Postpartum Tubal Ligation in Low- and Medium-Resource Settings
A Review and Synthesis of Literature

Executive Summary

While female sterilization is most commonly performed through bilateral tubal ligation, but can be performed by tubal occlusion, this paper deals only with tubal ligation (TL) in the postpartum period. For many women or couples who have completed their family, a tubal ligation in the immediate postpartum period may represent an ideal method of family planning. Having the baby and a postpartum tubal ligation (PPTL) during the same health care “contact” can save time and costs for the woman, her family and the health care system. No extra visits need be made to a center to initiate the method, and the service is easily implemented in a center that is already engaged in obstetrical care. In addition, unlike hormonal methods, PPTL has no impact on lactation and can safely and more easily be performed in the immediate postpartum period when the uterus and the tubes are easily accessible. Moreover, the progress and discomfort of recovery from this surgery is “masked” by recovery from the delivery itself, adding to the convenience of this approach for the woman.

While PPTL is a relatively common method of FP, many program planners, policy makers, and clinicians are unaware of the evidence supporting the practice of PPTL and addressing issues surrounding the provision of PPTL services. In response to this gap, this paper gathers evidence relevant to PPTL services. While not exhaustive, this synthesis reviewed gray and peer-reviewed literature, primarily from between 2000 and 2012, on experiences in the provision of PPTL services. The search for literature used Medline/PubMed, PubMed Central, and Cochrane databases, as well as Google and Bing search engines. We limited our search to studies conducted in Asia, Africa, and Latin America.

The literature from these searches revealed a number of factors influencing a woman’s access to PPTL, including policies, physician bias, and other surgical procedures (i.e., Cesarean section [CS] or repair of ruptured uterus). The literature also reported association of PPTL with increasing age and parity, as well as previous CS. Most, but not all, studies showed the positive influence of counseling during the antenatal period. Women living with HIV may have a unique experience in seeking and obtaining a PPTL, but greater prevalence among women living with HIV seems to correlate with a greater prevalence of PPTL among the general population. Interestingly, the one developing country PPTL study on regret found more regret by women who had not had a TL than by women who had received a TL at CS. In addition, most studies found the technique of choice for PPTL to be the Pomeroy method. (For citations, see full document.)

Unfortunately, the literature reviewed said little about PPTL in the context of a woman’s rights. While offering PPTL expands the woman’s choice of methods, diligence must be given to ensure the choice is voluntary and informed, and that an informed consent is always signed prior to the procedure being performed.
Background

Worldwide, tubal ligation (TL) is the most widely used method of contraception, with an estimated 180 million women relying on TL for contraception. In some countries, postpartum tubal ligation (PPTL) accounts for almost 50% of sterilizations performed. Global guidance specifies that TLs can be performed within 48 hours of a delivery (postpartum) or after six weeks (interval) following a delivery. PPTL is considered easier to perform than an interval TL because of the position of the tubes, and is convenient for the woman who delivers in a facility, saving her another hospital visit. PPTL can be performed following a vaginal birth, in conjunction with a Cesarean section (CS), or during the repair of a uterine rupture. Voluntary and informed consent is essential for a TL performed at any time, and it is the duty of the family planning provider to make sure that the decision for or against TL is made by the client and that she is not pressured or forced by anyone to make her decision.

It is worth noting that although there are very few absolute contraindications to PPTL, contraindications and cautions that apply to any surgery or to interval TL also apply to women having a PPTL (e.g., coagulopathy, systemic infection, chronic lung disease, and hemoglobin ≤ 7g/dl). In addition, the Medical Eligibility Criteria (MEC) developed by the World Health Organization (WHO) also specifies that for the postpartum woman, the procedure should be delayed until the condition is addressed for severe pre-eclampsia or eclampsia, severe antepartum or postpartum hemorrhage, severe trauma to the genital tract, prolonged rupture of membranes (24 hours or more), puerperal sepsis, or if the woman is between 7 and 42 days postpartum.

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6 The six points that a client must understand to give informed consent as stated in WHO/CCP’s Family Planning: A global handbook for providers (2011 update): 1) temporary contraceptives are available to the client, 2) TL is a permanent procedure, 3) there are certain risks to the procedure as well as benefits, 4) if successful, the procedure will prevent the client from ever having more children, 5) the procedure is permanent and cannot be reversed, 6) the client can decide against the procedure at any time before it takes place without losing any rights.
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Synthesis

- **Influences and Barriers: Policy, Concomitant Surgical Procedures, Age, and Parity**

Client choice and access are foundational to high-quality family planning service provision. Access, choice, and demand can be influenced by many factors including policy, provider attitudes and bias, and concomitant surgical procedures. Socio-cultural and information barriers can also influence a woman’s access to PPTL, but no literature was identified that addressed this issue specific to TL in the postpartum period.

Policy has significant influence on access to PPTL services. In 1997, a law was passed in Brazil that restricted PPTL, and thus the availability of PPTLs at CS. A primary intention of the law was to reduce the numbers of CSs. A prospective study of 1,612 pregnant women carried out in four Brazilian cities showed that 18–20% of women during first pregnancy, 68–72% of women during their second pregnancy, and 92–93% of women during their third or higher pregnancies declared in two separate interviews an intention not to have more children. In addition, 48% of antenatal care (ANC) clients in the public sector and 15% in the private sector stated that they wanted to be sterilized before leaving the hospital after delivery. Of these women, 69% in the private sector, but only 33% in the public sector received a PPTL, almost all of which were performed during CS (73/80).9

These policy factors, as well as provider factors that influence access of the general population to PPTL services, have also been shown to influence choice and access for women living with HIV. Using data from hospital records, in-depth pre- and postpartum interviews, and a prospective survey, researchers in Brazil studied childbirth intentions and sterilization outcomes for women served at two different facilities. Most women (70%) in both study sites stated during the in-depth interviews that they wanted no more children. However, only 4% of women in Site A received a TL, while 51% of women in Site B received a TL. Most PPTLs were associated with CS in both sites, and 10% in Site A delivered by CS, while 60% in Site B delivered by CS. Nevertheless, only 6% of women in Site A who wanted to have a TL received one, while 69% in Site B who wanted a TL received it. Authors concluded that the reasons Site B had 11 times more PPTLs than Site A may be due to physicians having different interpretations of the law.10

Physician bias may also influence PPTLs performed during CS where there is no law encouraging or restricting CSTL. Only 20% of physicians interviewed in Egypt reported that they would perform a TL based on a patient’s request, while approximately 25% approved TL when

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indicated intra-operatively and with high order cesarean. This study also found that CS and CSTL are less likely to be performed in public facilities compared to private facilities.\textsuperscript{11} In Nicaragua, a situation analysis found that only 34\% of providers trained in TL actually perform them because only Ob/Gyn specialists are allowed to perform them or there is no PPTL program in their hospital. This same analysis also found that only one in 19 health centers offered PPTL, and only one of 10 made referrals for PPTL. While 29\% of women interviewed during ANC wanted to have a TL, and 96\% said they wanted to have a TL within three months of delivery, only 10\% of contracepting postpartum women had a TL.\textsuperscript{12}

Because the abdomen is opened and the Fallopian tubes are easy to access during CS or repair of uterine rupture, concomitant surgical procedures may also influence choice, whether by client or provider, for PPTL. A retrospective study of case files in Nigeria found that of 102 women having a PPTL, 59\% had TL at CS, 28\% had TL with repair of ruptured uterus, and 14\% clients had TL alone on request.\textsuperscript{13} As noted in this study, in Nigeria PPTL during repair of ruptured uterus is frequent. Since the uterus may rupture again with a future pregnancy, these PPTLs are lifesaving. Similarly, a study of medical files of women having uterine repair for ruptured uterus in Sudan found that between 2006 and 2008, 29\% of repair of ruptured uteri included TL, 39\% were accompanied by hysterectomies, and 32\% without TL.\textsuperscript{14}

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<th>Article reporting study</th>
<th>Percentage of TLs performed during CS</th>
<th>Percentage of TLs performed during uterine repair</th>
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<tbody>
<tr>
<td>Adesiyun, 2007</td>
<td>59%</td>
<td>29%</td>
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<tr>
<td>Swende and Hwande, 2010</td>
<td>47%</td>
<td>(78% at emergency CS; 22% at elective CS)</td>
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<tr>
<td>Igerase et al., 2011</td>
<td>56%</td>
<td>6%</td>
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Another study in a different state in Nigeria found that the majority (47\%) of clients had a TL at CS, representing 3\% of all acceptors of family planning methods. Of the women who had TL at CS, 78\% had TL at emergency CS, while 22\% had TL at elective CS. The most common indication for TL was repeat CS (51\%).\textsuperscript{15} A study in Niger Delta, Nigeria, found very similar results although the rate of PPTLs was low (0.044\% of all deliveries.) Among the 103 PPTLs performed over five


\textsuperscript{13} Adesiyun A. Female sterilization by tubal ligation: a re-appraisal of factors influencing decision making in a tropical setting. 2007. Archives of Gynecology and Obstetrics. 275:241-244.


years, 56% were CSTLs, 6% accompanied repair of ruptured uterus, and 38% were performed after vaginal delivery. Also, 62% of these women were “unbooked” patients having had no ANC.\textsuperscript{16}

Previous CS as a factor in the decision to perform a CSTL is also confirmed by a case-control study in Turkey that found that multiple repeat CS (four or more compared to two or three) increases the risk for operative complications and poor perinatal outcomes. This study found a high incidence of TL, with 88% in women with two or three previous CSs, 84% of women with four or more CSs having an emergency CS, and 90% among women with four or more CSs having an elective CS. The authors conclude that women should be informed about the related risks of multiple CS and offered TL.\textsuperscript{17} In Guatemala, where female TL is the most widely used contraceptive method, women who underwent a CS were more likely to receive a TL than women who delivered vaginally (23% vs. 67% in 2006; 16% vs. 48% in 2007; 15% vs. 49% in 2008).\textsuperscript{18}

As expected, the literature reviewed generally showed an association of PPTL with increasing age and parity, as well as previous CS. A study in Nigeria also found PPTL across groups associated with age and parity. While age at PPTL ranged from 17 to 44 years, 74% occurred in women 31 years and older, and 88% of PPTLs occurred in women with parity of four or higher.\textsuperscript{19} Interestingly, a study in Thailand found that 14% of women undergoing PPTL were <24 years of age. PPTL was the most common method of contraception for women with three or more living children and women more than 40 years of age.\textsuperscript{20} In another state in Nigeria, grandmultiparity was the most common indicator (60%) for PPTL, followed by previous CS (40%), and ruptured uterus (6%).\textsuperscript{21}

- The Role of Antenatal Counseling in PPTL Programs

Counseling during ANC is a key element of PPTL programs since ANC provides time for careful counseling that helps ensure informed and voluntary choice and signed consent prior to the stressful time during labor or immediately after delivery. A study in Mexico found that women who received family planning advice during ANC were more likely to use contraception than those who did not receive advice (OR 2.2). Also, women who received family planning advice had a higher probability of using condoms (OR 2.3) or undergoing TL (OR 1.4) than of using


\textsuperscript{19} Ibid. Adesiyun.


\textsuperscript{21} Ibid. Igberase.
other methods. In Mansoura, Egypt, 1.5% of women with a normal delivery who received ANC counseling received a TL, while none of the women with a normal delivery without counseling received a TL. Also, 12.5% of women with a “high-risk” birth who received ANC counseling received a TL, while only 6.5% of women with a “high-risk” birth who did not receive ANC counseling received a TL. However, a three-country study conducted in Edinburg, Scotland; Shanghai, China; and Cape Town, South Africa, found that ANC counseling made no significant difference in the prevalence of contraceptive use, including the use of TL, at one-year postpartum, and had no impact on pregnancy rates during the first year after childbirth. No literature was identified that studied ANC in relationship to previous contraceptive use and the choice for PPTL following birth.

- **PPTL for Women Living with HIV**

While the reviewed literature indicates that women living with HIV are frequently offered PPTL, most are associated with CS, and prevalence is generally greater in countries in which sterilization in the general population is common. A review of field experiences with provision of family planning services within prevention of mother-to-child transmission of HIV programs in ten countries in Africa, Asia, and Latin America found that in Kenya and Zimbabwe no differences were observed in the use of TLs between women who were HIV-positive and women who were HIV-negative in their communities. Fortunately, many providers expressed an understanding of the human rights of the HIV-positive woman and that all women have the right to bear children despite their HIV status. In the Dominican Republic (DR), India, and Thailand, where HIV prevalence is low and sterilization rates are high, HIV-positive women are offered TL, and many accept it. Although TL is a common method of contraception in these countries, the nearly universal rates of acceptance of the method among HIV-positive women suggests that these programs may give priority to reducing the number of infants born with HIV rather than ensuring mothers’ reproductive health and rights. In the DR, all women living with HIV are offered elective CS for delivery and TL. In one hospital that reports 14,000 to 15,000 deliveries annually, 85% of these women living with HIV elect a CS, and 99% choose TL, either at delivery or at ten days postpartum. However, in the general population in the DR, more than 25% of women are sterilized before age 25, and more than two-thirds of women in union over the age of 35 have undergone TL. In a study among South African women living with HIV, 73% women reported that they did not want another pregnancy, yet only 6% of them were using TLs. Although this study did not look at provider attitudes or competencies, authors speculated that improving providers’ knowledge and competency might increase uptake.

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25 Schmidt JE, Hillis SD, Marchbanks PA, Jeff G, and Peterson WHO guidelines state that PPTLs should be performed within seven days, or six weeks after, delivery.
• **Regret**
Most of the literature on regret has studied women following interval TL, rather than PPTL, or took place in the developed world, and so is not included in this literature review. Most of the published literature on regret has found regret correlated with young age (<30 years), a change in life circumstances (new partner, death of child), or preoperative depression, but not with parity.\(^{28}\) However, in Zimbabwe among 418 women who had an emergency CS and who were successfully followed up (for a mean time since delivery of 3.8 months), 72% had been offered a TL and 80% accepted. This study found that 89% of these women were happy with the decision. Of the 117 (out of the 418) women not offered a TL, 64% regretted not having one.

Also in the Zimbabwe study, TLs performed during emergency CS had no higher regret rate (2.5%) that those performed during elective CS (3.2%). Women who did not have a TL during an emergency CS regretted this (56.4%) significantly more often than women who did not have a TL with an elective CS (35%) or after vaginal delivery (45%). Women were far more likely to regret declining a PPTL (40%) than regret accepting one (2.5%). The main ethical argument against offering a TL with an emergency CS is that such an important decision should not be taken on such short notice and during such a stressful situation. However, the authors of this study concluded that it is unethical not to offer such woman a TL. And some women are more likely to die from another pregnancy than to regret having a TL.\(^{29}\)

• **Post-Tubal Ligation Syndrome**
Another concern about TL has been the reported post-tubal ligation menstrual dysfunction resulting in dysfunctional uterine bleeding, dysmenorrhea, dyspareunia, exacerbation of premenstrual symptoms and pelvic pain. A study of 50 women undergoing TL by Pomeroy technique and 50 other matched contracepting women in a control group looked at a broad array of hormone levels, including aninmüllerian hormone, or AMH, which is a marker for ovarian reserve, and inhibin B, which controls follicle stimulating hormone. Postoperative levels of AMH and inhibin B were significantly higher in women who had had CSTL than women who had had interval TL, indicating that CSTL results in less disturbance to ovarian function than interval TL.\(^{30}\)

• **PPTL Procedures**
The most widely used method for PPTL is the modified Pomeroy procedure, which is relatively quick, free of complications, and requires only basic surgical instruments that are readily available in most centers worldwide. The modified Pomeroy procedure entails grasping either of the fallopian tubes at its mid-portion with a pair of Babcock forceps and elevating a loop of

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\(^{29}\) Verkuyl DAA. 2002. Sterilization during unplanned cesarean sections for women likely to have a completed family – should they be offered? Experience in a country with limited resources. *British Journal of Obstetrics and Gynaecology*. 109:900-904.

the tube. The base of the loop is then transfixed and ligated with chromic catgut number 1 and the sutures held long. A 2-cm portion of the tube in the ligated loop is then transected and removed with scissors. The cut ends of the tube are cleaned and inspected for hemorrhage. The same procedure is performed on the other tube.

Pomeroy Method

A systematic review of 14 studies compared failure rates of the Pomeroy method vs. Filshie (titanium) clips, and found no difference between these two methods (OR 0.76 [95% CI 0.30-1.95]). Complication rates were similar, although the Filshie clip technique was reported to be easier. A systematic review was also conducted to estimate the efficacy of the Filshie clip for PPTL. Ten observational studies and three reports from one single randomized controlled trial (RCT) were included in the review. The only RCT found a significantly increased risk of pregnancy at 24 months with clip sterilization postpartum compared with PPTL using the Pomeroy procedure. In the study cited above in Makurdi, Nigeria, TL was performed using the modified Pomeroy technique in 97% of the clients, with no pregnancy reported in this group.

Limitations

Many of the articles and reports reviewed provide only minimal description of the intervention. In some, the methodology is poorly described, making it difficult to draw a valid conclusion with programmatic implications. Moreover, sometimes it was difficult to determine whether the study was of poor quality or the description of the study was just poorly written.

34 Ibid. Swende.
Conclusion

PPTL is a safe, effective, and acceptable—but often underutilized—method of PPFP in many parts of the world. However, access is often limited due to policy and provider factors. While postpartum family planning counseling needs to be part of ANC, counseling throughout maternity care is also beneficial, especially for those who do not choose an immediate PPTL. TLs performed in the postpartum period may be more acceptable than interval TLs, even in association with emergency obstetrical care, such as emergency CS. However, diligence is required to ensure that informed, voluntary, and signed consent is part of all counseling and service provision. The literature lacks documentation about informed and voluntary consent for PPTLs following vaginal birth as well as informed consent for PPTLs that are a part of emergency or elective CS. More evidence is also needed on ways to reduce barriers to access, including the lack of operating theatre time, anesthesia, and insufficient hospital beds to keep postpartum women more than a few hours following delivery. Likewise, evidence for specific guidance is needed on effective counseling and demand generation interventions. Finally, further evidence is also required on ways to strengthen the health system, including human resources, for the provision of quality PPTL services.