Chapter 12

Postpartum Family Planning: Methods to Decrease Unintended Pregnancies

Jessica Maria Atrio, Isha Kachwala and Karina Avila

Additional information is available at the end of the chapter

http://dx.doi.org/10.5772/intechopen.73534

Abstract

Postpartum women are at high risk for unintended pregnancies and subsequent adverse perinatal outcomes often due to insufficient pregnancy intervals. There is a high burden of unmet family planning need caused by factors including inadequate education on postpartum contraception, limited access to healthcare professional in the immediate postpartum period, and lack of access to contraceptive options. This chapter will discuss the different contraceptive methods that can be utilized and their respective efficacies, venous thromboembolism (VTE) risk, and impact on lactation. Tubal ligation, lactation amenorrhea, barrier methods, the copper intrauterine device (IUD), and progestin-only pills (POP) have no clinically significant impact on VTE risk or lactation for the majority of women postpartum. Depot medroxyprogesterone acetate (DMPA) injection, implants, and levonorgestrel (LNG) IUDs are considered to have no impact on breastfeeding based on limited clinical evidence. Contraceptive methods that contain estrogens may increase a woman's risk for VTE in the peri-partum period and should be deferred approximately 30 days postpartum. Sterilization and long acting reversible contraceptives (LARC), including IUDs and contraceptive arm implants, have been proven to be the most reliable and cost-effective methods, which also have high rates of patient satisfaction and continuation. Women have a range of safe contraceptive choices they can use to prevent pregnancy or to space their pregnancies. Health care systems should empower women to become educated about and gain access to postpartum contraception so as to address unintended pregnancy disparities among this group of women. Above all, counseling should be patient-centered when choosing the right method for the woman.

Keywords: postpartum contraception, lactation amenorrhea, venous thromboembolism, LARC, unintended pregnancy

1. Introduction (premise and organization of the chapter)

In the United States, approximately 30% of all repeat pregnancies are conceived within 18 months of the previous birth, and approximately 40% of these pregnancies are unintended [1]. In regions of the world with the highest burden of unmet family planning need, the proportions are higher. Robust epidemiologic evidence demonstrates that interconception intervals less than 18 months, and most notably less than 6 months, are associated with adverse perinatal outcomes. Based on this the World Health Organization recommends an interpregnancy interval of 24 months [2]. An estimated 35% of adolescent mothers in the United States experience rapid repeat pregnancy within 2 years. These young women are more likely to experience adverse perinatal outcomes, are unable to attain an educational degree, and depend on public assistance programs [3]. Some women are not offered immediate postpartum contraception planning in many countries around the world. This may be due to the fact that women are absorbed with the range of emotions and adjustments that precede and follow having a baby. However, despite such hesitations or barriers from providers and patients to discuss contraception and sexual behaviors, it is very valuable to explore birth spacing prior to and following a delivery, even in the immediate peripartum time.

Women often rely on physicians and medical visits to access contraception. However, the antiquated and traditional western model of postpartum care delays counseling and initiation of contraception until a 6-week postpartum visit. Prior to the advent of implantable and hormonal contraceptive devices, this 6-week postpartum visit would have been an appropriate time to fit a woman for a diaphragm after involution of the uterus [4]. However, a large percentage of women, many of who are without stable insurance, transportation, housing, or support, are unable to present for their 6-week postpartum visit [5]. This chapter will review the range of contraceptive resources and technologies available to couples for postpartum contraception, with attention to considerations such as risk of venous thromboembolism and impact on lactation. Women have a range of contraceptive choices they can use to prevent pregnancy or to space their pregnancies.

1.1. Ovulation, sexual activity, lactation & sterilization

Many women resume sexual activity before their 6-week postpartum visit and are not using any form of contraception [6]. Women surveyed in the following countries reported sexual activity within 6 weeks postpartum: 57% in the United States, 60% in England, 71% in Scotland, 35% in Thailand, and 32% in Nigeria. Teens are also likely to have resumed sexual intercourse if they are living with their partner, and women who delivered by cesarean are more likely to be sexually active than women who had a vaginal delivery [7]. Sterilization is an effective and reliable method of contraception, which has no impact on breastfeeding or risk for venous thromboembolism. At the time of cesarean delivery, tubal ligation is an effective method, with minimal added morbidity or risk. Postpartum minilaparotomy is another excellent option and is typically completed during the same hospital admission as the delivery. Unfortunately, due to difficulty in mobilizing resources, a large percentage of women in the United States who deliver vaginall are discharged without receiving their requested sterilization. Forty-seven percent of these women with unfulfilled sterilization requests will become pregnant within a year of delivery [8].

http://dx.doi.org/10.5772/intechopen.73534

Serum steroid hormones, such as estrogens and progesterone, decrease to prepregnancy levels after approximately 2–3 days following delivery. It is at this time that most women experience milk letdown with lactogenesis. If a woman does not breastfeed, her prolactin levels fall to baseline 7 days following delivery. Gonadotropin-releasing hormone (GnRH) pulsatility will then resume after 2–4 weeks. Non-nursing mothers may ovulate 26 days postpartum, and 78% of women will ovulate prior to menses. Approximately 40% will ovulate by 6 weeks postpartum [4]. Among women who breastfeed elevated prolactin levels inhibit GnRH, preventing the pituitary from secreting follicular-stimulating hormone and luteinizing hormone, which in turn maintain ovarian suppression and prevent ovulation. Prolactin levels rise 10–20-fold in response to latch and suckling of an infant to the breast and will remain elevated with regular breastfeeding for months. Some research has demonstrated that supplemental feeding of an infant is associated with decreased suckling and ovulation within 6 weeks.

Exclusive and on-infant-demand breastfeeding postpartum is an effective method of contraception, called lactation amenorrhea, for up to 6 months postpartum. However, regular, day, and night breastfeeding of an infant is required. This method requires that the infant's total suckling experience be at the breast, without pacifiers or bottles, and that the mother is amenorrheic [9]. We do not know the impact of using a breast pump on the efficacy of ovulatory suppression.

1.2. Barrier methods

Barrier methods, including the female condom and the male condom, have no impact on breastfeeding and also have the benefit of preventing sexually transmitted infections (**Figure 1**). Male condoms are 98% effective with perfect use and 85% effective with actual use. Female condoms are 95% effective with perfect use and 79% effective with actual use. Spermicides, and natural family planning or fertility-based contraceptive methods, have no impact on breastfeeding. However, irregular vaginal bleeding Patterns postpartum as well as the risk of ovulation prior to menstruation places couples at high risk for unintended pregnancy if they choose to use natural family planning methods (such as cervical mucus assessment, Billing method, or 2 day methods) during the immediate postpartum period. It is unknown that the failure rates of these methods are in the postpartum setting; however, they are likely much higher than the projected 20–30% rates observed with typical use (**Figure 2**). There is a single-size diaphragm available on

Figure 1. Female condom.

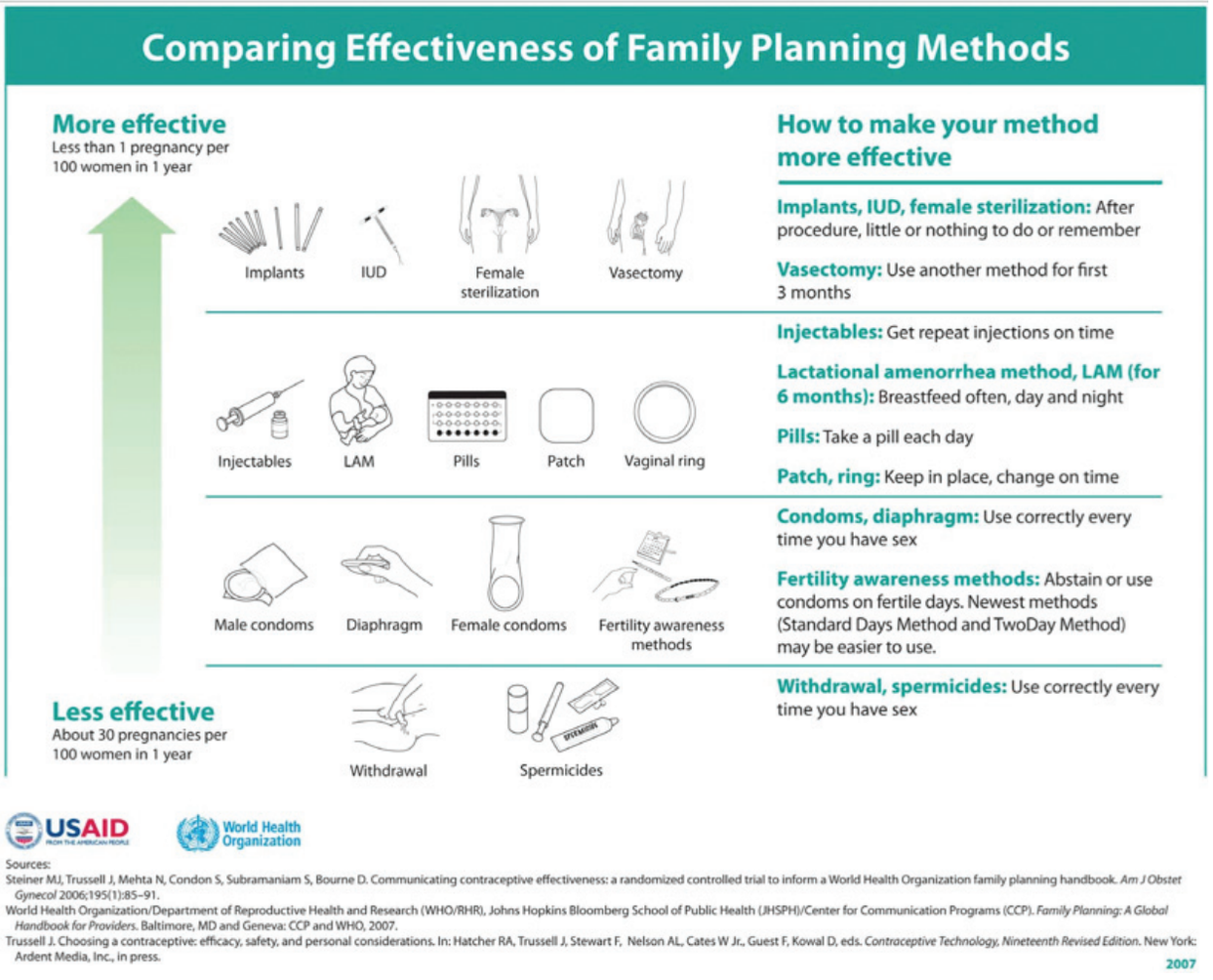

Figure 2. Comparing effectiveness of family planning methods.

the international market. The use of this diaphragm has no impact on lactation (**Figure 3**). None of these methods impact a woman's postpartum risk for venous thromboembolism.

Figure 3. Single-size diaphragm.

http://dx.doi.org/10.5772/intechopen.73534

1.3. Copper IUD

The *copper IUD*, when placed immediately after the delivery of a placenta or at a later interval, has no impact on lactation or a woman's risk for venous thromboembolism (**Figure 4**). The nonhormonal copper IUD is 3.6 cm with 380 mm^2 of copper. It has a failure rate less than 1% and was approved in 1984 for up to 10 years of use. It interferes with sperm function and prevents fertilization. It is associated with increased menstrual blood flow. The copper IUD is one of the most effective methods of emergency contraception. The IUD can be placed immediately following a vaginal delivery by a skilled provider using a sterile technique as shown in (**Figure 5**) or at the time of cesarean delivery. When placed following a vaginal delivery, patients should be counseled about increased risk for expulsion. High satisfaction has been noted among women who received an IUD at the time of cesarean section [10].

1.4. Hormonal contraceptive methods

Hormonal contraceptive methods contain progestins, or progestins and estrogens, which have historically raised concerns regarding potential interactions with lactation. Limited research suggests that combined hormonal contraceptives (that contain both estrogens and progestins) such as many of the pills, patches, vaginal rings, and injectables may slightly decrease milk quantity. However, the majority of research supports that progestin-only methods, such as injections (Uniplant and Depo-Provera), levonorgestrel-releasing IUDs, progestin contraceptive implants, progestin-only pills (POP), and the progestin ring, do not adversely impact lactation, fetal growth, or development. A systematic review of 43 studies and five randomized controlled trials (RCT) that assessed the impact of progestin-only contraceptives on

Figure 4. Copper IUDs.

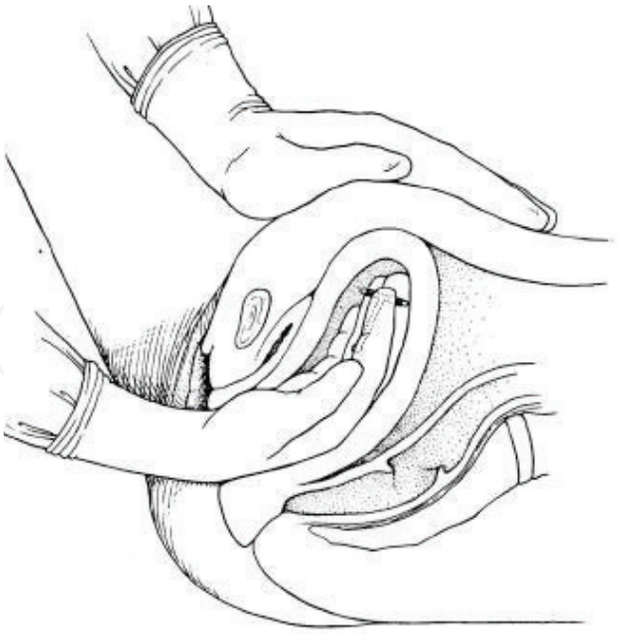

Figure 5. Post placental intrauterine device placement immediately following vaginal delivery.

breastfeeding continuation or infant outcomes saw no significant impact. However, evidence remains limited [11].

Furthermore, research supports that estrogens, but not progestins, contribute to an increased risk of *venous thromboembolism* (VTE) during the immediate postpartum period, approximately 30 days after delivery. At baseline women of reproductive age are at risk for VTE at a rate of 50/100,000 women-years. During pregnancy and postpartum, this increases fourfold to 200/100,000 women-years. Incidence of VTE is highest in the first week after delivery, and half of all postpartum VTE occurs during the first 2 weeks postpartum. There are increased serum concentrations of clotting factors synthesized in the liver during pregnancy and postpartum. Estrogen-containing contraceptives increase risk of VTE two- to fourfold because they further stimulate the liver to synthesize more clotting factors and serum globulins.

Guidance regarding the risks of various contraceptives in different populations is delineated in the World Health Organization's (WHO) *Medical Eligibility Criteria for Contraceptive Use (MEC)*, as well as the US *Medical Eligibility Criteria for Contraceptive Use* [12, 13]. Both documents score the safety of a method in a specific population or scenario. There are four numeric categories: category 1 indicates that the method is safe and can be used without restrictions, category 2 may have some theoretic or proven risks and advantages generally outweigh the risks, category 3 indicates the theoretical or proven risks that outweigh the benefits in most scenarios, and category 4 is consistent with unacceptable health risk to women using this contraceptive method (**Table 1**). Due to the global burden of infant morbidity and mortality related to diarrheal illness and unclean water, the importance of lactation and the nutritional benefits for the infant heavily guide the WHO and Centers for Disease Control and Prevention (CDC) recommendations regarding contraception in the postpartum period. In the absence of data, many committees feel it prudent to ensure that lactogenesis is safely established so as to mitigate the risk of infant malnutrition.

Category	Restriction
1	No restriction
2	Advantages generally outweigh theoretical or proven risks
3	Theoretical or proven risks usually outweigh advantages
4	Unacceptable health risk

Source: Centers for Disease Control and Prevention (CDC) [14].

Table 1. US medical eligibility criteria for contraceptive use.

1.5. Combined hormonal methods

Combined hormonal methods, which contain estrogens and progestins, are among the most commonly utilized methods among women in the United States. All hormonal contraceptives primarily prevent pregnancy by stimulating the cervix to produce thickened impenetrable mucus, which prevent sperm from entering the upper reproductive tract. Combined hormonal contraceptives often also prevent ovulation. Limited data suggests that estrogen-containing products may decrease the quantity of milk production or shorten the duration of breastfeeding [15]. An eight-year follow-up of children whose mothers took combined hormonal contraceptive pills and breastfeeding demonstrated no effect on the child's intelligence, behavior, or development of subsequent diseases [16]. The CDC MEC considers combined hormonal methods (such as pills, patches, vaginal rings, and injectables) to be category 4 until 21 days postpartum for breastfeeding and non-breastfeeding women. Among breastfeeding women it is category 3 after 42 days until 6 months postpartum. In non-breastfeeding women, it is category 2 from approximately 22 days until 42 days. After 42 days it is category 1. The American College of Obstetricians and Gynecologists and the World Health Organization recommend delaying initiation of combined hormonal methods until 6 months postpartum for reasons related to breastfeeding.

1.6. Progestin-only methods

Progestin-only methods include pills, implants, injections, and a vaginal ring. Progestin-only pills (POP) are taken continuously and without a pill-free, withdrawal bleed cycle, and contraceptive efficacy is approximately 87% with actual use. *Depot medroxyprogesterone acetate* (DMPA) is a progestin-only injection given every 1 or 3 months (depending on the dose) that inhibits ovulation (**Figure 6**). Trace amounts are transferred in the milk to the infant; however, no adverse events have been reported after decades of widespread global use. The Centers for Disease Control and Prevention (CDC) lists POP and DMPA as category 2 for the first 30 days postpartum for breastfeeding women, predominately due to theoretic concerns regarding lactogenesis and lactation. After 30 days postpartum, both of these methods are a category 1 among postpartum women who are breastfeeding. They are both category 1 among postpartum women who are not breastfeeding immediately postpartum. There is a progestin-releasing vaginal ring, which is intended for use among breastfeeding women after 30 days

Figure 6. Progestin-only injection (USAID and PATH).

postpartum. In clinical trials it was effective among women breastfeeding at least four times a day. The product is predominately registered in South American countries.

There are several contraceptive implants on the market. Internationally, levonorgestrel products are packaged as a two-rod *implant* system. In the United States, the progestin-only implant is a 4-cm, single rod that contains etonogestrel. It was approved in 2006, for up to 3 years of use (**Figure 7**). Implants are typically placed on the medial aspect of the arm with placement and removal being extremely safe and fast. Mechanism of action entails thickening of the cervical mucus as well as inhibition on pulsatile secretion of gonadotropin-releasing hormone, which prevents ovulation. Failure rates are less than 1%. Changes in bleeding patterns are common. It is recommended to offer anticipatory guidance and ongoing support to women who choose this method. The CDC MEC classifies both implants as category 2 among breastfeeding women until 30 days postpartum. Among non-breastfeeding women, it is considered category 1 at any time postpartum [13]. Postpartum placement can be anytime during hospital stay or postpartum. Provision of the implant prior to discharge from the hospital significantly lowered rates of rapid repeat pregnancy in adolescents (19 vs. 3%) [17]. Clinical trials have demonstrated no difference in time to lactogenesis in women who received the implant within 3 days of delivery versus those who waited 6 weeks; there also are no differences in breastfeeding rates though 6 months postpartum [18].

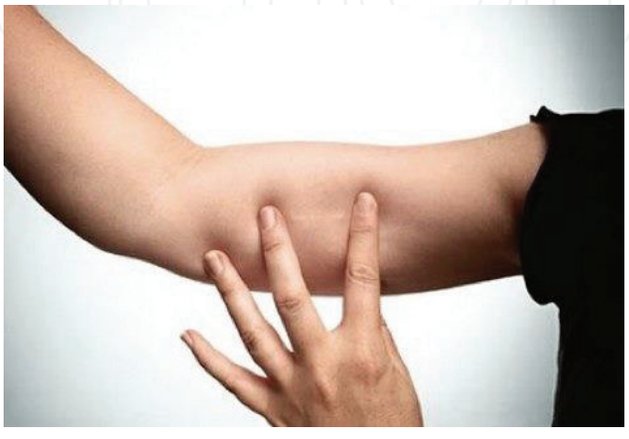

Figure 7. Etonogestrel contraceptive implant.

http://dx.doi.org/10.5772/intechopen.73534

1.7. Levonorgestrel intrauterine device

The levonorgestrel (LNG) intrauterine device (IUD), a progestin-releasing hormonal IUD, is approximately 3–3.2 cm wide at the arms (**Figure 8**). In the U.S. there are a range of products that contain different doses of LNG and are approved for 3–5 years. The first product was approved in 2000 in the United States. Cervical mucus is thickened, and over time some users continue to ovulate depending on the product. It is also an effective treatment for heavy menstrual bleeding. The CDC MEC lists the LNG IUD products as category 2 for the first 30 days postpartum for breastfeeding women, predominately due to theoretic concerns regarding lactogenesis and lactation. After 30 days postpartum, they are category 1 among postpartum women who are breastfeeding. They are category 1 among postpartum women who are not breastfeeding immediately postpartum. Increasing clinical trials and observational evidence demonstrate no impact on milk supply and continuation when initiated after 6 weeks postpartum or immediate postplacental at the time of the birth [19].

Both the copper and the LNG IUDs lower a woman's lifetime risk of endometrial cancer and ectopic pregnancy [20]. Scientific evidence has demonstrated that our current IUDs do not cause pelvic inflammatory disease or infertility. Intrauterine devices may be offered to women with a history of ectopic pregnancy. Same-day screening and insertion of IUDs reduce barriers to care and do not present a risk to women. Sexually transmitted infection testing should not delay placement of an IUD. Women with a history of sexually transmitted infections or HIV can safely use an IUD, and antibiotic prophylaxis is not recommended before IUD insertion. Women who are unmarried, nulliparous, or adolescents can safely use most contraceptives including IUDs.

Insertion of an IUD or implant immediately after a delivery does not alter the recovery, bleeding, and infection risk and is overall very safe and effective. It is often convenient for both the woman and her clinician as most women are motivated to delay pregnancy for several months or years following a delivery [6]. There are barriers to IUD and implant due to issues surrounding stock, payment, or provider skill set even among women who present for a

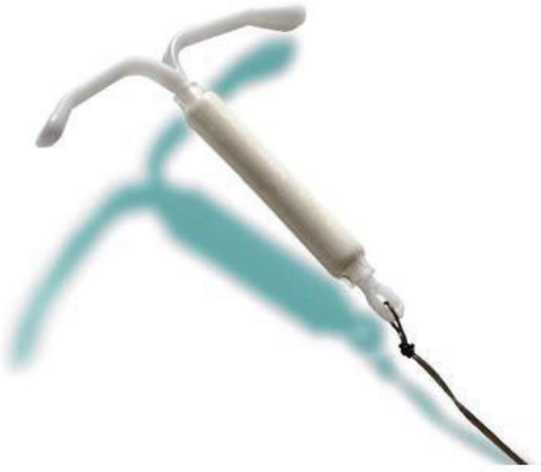

Figure 8. Levonorgestrel intrauterine device.

postpartum visit to request contraception. IUDs may be placed at the time of a vaginal delivery by a skilled provider using sterile techniques. For women who request IUD insertion at the time of delivery, the risk of expulsion, symptoms, and follow-up should be discussed. When an IUD is placed immediately after a vaginal delivery, it should be done within 10 min of delivery of the placenta, and it may be subsequently expelled 20–30% of the time. There is some concern that the LNG IUD may have a higher expulsion risk than the copper IUD. When placed at the time of cesarean, it is expelled approximately 8%. When placed at a later interval greater than 4 weeks postpartum, the expulsion rate is 3–5% (**Table 2**). The use of instruments, IUD modifications, and suturing the IUD in situ do not alter expulsion rates [21–23]. Additionally, as the uterus involutes, the IUD strings may lengthen and extend out of the vagina. A patient should be educated that she may need to return to have the strings trimmed and should try not to remove the IUD accidentally. Contraindication to postplacental IUD includes intrauterine infection, uterine anomalies, hemorrhage, and cervical or uterine cancer.

There is a robust body of research demonstrating that IUDs and hormonal contraceptive arm implants are methods that are able to reduce unintended pregnancy rates because they are not user dependent or coitus dependent, removing the need for adherence or maintenance. IUDs and implants are collectively referred to as long-acting reversible contraceptive methods or *LARC*. They are placed and removed by a practitioner, are extremely discrete, and do not require any ongoing effort from the user. Additionally, return to fertility and conception can occur within days of removal of the device. LARC methods are not only the most effective contraceptive methods but also have the highest satisfaction, cost efficiency, and continuation rates when compared to other forms of family planning [24]. Uptake of IUDs and the implant in the United States has almost tripled over the last decade. In 2002 less than 3% of women using contraception used an IUD or implant; in 2009 that increased to 8.5% women [25, 26]. The American College of Obstetricians and Gynecologists recommends that LARC methods are offered as the first-line contraception for the majority of women, including adolescents and women with complex medical problems. Increased uptake of these methods has the potential to decrease the rate of unintended pregnancy in the United States as well as around the globe [24, 27]. There are very few contraindications to immediate postpartum LARC. Institutions and healthcare systems should work to ensure that the resources, processes, and infrastructure are in place to offer LARC to postpartum women at the time of delivery.

A clinical trial in the United States entitled the Contraceptive CHOICE Project demonstrated that adolescents and adults both had high continuation rates for IUD and implant methods. At 24 months continuation for the copper IUD was 77%, for the LNG IUD 79%, and for the

	Cu IUD	**LNG IUD**
<10 min after placental delivery	1	2
10 min–4 weeks after delivery	2	2
>4 weeks after delivery	1	1

Table 2. United States Centers for Disease Control and Prevention Medical Eligibility for Contraceptive Use for IUDs in breastfeeding women.

implant 69%. Continuation for other short-acting methods including combined and progestin-only methods such as pill, patches, and shots, was 41%. Among postpartum patients continuation at 1 year for the copper IUD was 91 and 89% for the LNG IUD. For the implant it was 74% at 1 year postpartum [28]. A cost parity and public health impact model in the United States demonstrated that the cost of paying for IUDs and the cost of paying for the IUDs and implants is offset by preventing approximately 191 unintended pregnancies per 1000 women. This type of dramatic public health impact supports expanded access to IUDs and implants in the immediate postpartum setting. This would offer compelling and cost effective benefits even if theoretic expulsion/discontinuation rates were as high as 70% or the 1 year continuation rate was as low as 30% [29].

The principal factor in prescribing one method of contraception over another should be the patient's choice. Women who receive contraceptive counseling during the postpartum period have increased rates of contraceptive use and fewer unplanned pregnancies [30]. In the United States, providers and healthcare systems should strive to engage women in care prior to the 6 week postpartum visit and ideally within 3 weeks. There are a wide variety of contraceptive options available, and all women, including adolescents, have the right to decline any method of contraception. LARC methods should be offered as first-line contraceptive methods and encouraged as options for most women. LARC methods have few contraindications, and immediately postpartum and postabortion are ideal times for initiation [31, 32]. The importance of quality and patient-centered contraceptive counseling is crucial as women and families identify their reproductive goals.

Author details

Jessica Maria Atrio[1]*, Isha Kachwala[2] and Karina Avila[2]

*Address all correspondence to: jatrio@montefiore.org

1 Montefiore Medical Center and Einstein School of Medicine, New York City, New York, USA

2 Einstein School of Medicine, New York City, New York, USA

References

[1] Healthy People. Healthy People 2020. Family Planning Objectives [Internet]. 2017. Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/family-planning/objectives [Accessed: Dec 1, 2017]

[2] Zhu BP, Rolfs RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on perinatal outcomes. The New England Journal of Medicine. Feb 25, 1999;**340**(8):589-594

[3] Baldwin MK, Edelman AB. The effect of long-acting reversible contraception on rapid repeat pregnancy in adolescents: A review. The Journal of Adolescent Health. Apr 2013; **52**(4):S47-S53

[4] Speroff L, Mishell DR. The postpartum visit: it's time for a change in order to optimally initiate contraception. Contraception. Aug 2008;**78**(2):90-98

[5] Bryant AS, Haas JS, McElrath TF, McCormick MC. Predictors of compliance with the postpartum visit among women living in healthy start project areas. Maternal and Child Health Journal. Nov 2006;**10**(6):511-516

[6] Grimes DA, Lopez LM, Schulz KF, Van Vliet HA, Stanwood NL. Immediate post-partum insertion of intrauterine devices. Cochrane Database of Systematic Reviews. May 2010;**12**: 12(5)

[7] Barrett G, Peacock J, Victor CR, Manyonda I. Cesarean section and postnatal sexual health. Birth. Nov 25, 2005;**32**(4):306-311

[8] Thurman AR, Janecek T. One-year follow-up of women with unfulfilled postpartum sterilization requests. Obstetrics and Gynecology. Nov 1, 2010;**116**(5):1071-1077

[9] Lactational Amenorrhea Method. Lactational Amenorrhea Modules [Internet]. 1994. Available from: https://www.fhi360.org/sites/default/files/webpages/Modules/LAM/intro.htm. [Accessed: Dec 1, 2017]

[10] Levi EE, Cantillo E, Ades V, Banks E, Murthy A. Immediate postplacental IUD insertion at cesarean delivery: A prospective cohort study. Contraception. Aug 2012;**86**(2):102-105

[11] Kapp N, Curtis K, Nanda K. Progestogen-only contraceptive use among breastfeeding women: A systematic review. Contraception. Jul 2010;**82**(1):17-37

[12] World Health Organization. Medical Eligibility Criteria for Contraceptive Use. 5th ed. [Internet]. 2015. Available from: http://apps.who.int/iris/bitstream/10665/181468/1/9789241549158_eng.pdf?ua=1 [Accessed: Dec 1, 2017]

[13] Curtis KM, Tepper NK, Jatlaoui MD, Berry-Bibee E, Horton LG, Zapata LB, et al. U.S. medical eligibility criteria for contraceptive use, 2016. MMWR – Recommendations and Reports. Jul 29, 2016;**65**(3):1-104

[14] Centers for Disease Control and Prevention (CDC). U.S. medical eligibility criteria for contraceptive use, 2010. MMWR – Recommendations and Reports. 2010;**59**(RR-4):1-86. Available from: http://www.cdc.gov/mmwr/pdf/rr/rr5904.pdf

[15] Lopez LM, Grey TW, Stuebe AM, Chen M, Truitt ST, Gallo MF. Combined hormonal versus nonhormonal versus progestin-only contraception in lactation. Cochrane Database of Systematic Reviews. Mar 20, 2015;**3**

[16] Kapp N, Curtis KM. Combined oral contraceptive use among breastfeeding women: A systematic review. Contraception. Jul 2010;**82**(1):10-16

[17] Tocce KM, Sheeder JL, Teal SB. Rapid repeat pregnancy in adolescents: Do immediate postpartum contraceptive implants make a difference? American Journal of Obstetrics and Gynecology. Jun 2012;**206**(12):481.e1-481.e7

[18] Gurtcheff SE, Turok DK, Stoddard G, Murphy PA, Gibson M, Jones KP. Lactogenesis after early postpartum use of the contraceptive implant. American Journal of Obstetrics and Gynecology. May 2011;**117**(5):1114-1121

[19] Turok DK, Leeman L, Sanders JN, Thaxton L, Eggebroten JL, Yonke N, et al. Immediate postpartum levonorgestrel intrauterine device insertion and breast-feeding outcomes: a noninferiority randomized controlled trial. American Journal of Obstetrics and Gynecology; Aug 23, 2017;**217**(6):665.e1-665.e8

[20] Hatcher RA. Contraceptive Technology. 20th ed. Atlanta: Bridging the Gap Communications; 2011. 906 p

[21] Celen S, Moroy P, Sucak AA, Danisman N. Clinical outcomes of early postplacental insertion of intrauterine contraceptive devices. Contraception. Apr 2004;**69**(4):279-282

[22] Kapp N, Curtis KM. Intrauterine device insertion during the postpartum period: A systematic review. Contraception. Oct 2009;**80**(4):327-336

[23] Chen BA, Reeves MF, Hayes JL, Hohmann HL, Perriera LK, Creinin MD. Postplacental or delayed insertion of the levonorgestrel intrauterine device after vaginal delivery: A randomized controlled trial. American Journal of Obstetrics and Gynecology. Nov 2010; **116**(5):1079-1087

[24] Trussell J. Contraceptive failure in the United States. Contraception. May 2011;**83**(5):397-404

[25] Finer LB, Jerman J, Kavanaugh ML. Changes in use of long-acting contraceptive methods in the United States, 2007–2009. Fertility and Sterility. 2012;**98**(4):893-897

[26] Jones J, Mosher W, Daniels K. Current contraceptive use in the United States, 2006–2010, and changes in patterns of use since 1995. National Health Statistics Reports. 2012; **1980**(60):1-26

[27] Raine TR, Foster-Rosales A, Upadhyay UD, Boyer CB, Brown BA, Sokoloff A, et al. One-year contraceptive continuation and pregnancy in adolescent girls and women initiating hormonal contraceptives. Obstetrics & Gynecology. [Internet]. 2011;**117**(2 Part 1):363-371. Available from: http://insights.ovid.com/crossref?an=00006250-201102000-00024

[28] O'Neil-Callahan M, Peipert JF, Zhao Q, Madden T, Secura G. Twenty-four–month continuation of reversible contraception. Obstetrics & Gynecology [Internet]. 2013;**122**(5):1083-1091. Available from: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006250-201311000-00022

[29] Gariepy AM, Duffy JY, Xu X. Cost-effectiveness of immediate compared with delayed postpartum etonogestrel implant insertion. Obstetrics & Gynecology [Internet]. 2015;

126(1):47-55 Available from: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006250-201507000-00008

[30] Lopez LM, Grey TW, Hiller JE, Chen M. Education for contraceptive use by women after childbirth. Cochrane Database of Systematic Reviews. 2015;**7**

[31] American College of Obstetricians and Gynecologists. Long-acting Reversible Contraception: Implants and Intrauterine Devices. Practice Bulletin No. 186. Obstetrics & Gynecology. Nov 2017;**130**(5):e251-e269

[32] American College of Obstetricians and Gynecologists. Increasing access to contraceptive implants and intrauterine devices to reduce unintended pregnancy. Obstetrics & Gynecology. Committee Opinion No. 642. 2015;**126**(642):44-48