUD after 4 weeks postpartum, or usually 6 weeks postpartum, is considered a traditional IUD insertion. In India, postpartum IUD insertion is gaining popularity [3].

The use of contraception will provide a distance between pregnancies not to be too close. The use of PPIUD and postpartum implants prevents accidental pregnancies and too close pregnancy [4]. A pregnancy that is too close is risky for both mother and baby. The risk to the mother causes her not to have time for herself, especially if the mother has a congenital disease so that she does not have time to complete her recovery. In addition, the too close pregnancy of mothers who give birth with a history of cesarean section will be at risk of uterine rupture [5]. The use of postpartum implants has a lower risk of weight gain than the use of injectable contraceptives [2]. Thus, the risk of obesity is lower, so it is hoped that mothers will be healthier and avoid unwanted pregnancies. Meanwhile, the risks for the baby are slow fetal growth, preterm labor, and increased morbidity and mortality for babies. Short pregnancy intervals in adolescents (aged 10–18 years) increase the risk of preterm birth, lower birth weight, and stillbirth [6]. The use of postpartum implants does not interfere the breastfeeding mothers [2]. Thus, the baby gets enough milk intake needed for the baby's health.

Specifically, as a developing country, Indonesia has a high maternal mortality rate. ASEAN Maternal Mortality Rate 2015 showed that Laos is the highest with MMR 220 death/1000 live births, then Myanmar 212 death/1000 live births and Indonesia is 190 death/1000 live births. The lowest MMR is Singapore with 2.4 death/1000 live births [7].

The risk of this maternal mortality can be reduced by the high use of contraception in the community. The use of contraception, in addition to preventing unwanted pregnancies, is also an effort to achieve the 5<sup>th</sup> goal of the Millennium Development Goals, namely improving maternal health [5]. Regarding this, IUDs are still the preferred choice of long-term contraceptive method in Indonesia. In 2015, the coverage of IUD contraception in Indonesia was 7.3%, and implants were 6.21% [8]. The impact of the pandemic on the family planning program was a decrease in family planning services at health service facilities, this was related to the disruption of the supply chain of contraceptive devices and drugs due to the disruption of the mobility of officers in the field. Communication, Educational Information (CIE) Reproductive Health, Family Planning activities have also decreased because group-based activities in the community have limited mobility due to the application of physical and social distancing, it is highly recommended for maternity mothers to perform PPIUD insertion during parturition. Postpartum IUD insertion is recommended when providing education to pregnant women because it has the advantage of being reversible over sterilization [2]. However, the family planning outreach in Indonesia is not as intense as the slogan of two children is enough. The use of contraception in Indonesia in the last decade has not increased, instead there has been an increase in unmet need [9]. This condition still occurs even though the provision of information, education, and communication is always carried out [10]. Currently, the slogan of the National Family Planning Coordinating Board as a family planning institution in Indonesia is *Bangga Kencana*. This slogan accentuates that a prosperous family is a planned family. The success of family planning is in line with the decrease in unmet need. The main causes of unmet need include lack of knowledge about the pregnancy risks, fears of side effects and health problems, prohibition on the use of contraceptives, for example, husbands do not allow it, cost problems, subjective assumption that pregnancy does not occur even without contraception [11].

Therefore, the use of contraception is then introduced when pregnant women perform ANC, hoping that they will immediately choose family planning after giving birth. Thus, when the mother is discharged from the hospital, it is safe for her pregnancy to be thinned out for at least in the next 2 years.

Moreover, the problem often asked by prospective acceptors when the postpartum IUD is introduced is whether the IUD does not come off easily

because of the large size of the uterus. Therefore, this paper presents how the complaints and complications are likely to be encountered with postpartum IUD compared to interval IUD. If the postpartum IUD's effectiveness and efficiency are better, it will increase family planning coverage and reduce maternal mortality. In line with research conducted in India, PPIUD insertion increases family planning coverage rates [3]. PPIUD insertion reduces the incidence of unwanted pregnancies [5], thus, it is expected to reduce the risk of maternal death.

In previous research, several things have been explained about this question. One of them explicated that the expulsion incidence was 12% for the PPIUD insertion after vaginal delivery, 0% for PPIUD insertion during *sectio caesarea*, and 6% at interval IUD. However, the perforation incidence was not found in all study groups [3]. Katheit stated that knowledge about PPIUD was much lower than interval IUD insertion (5.79% vs. 73.55%). Therefore, the acceptance of PPIUD insertion at the age between 21 and 25 years was 50.88%. Then, the expulsion incidence was 10.5%, but there was no perforation incidence or other major complications. Concerning this, the PPIUD insertion is said to be safe, has high effectiveness, has long-term effects, and is a low-cost contraceptive. Moreover, the expulsion incidence can be reduced if the family planning officers are more trained and the PPIUD insertion is inserted into the uterine fundus [12]. Post-partum IUD insertion did not increase the incidence of bleeding, pain, and the risk of infection. In addition, there was also no incidence of uterine perforation. These conditions support the safety and effectiveness of PPIUD insertion [3]. In the absence of an increased risk of infection, bleeding, pain, and uterine perforation, it is safe to install a PPIUD [2]. Insertion of the Cu375 IUD is recommended during cesarean delivery to prevent the occurrence of unmet needs because it is proven to be safe, effective, and comfortable [13].

A study was conducted for 2 years, from January 2016 to December 2017, by Makins *et al.*, by carrying out PPIUD insertion counseling involving 6477 trained health providers; a total of 219,242 people were counseled out of 239,033 childbirth that took place. It could be concluded that the family planning acceptance, especially PPIUD insertion in several different countries, revealed different responses according to local culture, and it is impossible to generalize it to all countries [14].

Another research affirmed that PPIUD insertion ten minutes after placenta detachment is a potential contraceptive to reduce the incidence of unwanted pregnancies and the short distance between pregnancies [15]. The purpose of the study is to know the effectiveness of PPIUD and the interval IUD based on acceptors complaints and complications.

## Methods

This research method was cross-sectional analytic, the relationship between the types of IUD insertion, namely PPIUD and IUD intervals with complaints from the husband, the results of the inspeculo inspection (presence or absence of erosion and expelled IUD or not), the presence or absence of fungi, bacteria, menstrual complaints, pain, ultrasound examination results. The research subjects consisted of women with vaginal and *sectio caesarea* (SC) deliveries in the maternity room and operating room at RSIA 'Aisyiyah Klaten, with PPIUD installed that conformed to the inclusion and exclusion criteria. Meanwhile, interval IUD in this study was the respondents who inserted the IUD, and it was not related to the time of delivery. Inclusion criteria encompassed women with vaginal and *sectio caesarea* (SC) deliveries with normal temperature (<37°C), intact or ruptured amniotic before 18 h, no untreated postpartum hemorrhage, and were willing to sign an informed consent for the research. Exclusion criteria comprised mothers giving birth with comorbidities, such as asthma, heart disease, diabetes mellitus, hypertension, anemia, and allergies. Besides, this research has received ethical approval from the Health Research Ethics Commission, Universitas Muhammadiyah Yogyakarta, with number 181/EC-KEPK FKIK UMY/X/2020.

## Results

Table 1 shows the research subjects' characteristics. The study's total sample was 129 participants consisting of 82 (63.6%) PPIUD and 47 (36.4%) IUD intervals. In total, of the 129 IUD participants based on the educational level, the most were Senior High School with 53 (41.1%), followed by Bachelor with 43 (33.3%) participants, diploma with 18 (14.0%), and other education (Elementary School, Junior High School, Master Program/Doctoral Program) with a mean of 2–7 participants (1.6–5.4%). Besides, most IUD participants did not work, as many as 66 (51.2%), while private employees were 20 (15.5%). In this research, IUD participants revealed that 104 were multigravidas (80.6%), and 25 (19.4%) were primigravida. Then, participants who controlled/checked the IUD in health services were 93 (72.1%), while 35 (27.1%) participants had never had an IUD control. In addition, the participants who complained of vaginal discharge were quite a lot, as many as 85 (65.9%), while 44 (34.1%) participants did not complain. Furthermore, there were complaints of irregular menstruation as many as 22 (17.1%) participants, while regular menstruation was 107 (82.9%).

Table 1 regarding IUD complaints, most participants did not complain of pain, as many as 80 (62.0%) participants, while 49 (38.0%) participants complained of pain. Meanwhile, during sexual intercourse, on average, 126 (97.7%) participants did not experience complaints and felt fine, and only three (2.3%) participants experienced complaints.

**Table 1: Characteristics of research subjects**

Characteristics	Classification	IUD Interval		PPIUD	
		Freq	(%)	Freq	(%)
Last education	Senior high school	22	46.8	32	39.0
	Bachelor	20	42.5	28	34.2
	Diploma	2	4.3	16	19.5
	Other	3	6.4	6	7.3
Mother's job	Housewife	21	44.7	47	57.3
	Civil servants	10	21.3	14	17.1
	Private	9	19.1	9	11.0
	Entrepreneur	7	14.9	12	14.6
	Primigravida	5	10.7	19	23.2
Parity	Secundigravida	22	46.8	39	47.5
	Multigravida	20	42.5	24	29.3
	Ever control	28	59.6	65	79.3
IUD control	Never control	19	40.4	17	20.7
	Yes	26	55.3	59	71.9
Vaginal discharge	No	21	44.7	23	28.1
	Yes	35	74.5	73	89.0
Regular menstruation	No	12	25.5	9	11.0
	Yes	13	27.7	34	41.5
Pain	No	34	72.3	48	58.5
	Yes	3	6.4	0	0
Husband's complaints	No	44	93.6	82	100.0
	Yes	1	2.2	2	2.4
Ultrasound results abnormalities	No	46	97.8	80	97.6
	Yes	19	40.4	19	25.6
Results of inspeculo: erosion	No	28	59.6	61	74.4
	Light	14	29.8	13	15.9
Level of erosion abnormalities	Moderate	4	8.5	4	4.9
	Heavy	1	2.2	2	2.4
	No Abnormalities	28	59.6	61	74.4
	IUD failed	0	0.0	1	1.2
	No data	0	0.0	1	1.2
Inspeculo with thread	Yes	35	74.5	34	41.5
	No	12	25.5	45	54.9
	IUD failed	0	0.0	1	1.2
	No data	0	0.0	2	2.4
Total					

IUD: Intra uterine device, PPIUD: Post partum intra uterine device, freq: Frequency.

In addition, the gynecological ultrasound examination results showed that 126 (97.7%) participants had no abnormalities, while three (2.4%) showed abnormalities. The Inspeculo results revealed that 89 (69.0%) examinations found no erosion/redness of the uterine cervix, and 40 (31.0%) participants did not find abnormalities. On inspeculo examination based on the abnormality level, the highest was mild level with 58 (45.0%) participants, followed by moderate level with 48 (37.2%) participants and heavy level with 10 (7.8%) participants, and no vaginal discharge in 13 (10.1%) participants. On inspection of the presence or absence of threads, 68 people saw the IUD thread, while 61 people (47.3%) did not see the thread.

Table 2 displays the research subjects' microscopic examination results. In the vaginal swab microbiological culture results, the most pathogenic bacteria were found in 119 (92.2%) participants, while ten (7.8%) participants were normal. It was found positive in 75 (58.1%) participants for fungus swab results, while no fungus was found in 54 (41.9%) participants. In addition, Gram-negative diplococcus bacteria were found in 18 (14.0%) participants, while 111 (86.0%) participants had negative results.



**Table 2: The research subject's microscopic examination results**

Characteristics	Classification	Frequency	(%)
Bacterial vaginal swab examination	Yes	119	92.2
	No	10	7.8
Fungus	Yes	75	58.1
	No	54	41.9
NGO*	Yes	18	14.0
	No	111	86.0
Total		129	100

\*NGO: *Neisseria gonorrhoea*

Table 3 exhibits the bivariate analysis results of the research subjects. Four variables showed significant results with a  $p < 0.05$ . The significant variables consisted of husband's complaint ( $p = 0.021$ ), erosion ( $p = 0.011$ ), inspeculo with a thread ( $p = 0.01$ ), and the presence of fungi ( $p = 0.000$ ). Meanwhile, seven other variables, including menstruation complaints, vaginal discharge complaints, pain, ultrasound results, inspecules that described the vaginal discharge level, presence or absence of bacteria, presence or absence of NGO, exposed insignificant results, with  $p > 0.05$ .

**Table 3: Bivariate analysis results**

Variable	p-value of the IUD Effectiveness
Husband's complaints	0.021
Erosion	0.011
Inspeculo with thread	0.01
Fungus	0.000
Menstrual complaints	0.53
Vaginal discharge complaints	0.55
Pain	0.146
Ultrasound results	0.69
Inspeculo of vaginal discharge level	0.304
Bacteria	0.660
NGO	0.708

\*Significant if  $P < 0.05$ .

## Discussion

Besides, the vaginal bleeding incidence in PPIUD was around 7%, the expulsion incidence was 5%, while the shifted IUD incidence was 2%, but there was no perforation incidence [16]. The perforation incidence was also not found in the PPIUD insertion. The total expulsion incidence was found in six cases (7.5%), whereas those with partial expulsion were found in eight cases (10%). In this regard, the PPIUD insertion was an easy thing to do, stated by 93% ( $n = 74$ ) of operators [17]. Post-SC PPIUD insertion showed that the expulsion incidence at 6 weeks after insertion was 6.1% (7/114), expulsion in the year of insertion was 8.8%, no perforation incidence, and one infection incidence. In addition, the continued use of the IUD in a year reached 84.8%. Therefore, as many as 92.7% of respondents felt they were compatible with the IUD they had worn within a year of use [18].

In the evaluation six months after PPIUD insertion, the infection incidence was 0.8%, there was no perforation incidence in 98.3% of respondents, thus recommending the use of IUDPP and the total expulsion incidence was 29.8% ( $n = 113$ ) [19]. Besides, the IUD malposition incidence was 10.4%, identified by

ultrasound examination. Most malposition sites (73.1%) were in the lower uterine or cervical segment [20]. Further, the continued use rate at 6 months was 81.81% for the interval IUD and 88.23% for the IUDPP. The complication incidence was 15.33% for the PPIUD and 19.33% for the interval IUD. Meanwhile, the expulsion rate incidence in the PPIUD was 6.96% and 2.2% in the IUD interval, with  $p < 0.05$  [21].

Furthermore, the incidence of no visible thread was 29%, the expulsion incidence was less in post-SC respondents (aOR 0.33; 95% CI, 0.26–0.41), whereas in those inserted vaginally, aOR 0.59; 95% CI, 0.42–0.83 [22]. Besides, the PPIUD insertion by midwives had several complications in the form of infection in the uterus by 2.7%, the expulsion incidence was 2.3%, and IUD removal was 4.4% [23]. Meanwhile, serious complications were not found with post-SC PPIUD; the incidence of expulsion rates, PPIUD release due to bleeding or pain, and other medical reasons, respectively, were 17.6, 8.2, and 2.4/100 women per year. In addition, the rates of continued use of the IUD at six months and 12 months were 81.6% and 62% [24].

The highest incidence of expulsion was found in vaginal PPIUD (12%), compared to post-SC PPIUD (0%), and at the IUD interval of 6%, it was statistically significant ( $= 0.037$ ). The incidence of other complications in the form of heavy bleeding, pain, infection in the PPIUD was almost the same as the interval IUD and was not statistically significant ( $p = 0.972$ ). The perforation incidence was not observed in either group [3]. On the other hand, the apparent incidence of IUD thread was in different types of IUD of Cu375 and CuT380A at six weeks post-SC insertion evaluation, 97.9%, and 41.7%, respectively. The incidence at three months was 100% in the Cu375 group and 47.9% in the CuT380A ( $p < 0.001$ ) [13].

In this case, the threads would appear in the PPIUD at week six and three months less than the interval IUD. Then, in the PPIUD, the risk of expulsion was zero, whereas, in the IUD interval, it was 5/84 (5.95%) [25]. Expulsion was higher for levonorgestrel intrauterine system users (21/55 or 38%) than for copper intrauterine device users (8/41 or 20%) (odds ratio, 2.55; 95% confidence interval, 0.99e6.55;  $P \frac{1}{4} 0.05$ ) [26]. The risk of expulsion in immediate and early postpartum placements was higher than interval placement (adjusted RR 7.63, 95% CI 4.31–13.51; adjusted RR 6.17, 95% CI 3.19–11.93, respectively). Risk of expulsion in postpartum placement less than 4 weeks after vaginal delivery was higher than cesarean delivery (adjusted RR 5.19, 95% CI 3.85–6.99). Risk of expulsion at less than 4 weeks postpartum that the levonorgestrel intrauterine system was higher than CuT380A [27].

The existence of the IUD as one of the causes of vaginal discharge [28] was proven in this study, where vaginal discharge was found in both IUDPP acceptors and IUD intervals. *Neisseria gonorrhoea* was

found in 14% (18/129) in this study, which may progress to cervicitis. Hay said that cervicitis is associated with gonorrhoea, chlamydia, or *Mycoplasma genitalium*, which will appear as vaginal discharge [28]. Gonorrhoea is one of the five reproductive tract infectious diseases [29].

In the vaginal discharge, blood clots can be found, causing complaints of bleeding outside the menstrual cycle or irregular menstruation. Complaints of post-coital bleeding or bleeding after a vaginal swab are often found [28]. This indicates an erosion/wound on the portion or cervix so that when rubbed on a vaginal swab examination, it will bleed.

In this study, the incidence of erosion in the IUD interval was higher than the IUDPP 40.4% (19/47) versus 25.6 (19/80). In line with the higher incidence of regular menstruation in IUDPP 89% (73/82) than IUD interval 74.5% (35/47), where due to cervicitis it is possible to have bleeding outside the menstrual cycle as described above. Thus, the possibility of more NGOs being found at interval IUDs cannot be ruled out.

The weakness of this study is that it cannot be explained why vaginal discharge in IUDPP is lower than IUD interval. Further research is needed with a larger number of samples.

The incidence of pain in the IUDPP was 41.5% (34/82) higher than the IUD interval of 27.7% (13/47), possibly because the rhythmic contractions of the uterus that had just given birth in the process of involution could not be ruled out. The husband did not complain about the IUDPP compared to the interval IUD, which was 0% versus 6.4% (3/47), possibly because the IUDPP installation counseling involved the presence of the husband who was waiting for his wife who was about to give birth. Thus, the husband's acceptance of the IUD thread is better than the interval IUD, where the husband is not necessarily present at the time of insertion.

## Conclusion

There was a significant relationship between the type of IUD insertion and the husband's complaints ( $p = 0.021$ ), the erosion incidence ( $p = 0.011$ ), the presence or absence of threads during inspeculo examination ( $p = 0.01$ ), and the presence of fungi ( $p = 0.00$ ). PPIUD is more effective than interval IUD.

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## References

1. Tocce KM, Sheeder JL, Teal SB. Rapid repeat pregnancy in adolescents: Do immediate postpartum contraceptive implants make a difference? *Am J Obstet Gynecol.* 2012;206(6):481. e1-7. <https://doi.org/10.1016/j.ajog.2012.04.015> PMID:22631865
2. Mwalwanda CS, Black KI. Immediate post-partum initiation of intrauterine contraception and implants: A review of the safety and guidelines for use. *Aust N Z J Obstet Gynaecol.* 2013;53(4):331-7. <https://doi.org/10.1111/ajo.12095>. PMID:23635040
3. Chhari A, Zutshi V, Sharma R, Batra S. Comparison of post placental IUD with interval IUD. *Int J Reprod Contracept Obstet Gynecol.* 2015;4(4):1090-3. <https://doi.org/10.18203/2320-1770.ijrcog20150433>
4. Teal SB. Postpartum contraception: Optimizing interpregnancy intervals. *Contraception.* 2014;89(6):487-8. <https://doi.org/10.1016/j.contraception.2014.04.013> PMID:24815100
5. Wildemeersch D, Goldstuck ND, Hasskamp T. Current status of frameless anchored iud for immediate intracesarean insertion. *Dev Period Med.* 2016;20(1):7-15. PMID:27416620
6. Nerlander LM, Callaghan WM, Smith RA, Barfield WD. Short interpregnancy interval associated with preterm birth in US adolescents. *Matern Child Health J.* 2015;19(4):850-8. <https://doi.org/10.1007/s10995-014-1583-z> PMID:25062997
7. ASEANstat, Maternal Mortality Rate; 2021. Available from: <https://www.aseanstats.org/publication/asean-maternal-mortality-rate-infographic> [Last accessed on 2021 Dec 24].
8. Budiarti I, Nuryani DD, Hidayat R. The Determinant of Using Long Term Birth Contraceptive Method (LTBCM) on KB Acceptor. *J Kesehat.* 2017;8(2):220. <https://doi.org/10.26630/jk.v8i2.490>
9. Misnaniarti M, Ayuningtyas D. Unmet need for family planning in Indonesia and the policy strategy of intervention in several countries. *Int J Reprod Contracept Obstet Gynecol.* 2016;5(6):1680-5. <https://doi.org/10.18203/2320-1770.ijrcog20161652>
10. Winarni E, Dawam M. Family planning information, education and communication with contraceptive use. *Kesmas.* 2016;11(2):94-102. <https://doi.org/10.21109/kesmas.v11i2.801>
11. Westoff CF. Unmet Need for Modern Contraceptive Methods. *DHS Anal Stud.* No. 28; 2012. Available from: <http://www.dhsprogram.com/pubs/pdf/as28/as28.pdf>. [Last accessed on 2021 Dec 25].
12. Katheith G, Agarwal J. Evaluation of post-placental intrauterine device (PPIUCD) in terms of awareness, acceptance, and expulsion in a tertiary care centre. *Int J Reprod Contracept Obstet Gynecol.* 2013;2(4):539. <https://doi.org/10.5455/2320-1770.ijrcog20131210>
13. Agarwal K, Dewan R, Mittal P, Aggarwal A. Visibility of strings after postplacental intracesarean insertion of CuT380A and Cu375 intrauterine contraceptive device: A randomized comparative study. *J Obstet Gynaecol India.* 2017;67(5):324-9. <https://doi.org/10.1007/s13224-017-0965-8> PMID:28867882
14. Makins A, Taghinejadi N, Sethi M, Machiyama K, Thapa K, Perera G, et al. Factors influencing the likelihood of acceptance of postpartum intrauterine devices across four countries: India, Nepal, Sri Lanka, and Tanzania. *Int J Gynaecol Obstet.* 2018;143 Suppl 1:13-9. <https://doi.org/10.1002/ijgo.12599>

- PMid:30225876
15. ACOG. Immediate Postpartum Long-Acting Reversible Contraception. Vol. 128. United States: ACOG; 2016. p. e32-7.
  16. Raghuvanshi R, Chavan S, Hegde LC. To assess the safety and expulsion rate of cut 380a in immediate postpartum period. *Int J Clin Obstet Gynaecol*. 2019;3(6):286-9. <https://doi.org/10.33545/gynae.2019.v3.i6e.427>
  17. Singh S, Das V, Agarwal A, Dewan R, Mittal P, Bhamrah R, *et al*. A dedicated postpartum intrauterine device inserter: Pilot experience and proof of concept. *Glob Health Sci Pract*. 2016;4(1):132-40. <https://doi.org/10.9745/GHSP-D-15-00355>
  18. Heller R, Johnstone A, Cameron ST. Routine provision of intrauterine contraception at elective cesarean section in a national public health service: A service evaluation. *Acta Obstet Gynecol Scand*. 2017;96(9):1144-51. <https://doi.org/10.1111/aogs.13178>  
PMid:28590560
  19. Cooper M, McGeechan K, Glasier A, Coutts S, McGuire F, Harden J, *et al*. Provision of immediate postpartum intrauterine contraception after vaginal birth within a public maternity setting: Health services research evaluation. *Acta Obstet Gynecol Scand*. 2020;99(5):598-607. <https://doi.org/10.1111/aogs.13787>  
PMid:31837002
  20. Braaten KP, Benson CB, Maurer R, Goldberg AB. Malpositioned intrauterine contraceptive devices: Risk factors, outcomes, and future pregnancies. *Obstet Gynecol*. 2011;118(5):1014-20. <https://doi.org/10.1097/AOG.0b013e3182316308>  
PMid:22015868
  21. Singh U, Sonkar S, Yadav P, Dayal M, Gupta V, Saxena S. Comparative evaluation of postpartum IUCD versus interval IUCD at a tertiary care centre in Allahabad, India. *Int J Reprod Contracept Obstet Gynecol*. 2017;6(4):1534. <https://doi.org/10.18203/2320-1770.ijrcog20171423>
  22. Makins A, Taghinejadi N, Sethi M, Machiyama K, Munganyizi P, Odongo E, *et al*. FIGO postpartum intrauterine device initiative: Complication rates across six countries. *Int J Gynaecol Obstet*. 2018;143 Suppl 1:20-7. <https://doi.org/10.1002/ijgo.12600>  
PMid:30225873
  23. Muganyizi PS, Kimario G, Ponsian P, Howard K, Sethi M. Clinical outcomes of postpartum intrauterine devices inserted by midwives in Tanzania. *Int J Gynaecol Obstet*. 2018;143(1):38-42. <https://doi.org/10.1002/ijgo.12603>  
PMid:30225875
  24. Makins A. Clinical outcomes of postpartum intrauterine devices inserted by midwives in Tanzania. *Int J Gynaecol Obstet*. 2018;143(1):38-42. <https://doi.org/10.1002/ijgo.12603>  
PMid:30225875
  25. Çelen Ş, Sucak A, Yıldız Y, Danışman N. Immediate postplacental insertion of an intrauterine contraceptive device during cesarean section. *Contraception*. 2011;84(3):240-3. <https://doi.org/10.1016/j.contraception.2011.01.006>  
PMid:21843687
  26. Lucksom PG, Kanungo BK, Sebastian N, Mehrotra R, Pradhan D, Upadhyaya R. Comparative study of interval versus postpartum Cu-T insertion in a central referral hospital of North East India. *Int J Reprod Contracept Obstet Gynecol*. 2015;4(1):1. <https://doi.org/10.5455/2320-1770.ijrcog20150209>
  27. Goldthwaite LM, Sheeder J, Hyer J, Tocce K, Teal SB. Postplacental intrauterine device expulsion by 12 weeks: A prospective cohort study. *Am J Obstet Gynecol*. 2017;217(6):674.e1-8. <https://doi.org/10.1016/j.ajog.2017.08.001>  
PMid:28826801
  28. Jatlaoui TC, Whiteman MK, Jeng G, Tepper NK, Berry-Bibee E, Jamieson DJ, *et al*. Intrauterine device expulsion after postpartum placement: A systematic review and meta-analysis. *Obstet Gynecol*. 2018;132(4):895-905. <https://doi.org/10.1097/aog.0000000000002822>  
PMid:30204688
  29. Hay P. Vaginal discharge. *Medicine*. 2018;46(6):319-24. <https://doi.org/10.1016/j.mpmed.2018.03.006>
  30. Ilankoon IM, Gunawardana CS, Fernandopulle RC, Perera PP. Vaginal discharge assessment form for utilization by primary health care workers in a community setting. *J Gynecol Womens Health*. 2018;9(3):555-763. <https://doi.org/10.19080/jgwh.2018.09.555763>
  31. Singh S, Das V, Agarwal A, Dewan R, Mittal P, Bhamrah R, *et al*. A dedicated postpartum intrauterine device inserter: Pilot experience and proof of concept. *Glob Health Sci Pract*. 2016;4(1):132-40. <https://doi.org/10.9745/GHSP-D-15-00355>
  32. Heller R, Johnstone A, Cameron ST. Routine provision of intrauterine contraception at elective cesarean section in a national public health service: A service evaluation. *Acta Obstet Gynecol Scand*. 2017;96(9):1144-51. <https://doi.org/10.1111/aogs.13178>  
PMid:28590560
  33. Cooper M, McGeechan K, Glasier A, Coutts S, McGuire F, Harden J, *et al*. Provision of immediate postpartum intrauterine contraception after vaginal birth within a public maternity setting: Health services research evaluation. *Acta Obstet Gynecol Scand*. 2020;99(5):598-607. <https://doi.org/10.1111/aogs.13787>  
PMid:31837002
  34. Braaten KP, Benson CB, Maurer R, Goldberg AB. Malpositioned intrauterine contraceptive devices: Risk factors, outcomes, and future pregnancies. *Obstet Gynecol*. 2011;118(5):1014-20. <https://doi.org/10.1097/AOG.0b013e3182316308>  
PMid:22015868
  35. Singh U, Sonkar S, Yadav P, Dayal M, Gupta V, Saxena S. Comparative evaluation of postpartum IUCD versus interval IUCD at a tertiary care centre in Allahabad, India. *Int J Reprod Contracept Obstet Gynecol*. 2017;6(4):1534. <https://doi.org/10.18203/2320-1770.ijrcog20171423>
  36. Makins A, Taghinejadi N, Sethi M, Machiyama K, Munganyizi P, Odongo E, *et al*. FIGO postpartum intrauterine device initiative: Complication rates across six countries. *Int J Gynaecol Obstet*. 2018;143(1):20-7. <https://doi.org/10.1002/ijgo.12600>  
PMid:30225873
  37. Muganyizi PS, Kimario G, Ponsian P, Howard K, Sethi M. Clinical outcomes of postpartum intrauterine devices inserted by midwives in Tanzania. *Int J Gynaecol Obstet*. 2018;143(1):38-42.

### Author Query???

AQ1: Kindly cite reference 30-37 in the text part