ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 11 | November - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A PROSPECTIVE ANALYTICAL STUDY TO ASSESS THE SAFETY, EFFICACY AND FEASIBILITY OF PPIUCD FOLLOWING DELIVERY, AT TERM SINGLETON LIVE BIRTH IN A DISTRICT HOSPITAL IN WEST BENGAL

Obstetrics & Gynaecology

Dr Kajol Kiran Nath — Senior Resident, Department of Obstetrics and Gynecology, Chittaranjan Seva Sadan College of Obstetrics, Gynaecology and Child Health, Kolkata, West Bengal

Dr Alankrita Pandey — Senior Resident, Department of Obstetrics & Gynaecology, KPC Medical College & Hospital, Kolkata, West Bengal.

Dr Aditi Raina — Senior Resident, Department of Obstetrics & Gynaecology, Jag Pravesh Chandra Hospital, New Delhi.

Dr Debayan Chowdhury* — Senior Resident, Department of General Surgery, College of Medicine and Sagar Dutta Hospital, Kamarhati, Kolkata, West Bengal. *Corresponding Author

ABSTRACT

Background: In India, in spite of availability of wide range of contraceptives, the unmet need for family planning in postpartum period is estimated to be 65%2. IUCD insertion has many advantages over other methods like simplicity, minimal motivation, long acting, reversibility, free of cost availability, virtually no systemic side-effects, and high continuation rate and very low failure rate1,6 and Indian women have very high level of satisfaction with PPIUCD.7 **Aim and Objectives:** To assess the safety (incidence of perforation /pain/bleeding/foul discharge), efficacy and expulsion rates of PPIUCD following vaginal deliveries, instrumental deliveries and caesarean section. **Materials and Methods: Study Area:** Department of Obstetrics and Gynaecology, M.R. Bangur Hospital, Kolkata, West Bengal. Study **Population:** All term pregnant women with live singleton birth who were admitted through gynaecological outpatient department, antenatal outpatient department and through emergency, delivered either vaginal or caesarean section. Study Duration: 1st June 2020 to 30th May 2021. Sample Size: 380 cases [190 post placental group (following vaginal delivery) and 190 Intra Caesarean group]. **Results:** 9.34% and 10.12% of patients respectively from intra caesarean and post placental group came with complain of excessive bleeding during 6 weeks of follow up. 3.1% of patients came with complain of pain abdomen, 5.1% of patients came with complain of elongated thread, 2.3% of patients came with complains of foul-smelling vaginal discharge, and 2.6% of patients came with complain of spontaneous expulsion at 6 weeks post-partum. 14.6% of patients came with complains of missing string. Spontaneous expulsion rate was 2.6%. Continuation rate of PPIUCD was 93.7%. **Conclusion:** This prospective analytical study shows that PPIUCD can be inserted post vaginal delivery and also post caesarean section with complications and efficacy being comparable.

KEYWORDS

PPIUCD insertion – intra-caesarean and post-placental, PPIUCD expulsion and continuation rate.

INTRODUCTION

India is the second most populous country in the world, sustaining 17.01% of world population on 2.4% of world's surface area. According to Census 2011, the population of India on 1 March 2011 was 1,210,193,422. In spite of availability of wide range of contraceptives, the unmet need for family planning is estimated to be 12.8%[1] and in postpartum period it is 65%[2]. The reasons behind it includes lack of knowledge or information, unnecessary fear about adverse effects and unsatisfactory services, as sufficient doctors are not available in many of the peripheral health centres. During the postpartum period women are vulnerable to unintended pregnancy, which often leads to illegal abortion, premature labour, post-partum haemorrhage and low birth weight babies[3]. In low-resource countries, delivery is probably the only time when a healthy woman comes into contact with a healthcare provider and the likelihood of her returning for contraceptive advice is low[4].

Sterilization has remained the leading method of contraception in India, accounting for 36% of contraceptive users, but it does not address woman's needs for healthy birth spacing[5]. Apart from lactational amenorrhea, the methods which can be used by the postpartum women for birth spacing are barrier methods, progesterone only pills, injectable progesterone and postpartum IUCD (PPIUCD). IUCD insertion has many advantages over other methods like simplicity, minimal motivation, long acting, reversibility, free of cost availability, virtually no systemic side-effects, and high continuation rate and very low failure rate[1,6] and Indian women have very high level of satisfaction with PPIUCD[7].

Contraceptive counselling has become an integral part of antenatal and postpartum program as pregnant and postpartum women are generally highly motivated towards controlling the fertility, either in spacing out their children or stopping their fertility altogether[8]. India was the first country in the developing world to start its family planning program in 1952. Based on the results of clinical trials conducted by the Indian Council of Medical Research (ICMR) in 1972, Copper T 200 B was introduced in the program in 1975. In 1997, ICMR conducted a comparative study between IUCD 200 B and 380 A based on which Cu IUCD 380 A was introduced in 2002, replacing CuT 200B in the program. In 2010, PPIUCD service was introduced in facilities with high case-load of deliveries.

From 2010 till now, PPIUCD services are being scaled up in a phased manner throughout the country. In 2012, the ML 375 was introduced so that women could choose between CuT 380 A with a lifetime of 10 years and ML 375 with a lifetime of 5 years.

IUCD is most effective and one of the good options for spacing pregnancies as it is convenient, long acting and rapidly reversible. It can be removed whenever the individual desires and fertility returns immediately[9]. IUCD is usually inserted as an interval procedure that is six weeks after delivery or along with induced abortion.

PPIUCD insertion can be done post placental that is within 10 mins of placental expulsion, intra caesarean at the time of caesarean section or within 48 hours of delivery[10]. A special instrument (Kelly's forceps) may be required for its insertion. Insertion of PPIUCD at 10 minutes after delivery is appealing for several reasons:

(a) Recommencement of ovulation can be unpredictable after delivery, and the PPIUCD provides exceedingly useful contraception during the puerperium.
(b) The woman is also likely to have a high motivation for accepting contraception and the healthcare center provides a convenient setting for insertion of IUCD.
(c) In the developing countries, delivery may be the only time when a healthy woman comes into contact with health care providers and the chances of returning for contraceptive advice are uncertain[11,12].

With this background, the present study was undertaken to assess the safety (incidence of perforation /pain/bleeding/foul discharge), efficacy and expulsion rates of PPIUCD following vaginal deliveries, instrumental deliveries and caesarean section, a long-term reversible method that can serve as an alternative for sterilization for many women.

AIM

To assess the safety (incidence of perforation /pain/bleeding/foul discharge), efficacy and expulsion rates of PPIUCD following vaginal deliveries, instrumental deliveries and caesarean section.

OBJECTIVES

1) To determine the proportion of women accepting immediate PPIUCD insertion.
2) To determine the factors associated with acceptability including the socio-demographic and obstetric characters.
3) To determine the rates of expulsion, pelvic infection, lost strings and misplacement among the acceptors following the post placental insertion and its outcome after six weeks.
4) To evaluate the complications of PPIUCD and its appropriate management.
5) To assess the experience and satisfaction with their choice in the women who accepted PPIUCD.

MATERIALS AND METHODS

Study Area:
Department of Obstetrics and Gynaecology, M.R. Bangur Hospital, Kolkata, West Bengal.

Study Population:
All term pregnant women with live singleton birth who were admitted through gynaecological outpatient department, antenatal outpatient department and through emergency, delivered either vaginal or caesarean section

Study Design: A prospective analytical study

Study Duration: 1st June 2020 to 30th May 2021(1 year)

Sample Size: 380 cases [190 post placental group (following vaginal delivery) and 190 Intra Caesarean group]

Inclusion Criteria:
1) Women delivering vaginally or by caesarean delivery.
2) Willing and able to sign an informed consent.
3) Age 18 years or older.
4) Counselled for PPIUCD insertion in prenatal period or during labour or within 48 hours of delivery.
5) Patient willing to have PPIUCD insertion and follow up.

Exclusion Criteria:
1) Patient refusal /allergy to copper.
2) Rupture of membrane for more than 18 hours.
3) Sexually transmitted disease or history of pelvic infection, current or within 3 months OR evidence of intrauterine infection.
4) Unresolved postpartum haemorrhage or multifetal pregnancy or antepartum haemorrhage.
5) Undiagnosed genital tract bleeding.
6) Past history of ectopic pregnancy/ intrauterine foetal death.
7) Distortion of shape of uterine cavity as in fibroid, septum etc.
8) Pregnancy induced Hypertension.
9) Evidence of severe anaemia.
10) Malignancy of genital tract.

Methodology:
Counselling of the patient:
was done during antenatal visits, if not then during admission, early labour or prior to scheduled caesarean section, if not then on the first day of post-partum period. CuT 375 was used in this study that is effective for 5 years.

Following Standard Universal Precautions of Infection Prevention IUCD were inserted as:
Post-placental(Within 10 minutes):

Following vaginal delivery, the IUCD was held in a suitably long forceps without a lock (eg. long placental forceps **(Kelly's).** The instrument was inserted upto the fundus of the uterus, and the IUCD was released.

Intra caesarean: The IUCD was introduced through the uterine incision during a caesarean section and placed at the uterine fundus. This was done manually or using a regular ring forceps.

Immediate postpartum: The IUCD was inserted within 48 hours following the birth of the baby with regular ring forceps.

Insertion Technique:
1) In vaginally delivered cases:
It was ensured that the women has been counselled for PPIUCD & has provided informed verbal consent for the same. Confirm that the woman did not have any above-mentioned exclusion criteria. Consent for insertion was confirmed verbally once again from the patient. Checked for complete expulsion of placenta. Hands were washed and sterile gown and sterile gloves were put on, perineum was draped with a sterile sheet. Perineum, labia and vaginal wall were carefully inspected to look for lacerations. Repair of lacerations was done after IUCD insertion, if not bleeding actively. Under all aseptic precautions, cervix was visualized by retracting posterior vaginal wall with Sims's speculum. Cervix was cleaned twice with betadine solution. Anterior lip of cervix was gently grasped with sponge holding forceps. IUCD was grasped inside the sterile package using Kelly's placental forceps so that junction of vertical & horizontal arms was gripped by the instrument. Vertical limb was avoided in the grip. Anterior lip of cervix was held using sponge holder to allow IUCD to be introduced into the dilated uterine cavity. Left hand was placed on the lower part of the uterus, on a sterile towel placed over the lower abdomen. IUCD was advanced towards the fundus, following the curve of uterine cavity. Fundus of the uterus was gently pushed upwards and backwards to straighten the angle between the vagina and the uterus, and right hand was lowered to negotiate this angle. Kelly's forceps with IUCD was gently advanced upwards towards the fundus following the curve of uterine cavity. Once the fundus was reached, forceps was opened to release IUCD. Forceps was slowly removed, sweeping along the lateral uterine wall, so that the copper T remained at its place. Cervix was examined to ensure that strings were not visible. If strings were visible, IUCD was removed and reinserted. Other instruments were removed and woman was allowed to relax and breastfeed the baby.

2) In Caesarean cases:
It was ensured that the woman undergoing caesarean section has been counselled for PPIUCD before the caesarean procedure and has provided informed verbal consent for the same. IUCD was inserted after delivery of the baby and placenta and evaluation for PPH but prior to closure of uterine incision. Insertion was done either manually or using a ring (or sponge holding) forceps since it can be easily seen and reached the uterine fundus. The IUCD was held between the middle and index fingers of the hand and was passed through the uterine incision. Once it was placed at the fundus, the fingers/ ring forceps was slowly withdrawn taking care not to dislodge IUCD from the fundus. IUCD strings was pointed towards lower uterine segment but was not pushed through the cervical canal. Care was taken during closure of the uterine incision so that IUCD strings did not get included into the suture.

Post-insertion Instructions:
Women were given a PPIUCD follow up card showing type of IUD inserted, date of insertion, duration of contraceptive effectiveness and follow up date. Women were explained about follow up at 6weeks or as soon as possible if she noticed any of the sign below:
1) Foul smelling unusual vaginal discharge.
2) Excessive bleeding & lower abdominal pain.
3) Any signs & symptoms of infection like fever, myalgia, and body ache, string related problems i.e. if it has come out suspecting expulsion, or needs to be cut etc.

Women were informed that there was no effect on breast milk and breastfeeding so she can continue feeding her baby without any fear, informed that IUD's will not confer protection against sexually transmitted diseases. Women were told not to check the strings routinely. At 6 weeks post-partum strings can be felt by some women and majority of women can feel the thread at 6 months of insertion. Women were told to check for the expulsion of IUD & in case of any doubt report to hospital.

Follow-up and Assessment:
The subject was advised at discharge to come for follow up at 6 weeks as uterus takes 6 weeks to involute to pre-pregnant size. Women were asked for excessive bleeding, pain abdomen or abnormal discharge per vagina, spontaneous expulsion etc and were treated accordingly as discussed later on when they were examined per abdomen, per speculum and per vaginum and findings were recorded.

If thread was not seen and if no history of expulsion, pelvic USG or probe test were done to rule out misplaced IUD. If thread was long then

was cut 1 cm from external os. Further expulsion rate, removal rate and continuation rate of PPIUCD was calculated.

Statistical Analysis: was performed with the help of Epi Info (TM) 7.2.2.2 - a trademark of the Centre for Disease Control and Prevention (CDC).

1) Chi-square test was used to test the association of different study variables.
2) Z-test (Standard Normal Deviate) was used to test the significant difference between two proportions.
3) Numerical data was expressed as mean ± standard deviation, and categorical data was expressed as relative frequency and percentage.
4) The following statistical significance tests was applied

i) T-test to compare two independent groups of continuous data.
ii) The "Chi-square test" and "MC Nemar test" to compare categorical data.

5) A "p-value" <0.05 was considered significant.

RESULTS

In our study including 380 cases, 48(12.6%) belonged to the age group 18-20years, 180(47.3%) belonged to 21-25years, 117(30.8%) belonged to 26-30years, 31(8.2%) belonged to 31-35years, 3(0.8%) belonged to 36-40 years and 1(0.3%) belonged to 41-45years. The mean age of study population was 26.53 ± 4.12 years. Mean age of intra-caesarean and post-placental group was 26.15 ± 4.13 years and 26.91 ± 4.09 years respectively. There was no significant difference in mean age among two groups(p-value 0.073).

Number of patients with parity 1 was 131(34.47%), parity 2 was 231(61.79%), and parity 3 was 18(4.74%). Most of the women belonged to middle class(n=243, 63.95%), followed by lower class(n=89, 23.42%) and least belonged to higher class(n=48, 12.63%).

Maximum number of women 227(59.74%) were educated up to secondary level. 92(24.21%) women were educated up to primary level. Only 48(12.63%) women have done their graduation. 13(3.42%) women were illiterate. 269(70.79%) patients belonged to urban area and 111(29.21%) patients belong to rural area.

380(Intra-Caesarean-190; post-placental-190) patients were counselled and PPIUCD was inserted and then were followed at 6 weeks either by hospital visit or by telephone. Total 360(Intra-Caesarean-182; post-placental-168) patients were followed up and 30(Intra-caesarean-8; post-placental-22) patients were lost to follow up.

Women followed up at 6 weeks both in intra-caesarean and post-placental group either by hospital visit or over telephone. In intra-caesarean group, 146(80.2%) women visited hospital for follow up whereas 36(19.8%) women were followed up over telephone. In post-placental group 124(73.8%) women visited hospital for follow up whereas 44(26.2%) women were followed up over telephone. There was no significant difference among these patients (p-value 0.153).

17(9.34%) patients from intra-caesarean group and 17(10.12%) patients from post-placental group came with complain of excessive bleeding during 6 weeks follow-up. There was no significant difference among these patients(p-value 0.805).

11(3.1%) patients [6(3.3%) from intra-caesarean group and 5(2.9%) from post-placental group] came with complain of pain abdomen at 6 weeks post-partum. Statistically, there was no significant difference between these patient groups(p-value 0.863).

18(5.1%) patients [8(4.4%) from intra-caesarean group and 10(5.9%) from post-placental group] came with complain of elongated thread at 6 weeks post-partum. There was no significant difference among these patients(p-value 0.510).

8(2.3%) patients [4(2.1%) from intra-caesarean group and 4(2.4%) from post-placental group] came with complain of foul-smelling vaginal discharge at 6 weeks post-partum. There was no significant difference among these patients(p-value 0.908).

9(2.6%) patients [3(1.6%) of women from intra-caesarean group and 6(3.6%) of women from post-placental group] came with complain of spontaneous expulsion at 6 weeks post-partum to which they were aware. There was no significant difference among them(p-value 0.256).

51(14.6%) patients [34(18.6%) from intra-caesarean group and 17(10.1%) from post-placental group] came with complains of missing string at 6 weeks post-partum. Number of missing string cases were significantly higher in intra-caesarean insertion group than post-placental group(p-value 0.023).

In intra-caesarean group, 165(90.6%) patients were satisfied, 4(2.2%) were partially satisfied and 13(7.1%) were unsatisfied. In post-placental group 152(90.4%) were satisfied, 4(2.3%) were partially satisfied and 12(7.1%) were unsatisfied. There was no significant difference among these patient groups(p-value 0.993).

11(3.1%) cases [6(3.2%) from intra-caesarean group and 5(2.9%) from post-placental group]were not willing to continue PPIUCD at 6 weeks post-partum. There was no significant difference among them(p-value 0.863).

204(58.3%) patients [101(55.4%) from intra-caesarean group and 103(61.3%) from post-placental group] did not have any complains and were willing to continue PPIUCD. Statistically there was no significant difference among them(p-value 0.270).

No case of accidental pregnancy was documented in this study. No perforation reported in present study. 5(1.4%) patients [3(1.6%) from in intra-caesarean group and 2(1.2%) from post-placental group] had complain of fever with chills without sign and symptoms of pelvic inflammatory disease. There was no significant difference among these patients(p-value= 0.718).

Type of insertion	No. of patients		Percentage
Intra Caesarean (n=17)	Medical RX	8	47%
	Assurance	3	17.7%
	Removal	6	35.3%
Post placental (n=17)	Medical RX	7	41.2%
	Assurance	3	17.6%
	Removal	7	41.2%

Fig 1: Interventions done for excessive bleeding

There was no significant difference among the patients, according to their intervention done for excessive bleeding between the two groups(p-value 0.905).Spontaneous expulsion rate was 2.6%(n=9). 6(1.7%) patients were not aware of expulsion whereas only 3(0.8%) were aware of PPIUCD expulsion when they came for follow up. Continuation rate of PPIUCD was 93.7%(n=404).

DISCUSSION

In our study, the mean age of study population was 26.53±4.12 years. Mean age of intra-caesarean and post-placental group was 26.15±4.13 years and 26.91±4.09 years respectively. (no significant difference). Thus, both groups are matched to age and constitute a younger age group. In Kumar et al[13] study mean age was 24±4 years wich was more or less similar to ours.

In our study, parity distribution was such that patients with parity 1 was 34%, parity 2 was 61%, and parity 3 was 5%. Safwat et al[12] study shows 30% of primiparous accepted the use of PPIUCD compared to 15% of grand multiparous.

In our study, most of the women belonged to middle class(63.95%), maximum number of women 227(59.74%) were educated up to secondary level. 92(24.21%) women were educated up to primary level. Only 48(12.63%) women have done their graduation. 13(3.42%) women were illiterate. Safwat et al[12] study, 65% of the acceptors had a formal education. Education has a positive effect on contraceptive use.

In our study, 9.34% and 10.12% of patients respectively from intra caesarean and post placental group came with complain of excessive bleeding during 6 weeks of follow up. Gupta et al[14] observed bleeding in 4.3% PPIUCD cases using CuT-380-A. Ei-Shafei et al[15] found incidence of menorrhagia in 9% in which CuT380A was inserted within 10 mins at 1 year follow up.

In our study, 3.1% of patients came with complain of pain abdomen at 6 weeks post-partum(statistically no significant difference). El-Shafei et

al[15] also reported a low incidence of pain. In our study, 2.3% of patients came with complains of foul-smelling vaginal discharge at 6 weeks post-partum. Welkovic et al[16] compared infection rates among women with post placental IUD and women without IUD and found no difference.

In our study, 2.6% of patients(1.6% of women from intra-caesarean group and 3.6% from post-placental) came with complain of spontaneous expulsion at 6 weeks post-partum. Tyagi et al[17] found spontaneous expulsion in 16(8.5%) women in vaginal delivery group and 4(2.5%) women in intra-caesarean group. Gupta et al[14] reported lower expulsions after caesarean insertions than vaginal delivery.

In our study, number of missing string cases at 6 weeks post-partum were significantly higher in intra-caesarean insertion group than post-placental group. Ergoglu et al[18] reported missing strings rate of 3.3% and 7.8% at six months and 12 months after PPIUCD insertion, respectively. Mishra S et al[11], study found that out of 564 women using PPIUCD, 43 women returned for follow up for missing string.

In our study, in intra caesarean insertion group 90.6% were satisfied, 2.2% were partially satisfied and 7.1% were unsatisfied. In post placental insertion group 90.4% were satisfied, 2.3% were partially satisfied and 7.1% were unsatisfied. In Gupta G et al[14] study, percentage satisfaction after 6 weeks was 91.7 %. Kumar S et al[13] study reported that over 90% were happy with the IUCD at six weeks follow up.

In our study, Continuation rate of PPIUCD was 93.7%. In Mishra S et al[11] study continuation rate was 81% at 6 months follow up. In our study, no case of accidental pregnancy was documented in this study. No perforation reported in our present study. Gupta G et al[14] also reported no case of accidental pregnancy or perforation. In our study, 3 (1.6%) patients in intra caesarean group and 2 (1.2%) patients in post placental group had complain of fever and chill without sign and symptoms of pelvic inflammatory disease. Eroglu et al[18] reported genital infection in 1.3% women after PPIUD insertion.

In our study, spontaneous expulsion rate is 2.6%. 1.7% of patient were not aware of expulsion whereas only 0.8% of patient were aware of PPIUCD expulsion when they came for follow up. The most probable reason for spontaneous expulsion of PPIUCD is due to involution of uterus. In Tyagi et al[17] study, spontaneous expulsion was seen in 16 (8.5%) women in vaginal delivery group and 4 (2.5%) women in intra-caesarean group. Gupta et al[14] reported lower expulsions after caesarean insertions than vaginal delivery.

CONCLUSION

In this prospective, analytical study 9.34% and 10.12% of patients respectively from intra caesarean and post placental group came with complain of excessive bleeding during 6 weeks of follow up. 3.1% of patients came with complain of pain abdomen, 5.1% of patients came with complain of elongated thread, 2.3% of patients came with complains of foul-smelling vaginal discharge, and 2.6% of patients came with complain of spontaneous expulsion at 6 weeks post-partum. There was no significant difference in pain abdomen, excessive bleeding, foul smelling vaginal discharge, elongated thread, and spontaneous expulsion cases among intra caesarean and post placental insertion groups. 14.6% of patients came with complains of missing string. Number of missing string cases were significantly higher in intra caesarean insertion group than post placental group. In intra caesarean insertion group 90.6% were satisfied, 2.2% were partially satisfied and 7.1% were unsatisfied. In post placental insertion group 90.4% were satisfied, 2.3% were partially satisfied and 7.1% were unsatisfied. 58.3% of the patients did not have any complains and were willing to continue PPIUCD. No case of accidental pregnancy and perforation was documented in this study. Spontaneous expulsion rate was 2.6%. Continuation rate of PPIUCD was 93.7%.

REFERENCES:

[1] Alukal AT, George L, Raveendran RC. Awareness and practice of contraceptive methods among women in Kerala, India. Int J Reprod Contracept Obstet Gynecol. 2018 Apr;7(4):1501-4.

[2] Pasha O, Goudar SS, Patel A, Garces A, Esamai F, Chomba E, Moore JL, Kodkany BS, Saleem S, Derman RJ, Liechty EA, Hibberd PL, Hambidge K, Krebs NF, Carlo WA, McClure EM, Koso-Thomas M, Goldenberg RL. Postpartum contraceptive use and unmet need for family planning in five low-income countries. Reprod Health. 2015 Dec;12 Suppl 2(Suppl 2):S11.

[3] Tsui AO, McDonald-Mosley R, Burke AE. Family planning and the burden of unintended pregnancies. Epidemiol Rev. 2010;32(1):152-74.

[4] Dehlendorf C, Rodriguez MI, Levy K, Borrero S, Steinauer J. Disparities in family planning. Am J Obstet Gynecol. 2010 Mar;202(3):214-20.

[5] Pachauri S. Priority strategies for India's family planning programme. Indian J Med Res. 2014 Nov;140 Suppl(Suppl 1):S137-46.

[6] Ouyang M, Peng K, Botfield JR, McGeechan K. Intrauterine contraceptive device training and outcomes for healthcare providers in developed countries: A systematic review. PLoS One. 2019 Jul 15;14(7):e0219746.

[7] Valliappan A, Dorairajan G, Chinnakali P. Postpartum intrauterine contraceptive device: Knowledge and factors affecting acceptance among pregnant/parturient women attending a large tertiary health center in Puducherry, India. Int J Adv Med Health Res. 2017;4(2):69-74.

[8] Dehlendorf C, Krajewski C, Borrero S. Contraceptive counseling: best practices to ensure quality communication and enable effective contraceptive use. Clin Obstet Gynecol. 2014 Dec;57(4):659-73.

[9] Kathpalia SK, Mustafa MS. Awareness about postpartum insertion of intrauterine device among antenatal cases. Med J Armed Forces India. 2015 Jul;71(3):221-4.

[10] Hooda R, Mann S, Nanda S, Gupta A, More H, Bhutani J. Immediate Postpartum Intrauterine Contraceptive Device Insertions in Caesarean and Vaginal Deliveries: A Comparative Study of Follow-Up Outcomes. Int J Reprod Med. 2016;2016:7695847.

[11] Mishra S. Evaluation of Safety, Efficacy, and Expulsion of Post-Placental and Intra-Caesarean Insertion of Intrauterine Contraceptive Devices (PPIUCD). J Obstet Gynaecol India. 2014 Oct;64(5):337-43.

[12] Mohamed SA, Kamel MA, Shaaban OM, Salem HT. Acceptability for the use of postpartum intrauterine contraceptive devices: Assiut experience. Med Princ Pract. 2003 Jul-Sep;12(3):170-5.

[13] Kumar S, Sethi R, Balasubramaniam S, Charurat E, Lalchandani K, Semba R, Sood B. Women's experience with postpartum intrauterine contraceptive device use in India. Reprod Health. 2014 Apr 23;11:32.

[14] Gupta G, Goyal R, Kadam VK, Sharma P. The Clinical Outcome of Post Placental Copper-T-380A Insertion with Long Placental Forceps (Kelly's Forceps) After Normal Vaginal Delivery and Cesarean Section. J Obstet Gynaecol India. 2015 Dec;65(6):3868.

[15] El-Shafei MM, Mashali A, Hassan EO, El-Boghdadi EL, El-Lakkany N. Postpartum and postabortion intrauterine device insertion unmet needs of safe reproductive health: three years experience of a Mansoura University Hospital. Egypt Soc Obstet Gynecol. 2000;26(1-3):253-62.

[16] Welkovic S, Costa LO, Faúndes A, de Alencar Ximenes R, Costa CF. Post-partum bleeding and infection after post-placental IUD insertion. Contraception. 2001 Mar;63(3):155-8.

[17] Tyagi S, Aditya V, Srivastava R, Gupta G. Changing trends in intrauterine contraceptive device: from interval intrauterine contraceptive device to postpartum intrauterine contraceptive device: a prospective observational study in a tertiary care hospital in eastern Uttar Pradesh. Int J Reprod Contracept Obstet Gynecol. 2016 Jul;5(7):2104-8.

[18] Eroğlu K, Akkuzu G, Vural G, Dilbaz B, Akin A, Taşkin L, Haberal A. Comparison of efficacy and complications of IUD insertion in immediate postplacental/early postpartum period with interval period: 1 year follow-up. Contraception. 2006 Nov;74(5):376-81.