

**CONTRACEPTIVE USE AMONG UTERINE EVACUATION CLIENTS IN
BANGLADESH:
THE ROLE OF INDIVIDUAL, FAMILY, AND
SERVICE DELIVERY FACTORS**

by
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DISSERTATION ABSTRACT

Background: Post-abortion contraception is recommended to reduce subsequent unwanted pregnancy and recourse to unsafe abortion, but little is known about the factors associated with successful post-abortion contraceptive use. Guided by the social-ecological model, this study seeks to understand the multiple levels of influence on women's post-abortion contraceptive use.

Methods: This dissertation uses data from a facility-based sample of 498 public sector uterine evacuation (UE) clients in Bangladesh. Respondents completed a quantitative interview on the day of their UE procedures and a follow-up interview four months later. Logistic regression models assess factors at the individual, family and UE service delivery levels associated with immediate post-abortion contraceptive acceptance (on the day of the UE procedure) and use four months post-abortion. Finally, intimate partner violence (IPV) is explored in greater depth to understand the intersection with other potential constraints to reproductive autonomy and the association between IPV and reproductive health outcomes.

Results: Post-abortion contraceptive use was more common at the four-month follow-up (85.4%) compared to the day of the UE procedure (72.7%). Women receiving medication abortion (MA) and dilatation and curettage (D&C) had significantly lower odds of immediate acceptance, compared to women whose procedures were performed using manual vacuum aspiration (MVA) (AOR=0.07 and AOR=0.18, respectively). Though equally likely to be using modern contraception four months post-abortion, MA and D&C clients demonstrated delayed acceptance compared to MVA clients. Women whose fertility intentions were discordant from their husband/partner's and those who experienced past year IPV were also more likely to have delayed acceptance, particularly if their husband/partner accompanied them for the UE procedure.

Experience of IPV was associated with other domains of constrained reproductive autonomy and reproductive health outcomes such as selecting MA, compared to MVA (APR=2.38).

Discussion: Use of post-abortion contraception is influenced by individual, family, and UE service delivery characteristics. The higher rate of modern contraceptive use four months post-abortion is encouraging, but also suggests gaps in immediate post-abortion contraceptive provision. Interventions are needed at multiple levels to ensure all women have access to confidential UE and post-abortion contraceptive services.

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LIST OF ACRONYMS

BAPSA	Bangladesh Association for Prevention of Septic Abortion
CDC	Centers for Disease Control and Prevention
D&C	Dilation and Curettage
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DHS	Demographic and Health Survey
EVA	Electric Vacuum Aspiration
FECOND	Fertility, Contraception, Sexual Dysfunctions Survey
GII	Gender Inequality Index
HDI	Human Development Index
IPV	Intimate Partner Violence
IUD	Intrauterine Device
LARC	Long-acting and Reversible Contraception
LMP	Last Menstrual Period
MA	Medication Abortion
MMR	Maternal Mortality Ratio
MR	Menstrual Regulation
MRM	Menstrual Regulation with Medication
MRTSP	Menstrual Regulation Training and Services Program
MVA	Manual Vacuum Aspiration
NGO	Non-governmental Organization
NSFG	National Survey of Family Growth
NTC	National Technical Committee
PAC	Post-abortion Care

PPS	Probability Proportional to Size
RHSTEP	Reproductive Health Services Training and Education Program
TFR	Total Fertility Rate
UE	Uterine Evacuation
WHO	World Health Organization

CHAPTER 1:
INTRODUCTION

1.1. INTRODUCTION AND OBJECTIVE

Unwanted pregnancy contributes to maternal morbidity and mortality globally, especially in countries where abortion is illegal or provided under unsafe conditions (Campbell and Graham, 2006). Contraceptive use is credited with facilitating the dramatic worldwide fertility decline observed over the past four decades, which in turn is associated with declines in maternal and child mortality (Ahmed et al., 2012; Cleland et al., 2006). Abortion clients are a key population for contraceptive use because most wish to avoid subsequent pregnancy following their procedure, but they can become at risk for pregnancy within two weeks of their abortion procedures (World Health Organization, 2012). Post-abortion contraception can reduce subsequent unwanted pregnancy and recourse to unsafe abortion, and counseling as well as provision of contraceptive methods is recommended at the time of the abortion procedure (World Health Organization, 2012). As a result, provision of highly effective post-abortion contraceptive methods has been promoted, but available evidence suggests focusing on counseling and provision of contraceptive methods alone is not enough to ensure prevention of subsequent unwanted pregnancy and repeat abortion (Schunmann and Glasier, 2006). Successful use of post-abortion contraception is likely to depend on a broad array of factors from women's individual fertility intentions and experiences with contraceptive use, to family dynamics affecting women's reproductive autonomy, to characteristics of the abortion care they receive.

In Bangladesh, the pregnancy termination rate is considerably higher than the average for South Asia, at 37 per 1,000 women of reproductive age in Bangladesh compared to 26 per 1,000 women in South Asia (Singh et al., 2012; Sedgh et al., 2012). Abortion is legally restricted in Bangladesh, but menstrual regulation (MR) is permitted to induce menstruation up to 10 weeks from the last menstrual period (LMP) (Bart Johnston et al, 2010). Though MR services are widely available in the public sector, quality of care is low, and the rate of illegal abortion is equal to the MR rate (Singh et al., 2012). As a result, many women in Bangladesh do not have

access to safe UE care, putting them at risk for maternal morbidity and mortality. Women's access to reproductive health services is also impacted by their husbands and other family members such as in-laws who often act as gatekeepers for health service utilization, including family planning use (Schuler et al., 1995). In addition, 50-60% of women in Bangladesh have experienced intimate partner violence (IPV), 30% in the past year (Garcia-Moreno et al., 2006). Women who experience IPV may also experience constrained reproductive autonomy, as IPV is associated with poor reproductive health outcomes including unwanted pregnancy and abortion (Silverman et al., 2007; Pallitto et al., 2013). Scale-up of post-abortion contraceptive provision through the public sector health system is a promising strategy to reduce subsequent unwanted pregnancy and the risks associated with unsafe abortion. Key to effective scale-up is an understanding of the factors associated with successful post-abortion contraceptive use.

The objectives of this dissertation are to explore the individual, family, and UE service delivery factors associated with post-abortion contraceptive acceptance and use four months post-abortion, and to understand IPV and other threats to reproductive autonomy faced by UE clients in Bangladesh.

1.2. SPECIFIC AIMS

1. To examine the factors associated with immediate short-acting post-abortion contraceptive acceptance and method selection (Chapter 4).
2. To examine the predictors of modern contraceptive use four months post-abortion, and the timing of acceptance of modern contraception over the four months following abortion (Chapter 5).
3. To explore the intersection of IPV and other constraints on women's reproductive autonomy, and the influence of IPV on reproductive health outcomes (Chapter 6).

1.3. DISSERTATION OVERVIEW

Specific aims are in stand-alone manuscript format, each consisting of an abstract, background, methodology, results, and discussion section. Chapter 2 provides an overview of the literature related to post-abortion contraceptive use and women's reproductive autonomy, the conceptual framework used for this dissertation, and the study setting.

Chapter 3 presents the methodology used in this research. This chapter provides an overview of the parent study from which the data were obtained, including information on the sample and the data collection procedures used. The chapter also provides information on the primary measures used in this dissertation and the analyses conducted, including relevant power calculations and a description of missing data. The chapter concludes with a discussion of ethical considerations.

Chapter 4 is the first manuscript, which focuses on the factors associated with post-abortion contraceptive acceptance and method selection on the day of the UE procedure, among women who do not intend pregnancy in the four months following their UE procedures. This cross-sectional analysis of baseline data explores potential factors at three levels: individual, family, and UE service delivery, and seeks to understand the most proximate independent predictors of immediate post-abortion contraceptive acceptance. Among women who accept a method of post-abortion contraception on the day of their UE procedures, the factors associated with the specific short-acting post-abortion contraceptive method selected and the reasons for selecting that method are explored.

The second manuscript (Chapter 5) is a prospective study of the predictors of modern contraceptive use four months post-abortion among women who do not intend pregnancy, either

in the four months following their UE procedures or in the month following their four-month follow-up interview. Like the first manuscript, the most proximate independent baseline predictors of modern contraceptive use four months following the UE procedure are identified. In addition, among women using modern contraception four months post-abortion, the predictors of immediate (baseline) acceptance compared to delayed acceptance (over the four-month follow-up period) are examined. This chapter concludes with a *post hoc* analysis exploring the association between experience of IPV and timing of acceptance of post-abortion contraception, stratified by accompaniment to the health facility on the day of the UE procedure.

Chapter 6, the third manuscript, provides more in-depth analysis of potential constraints on women's reproductive autonomy. The association of past year experience of IPV with other potential threats to reproductive autonomy is examined, including individual level perceptions about access to family planning and family level factors such as discordance in fertility intentions, household decision-making, opposition to family planning, and spousal accompaniment to the health facility. This manuscript also examines the association between experience of past year IPV and reproductive health outcomes, including history of abortion and UE care received.

Chapter 7 provides a summary of the findings from this dissertation as well as a discussion of the strengths, limitations, programmatic and policy implications.

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CHAPTER 2:
BACKGROUND AND SIGNIFICANCE

2.1. BACKGROUND

Unwanted pregnancy is a significant contributor to maternal death and disability globally. Scale-up of family planning programs has led to significant decreases in fertility over time, and in turn, decreases in maternal mortality (Ahmed et al., 2012; Cleland et al., 2006). In 2008, use of contraception was responsible for an estimated 44% reduction in maternal mortality, and it is estimated that satisfying unmet need for contraception would have led to an additional 29% reduction in maternal mortality (Ahmed et al., 2012). Use of contraception improves women's lives in multiple ways; in addition to decreasing maternal and child mortality, reduced childbearing can lead to poverty reduction and increases in women's empowerment by reducing the burden of excess childbearing (Cleland et al., 2006).

The type of contraceptive method selected has implications for preventing unwanted pregnancy. Contraceptive methods can be categorized as modern or traditional, including withdrawal and fertility awareness methods. Modern methods of contraception will be the focus of this dissertation and include condoms, oral contraceptive pills, emergency contraception, lactational amenorrhea method, injectables, implants, intrauterine devices (IUD), and sterilization (World Health Organization, 2013). Modern contraceptive methods can be further categorized into permanent methods such as sterilization, long-acting and reversible contraceptive (LARC) methods including IUDs and implants, and short-acting methods such as condoms, oral contraceptive pills and injectables. Though short-acting methods have lower rates of effectiveness and higher rates of discontinuation compared to LARC methods, they are the most widely used methods both in the post-abortion and general populations (Cleland et al., 2006; Roberts et al., 2010). Short-acting methods can be 98-99% effective with correct and consistent use, but effectiveness falls to 85% for condoms compared to 95% for pills and 97% for injectables as commonly used (World Health Organization, 2013). Understanding method mix aids in

predicting the potential success of family planning programs in reducing unwanted pregnancies and abortion.

Globally, there were an estimated 43,684 maternal deaths due to abortion in 2013, accounting for approximately 15% of maternal deaths (Kassebaum et al., 2014). Abortion-related deaths declined between 1990 and 2013, but abortion remained the third most common cause of maternal mortality globally (Kassebaum et al., 2014). Abortion is a safe procedure when performed by a trained provider under hygienic conditions, with a case-fatality rate of less than one death per 100,000 procedures in developed countries (Grimes et al., 2006). The risk of maternal mortality associated with abortion is attributed to the estimated 19-20 million unsafe abortions performed each year, 97% of which are in developing countries (Grimes et al., 2006). Abortion-related morbidity and mortality can be reduced by using World Health Organization (WHO)-approved uterine evacuation (UE) technologies such as manual or electric vacuum aspiration (MVA or EVA) and medication abortion (MA), and by providing post-abortion contraception to reduce subsequent unwanted pregnancy and recourse to unsafe abortion (World Health Organization, 2012).

2.1.1. Importance of Post-abortion Contraceptive Provision

It is estimated that use of effective family planning methods could avert 90% of abortion-related morbidity and mortality among women who want to space or limit their births (Collumbien et al., 2004). UE care is a point of interaction with the healthcare system, offering an opportunity to provide women with contraception to prevent subsequent unwanted pregnancy.

WHO guidelines on safe abortion care recommend that all UE¹ clients receive contraceptive counseling and are offered contraception before leaving the health facility (World Health Organization, 2012). Women can become at risk for pregnancy as soon as two weeks after their UE procedures (World Health Organization, 2012). All modern contraceptive methods can be initiated immediately following a first trimester surgical abortion procedure using methods such as MVA or EVA (World Health Organization, 2012). For women who receive MA, hormonal methods can be initiated after the woman takes the first pill of the MA regimen, but IUD insertion and sterilization should be delayed until the abortion is confirmed to be complete (World Health Organization, 2012).

2.1.2. Study Design Considerations in Assessing Post-abortion Contraceptive Use (Aims 1 and 2)

Studies of post-abortion contraceptive acceptance typically define method initiation within a timeframe ranging from the day of the UE procedure to three months post-abortion; however, other studies have defined acceptance as initiation between two and sixty months following abortion (Zavier & Padmadas, 2012; Tavrow et al., 2012; Yassin & Cordwell, 2005; El-Tagy et al., 2003). Using these varied timeframes may not provide a complete picture of women's protection from unwanted pregnancy as they extend beyond the two-week period of natural protection after abortion, and do not take into account that immediate provision of post-abortion contraception, on the day of the UE procedure, is recommended (World Health Organization, 2012). Aim 1 of this dissertation (Chapter 4) uses cross-sectional analysis of baseline data (collected on the day of the UE procedure) to assess immediate acceptance of post-abortion contraception for greater consistency with WHO guidelines. In addition, Aim 2 (Chapter 5) uses

¹ In this dissertation, the term uterine evacuation (UE) will be used to include both induced abortion and post-abortion care (PAC) procedures. PAC procedures treat incomplete abortion resulting from either induced or spontaneous abortion (miscarriage).

prospective data to assess modern contraceptive use four months following the UE procedure, and secondarily, timing of acceptance over the four-month follow-up period. In the analysis of timing of acceptance, immediate acceptance on the day of the UE procedure is compared to delayed acceptance over the four months following the UE procedure. Assessing timing of acceptance among women who are using modern contraception four months post-abortion provides insight into the factors associated with delayed acceptance among women who have a need for post-abortion contraception that is not being met on the day of the UE procedure, potentially putting them at risk of unwanted pregnancy.

Most studies of post-abortion contraception have focused on contraceptive *continuation* (Puri et al., 2014; Kalyanwala et al., 2012; Zavier & Padmadas, 2012; Upadhyay et al., 2012), and post-abortion contraceptive *use* has been assessed less frequently (Ceylan et al., 2009; Sultana et al., 2013). Studies with longer follow-up periods have been able to assess the association between post-abortion contraceptive use and outcomes such as repeat unwanted pregnancy and abortion (Roberts et al., 2010; Rose & Lawton, 2012). In the absence of prospective data with long follow-up periods, focusing on post-abortion contraceptive *use* allows for greater analytic flexibility to understand contraceptive behavior of women who begin using contraception in the months following their UE procedures. Evidence from India demonstrates that in the first month following abortion, women whose abortion was performed using MA were significantly less likely to accept a contraceptive method, compared to those who had a MVA procedure (Kalyanwala et al., 2012). Despite the initial differences in timing of acceptance, women were equally likely to be using reversible methods of contraception, regardless of procedure type six months following their abortion procedures (Kalyanwala et al., 2012). In settings where short-acting methods dominate, contraceptive *use* post-abortion may be more important for understanding risk of unwanted pregnancy, and as a result, contraceptive *use* four months post-abortion will be the primary outcome assessed in Aim 2 (Chapter 5).

In addition to observational studies, evaluations have been conducted to assess the association between exposure to post-abortion contraceptive counseling and service delivery interventions and outcomes such as post-abortion contraceptive acceptance and repeat unplanned pregnancy and abortion (Tripney et al., 2013). Because of the higher continuation rates associated with LARC methods, much of the focus has been on increasing post-abortion LARC acceptance in South Asia and globally (Puri et al., 2014; Kalyanwala et al., 2012; Akhter, 1987; Roberts et al., 2010). However, randomized controlled trials from developed countries show mixed results for these types of interventions. In the United Kingdom an intervention was evaluated that sought to improve LARC acceptance and reduce repeat abortion through specialized contraceptive counseling and enhanced provision of contraceptives, including offering the implant and additional cycles of pills (Schunmann & Glasier, 2006). The study found the intervention increased acceptance of IUDs and implants immediately post-abortion, but had no effect on repeat abortion (Schunmann & Glasier, 2006). This finding suggests focusing on counseling and provision of contraceptive commodities is not enough to ensure prevention of subsequent unwanted pregnancy, repeat abortion, and ultimately maternal morbidity and mortality. Additional factors, including the context in which a woman uses contraception likely play a role, but evidence is lacking on the broader set of factors influencing women's post-abortion contraceptive use. This dissertation uses an observational study design considering multiple levels of influence to provide further insight into women's ability to use post-abortion contraception effectively.

2.1.3. Intimate Partner Violence as a Threat to Reproductive Autonomy and Reproductive Health (Aim 3)

Globally, intimate partner violence (IPV) affects approximately one in three women during their lifetimes (World Health Organization et al., 2013), and is associated with poor reproductive

health outcomes, including higher prevalence of unwanted pregnancy and abortion (Pallitto et al., 2013; Silverman et al., 2007). Women who experience IPV may face constrained reproductive autonomy, which could explain the poor reproductive health outcomes consistently observed among women experiencing IPV. The association between IPV and other potential constraints to reproductive autonomy among UE clients in Bangladesh will be considered in this dissertation (Aim 3, Chapter 6). Potential constraints to be assessed include perceived access to family planning, discordance in fertility intentions between women and their families, and under the domain of women's power within the family, opposition to family planning use, accompaniment to the health facility, and household decision-making.

Studies have demonstrated that women who experience IPV have lower reproductive agency, including decreased ability to use contraception effectively due to partner refusal and contraceptive sabotage (Fanslow, et al., 2008; Miller et al., 2007). Lack of reproductive agency may affect women's perceptions about access to family planning, making them feel that methods are too difficult to obtain or inconvenient to use. In addition, discordance in fertility intentions between a woman and her husband/partner in the context of IPV experience may indicate pressure by the husband/partner either to continue a pregnancy that she wants to terminate, or to terminate a pregnancy that she wishes to continue (Silverman & Raj, 2014; Silverman et al., 2010).

Domains of women's power within the family (opposition to family planning, accompaniment to the health facility, and household decision-making) may also be associated with constrained reproductive autonomy in the context of IPV. Opposition to family planning may be overt, such as a violent partner blocking access to reproductive health services, including contraception and abortion (Silverman & Raj, 2014; Miller et al., 2010a; Miller et al., 2010b), but in some settings, opposition to family planning may be more hidden. Ethnographic work in Bangladesh has shown

that even women who do not face direct opposition to family planning from their husbands and in-laws lack support for family planning use (Schuler et al., 1995). Women feel solely responsible for potential ill effects of contraception, and fear violence that could result from lost fertility or productivity (Schuler et al., 1995). Women experiencing IPV are significantly more likely to experience controlling behaviors, including constraints on their mobility, compared to women who do not experience IPV (Garcia-Moreno et al., 2006). As a result, women experiencing IPV may be more likely to be accompanied to health services by their husband/partner, and they may face barriers to traveling to the health facility for abortion care if their spouse is not in agreement with the abortion decision (Silverman & Raj, 2014). Reproductive decision-making, including decision-making for family planning and health service utilization, is similarly associated with IPV in some settings. Perpetration of IPV and controlling behaviors may be related to male domination of family planning decisions (Silverman & Raj, 2014) as well as husband/partner expectations that women seek permission before accessing health services (Garcia-Moreno et al., 2006). Though studies have identified these constructs as potential constraints to reproductive autonomy in the context of IPV, our understanding of the multiple threats to women's reproductive autonomy remains limited. In particular, little is known about potential constraints to reproductive autonomy among abortion clients, a key population due to the disproportionate burden of unwanted pregnancy and abortion among women who experience IPV (Pallitto et al., 2013; Silverman et al., 2007).

In addition to the overlap between IPV and other potential constraints to reproductive autonomy, this dissertation seeks to understand the association between IPV and reproductive health outcomes among UE clients. IPV experience is consistently associated with unintended pregnancy and abortion, including repeat abortion, in settings ranging from developed countries to South Asia (Pallitto et al., 2013; Silverman et al., 2007; Silverman et al., 2010). Though recourse to unsafe abortion has not been directly assessed among women who experience IPV, it

is likely that women who experience IPV are at greater risk of maternal mortality resulting from unsafe abortion due to increased incidence of unintended pregnancy (Silverman & Raj, 2014). IPV may also increase the likelihood of accessing abortion services outside of the health system due to restricted access to health facilities and concerns about lack of privacy. Emerging evidence suggests that women who experience IPV may be more likely to use MA than surgical abortion procedures such as MVA, as MA can be used covertly (Marlow et al., forthcoming). It has been suggested that MA may be more accessible for women who have restricted mobility in the context of IPV, often available at nonsurgical venues such as pharmacies (Silverman & Raj, 2014). In addition, it has been posited that MA holds promise for women experiencing IPV because it can be used to simulate miscarriage, potentially reducing the likelihood of violence from a husband/partner pressuring her to continue the pregnancy (Silverman & Raj, 2014). Although strong evidence exists on the association between IPV and abortion, including male involvement in abortion decision-making (Pallitto et al., 2013; Silverman et al., 2007; Silverman et al., 2010), little is known about women's reproductive health outcomes related to abortion in the context of IPV. This dissertation will provide quantitative evidence of the relationship between IPV and abortion-related reproductive health outcomes in Bangladesh, including repeat abortion, UE treatment type, and UE procedure type. Bangladesh is an important setting for this assessment due to the comparatively high levels of IPV and pregnancy termination experienced by women (Garcia-Moreno et al., 2006; Fulu et al., 2013; Singh et al., 2012).

2.2. THEORY AND FRAMEWORK

Recognizing that health behaviors, including post-abortion contraceptive use, are influenced by a complex set of factors beyond the individual, this dissertation is guided by the social-ecological model (Bronfenbrenner, 1979; McLeroy et al., 1988). This model acknowledges that behavior is influenced by individual characteristics as well as the social environment in which an individual

lives (McLeroy et al., 1988). The social-ecological model has been used to understand contraceptive behavior in developed country contexts (Bull and Shlay, 2005; Raneri and Wiemann, 2007; Miller et al., 2001), and evidence suggests that contraceptive behavior and pregnancy are influenced by factors at multiple levels of the model (Raneri and Wiemann, 2007). Prior studies of post-abortion contraceptive use have focused primarily on individual socio-demographic characteristics and some aspects of abortion care, but none have considered the multiple levels of influence on women's post-abortion contraceptive use in a developing country context.

This dissertation uses a modified version of the social-ecological model focusing on three levels: individual, family, and UE service delivery (Figure 2.1). At the individual level, fertility intentions, history of menstrual regulation (induced abortion), and perceived access to family planning are considered. The family level focuses on family dynamics expected to influence contraceptive use, including discordance in fertility intentions within the family as well as women's power within the family. Women's power within the family encompasses four domains: experience of IPV, opposition to family planning, accompaniment to the health facility, and household decision-making. The UE service delivery level considers the type of facility where a woman received UE services, her procedure type, and characteristics of the post-abortion contraceptive counseling received. Aims 1 and 2 explore the association between factors at each level and post-abortion contraceptive outcomes. Aim 3 focuses on IPV and its overlap with other potential constraints to reproductive autonomy, which are cross-cutting and identified in italics below the center line in Figure 2.1.

2.2.1. Individual Level Factors Associated with Post-abortion Contraceptive Use

Previous studies of post-abortion contraceptive acceptance and use have focused primarily on individual socio-demographic characteristics and some aspects of women's reproductive

histories. Socio-demographic characteristics such as older age, urban residence, more education, exposure to mass media, and having at least one child are associated with post-abortion contraceptive acceptance in various developing country settings (Zavier & Padmadas, 2012; Tavrow et al., 2012). In addition, women's reproductive histories are associated with post-abortion contraceptive use. Among post-abortion clients in Kenya, prior contraceptive use was associated with an increase in the odds of post-abortion contraceptive acceptance (AOR=10.3, 95% CI: 4.1-25.6) (Tavrow et al., 2012). Studies of post-abortion clients in India and Kenya have also shown a previous pregnancy termination was associated with an increased odds of post-abortion contraceptive acceptance (Zavier & Padmadas, 2012; Tavrow et al., 2012).

Fertility intentions have been less commonly assessed among UE clients, presumably because the assumption is that both the terminated pregnancy and future pregnancies are unwanted.

However, fertility intentions may vary, especially between spontaneous and induced abortion clients. A study in Kenya found that future fertility intentions among PAC clients varied substantially, with 20% preferring their next birth in less than one year from the time of the UE procedure, 22% preferring to wait one to two years, 25% preferring to wait more than two years, and 16% preferring no more children (Solo et al., 1999). This dissertation will assess intentions regarding the terminated pregnancy as well as future fertility intentions as predictors of post-abortion contraceptive use.

Perceived access to family planning is also of interest in relation to post-abortion contraceptive acceptance and use, and can be related to barriers such as distance from a health facility or cost of family planning methods. In Bangladesh, contraceptive methods are widely available at the community level through government field workers and pharmacies, as well as through the government health system (NIPORT et al., 2013). In the general population in Bangladesh almost one quarter of current contraceptive users receive their method free of charge from

government field workers, and one third of current users access family planning through pharmacies (NIPORT et al., 2013). As a result, perceptions about access to family planning may be related to constrained reproductive agency and autonomy in this setting. Women who perceive limited access to family planning may be more likely to accept a method on the day of their UE procedures. However, these women may also be less likely to be using modern contraception in the months following abortion if they lack reproductive agency to refill their contraceptive method.

2.2.2. Family Level Factors Associated with Post-abortion Contraceptive Use

Though family level factors have not been assessed in relation to post-abortion contraceptive use, evidence suggests that family dynamics play a role in women's contraceptive use, especially in patriarchal societies such as Bangladesh. Both the fertility intentions of family members and women's power within the family are likely to affect women's ability to use post-abortion contraception effectively.

Discordance in fertility intentions, the most common form being more pronatalist preferences of the husband/partner, has been shown to be associated with increased fertility in developing country settings (DaVanzo, Peterson, and Jones 2003; Gipson and Hindin 2009). Studies from Bangladesh have demonstrated that women are less likely to use contraception if they perceive that their husbands do not approve of family planning use or are not supportive of use (Kamal, 2000; DeGraff, 1991; Khan, 2003). Less is known about discordance with in-laws' intentions, but qualitative evidence from rural Bangladesh demonstrates that husband or in-laws' disapproval of pill use and husband's dissatisfaction with the method are important reasons for discontinuation of pills (Ullah & Humble, 2006). In addition, failing to obey the in-laws has been cited as a reason for IPV in rural Bangladesh, suggesting the higher status and power of in-laws within the household (Schuler et al., 1996).

Women's power within the family, spanning domains such as IPV, opposition to family planning, accompaniment to the health facility, and household decision-making, may also play a role in women's ability to effectively use post-abortion contraception. Studies have demonstrated that women's experiences of violence and reproductive coercion, both in their relationships with their husband/partner and in-laws, are related to reproductive control, and by extension contraceptive use (Silverman & Raj, 2014; Gupta et al., 2012; McCauley et al., 2014). The most recent Bangladesh DHS showed that only 63.0% of women participate in decision-making for their own healthcare (NIPORT et al., 2013), and husbands and in-laws may be key decision-makers for contraceptive use due to patriarchal cultural norms and women's economic dependence (Schuler et al., 1995). In this context, accompaniment to the health facility for the UE procedure could be positive, indicating social support for abortion, or it could be an indicator of lack of autonomy and mobility. Evidence from India suggests that some women see spousal accompaniment as positive and a source of emotional support (Ganatra et al., 2010), but it may be experienced as controlling or coercive for other women (Silverman & Raj, 2014).

2.2.3. UE Service Delivery Factors Associated with Post-abortion Contraceptive Use

Abortion procedure type has been identified as an important predictor of post-abortion contraceptive use. A study in India found that women who used MA had delayed initiation of post-abortion contraception and were much less likely to adopt a method within the first month after the abortion, compared to women who had MVA procedures (Kalyanwala et al., 2012). However, by six months post-abortion, women who received MA and MVA were equally likely to be using reversible methods of contraception (Kalyanwala et al., 2012).

Quality of post-abortion contraceptive counseling has also been shown to be an important predictor of post-abortion contraceptive acceptance and use over time, but evidence is mixed.

Studies in Egypt and the United Kingdom have shown quality of counseling is associated with acceptance on the day of the UE procedure (El-Tagy et al., 2003; Yassin & Cordwell, 2005), and a study in Turkey found immediate contraceptive acceptance is the most important predictor of modern contraceptive use one year following abortion (Ceylan et al., 2009). In Bangladesh, women who received high quality of post-abortion contraceptive counseling had three times higher odds of modern method use three months post-abortion, compared to women who received low quality counseling (AOR=3.01; 95% CI: 1.43 – 6.37) (Sultana et al., 2013). However, studies in other settings that have used longer follow-up periods have found no association between counseling interventions and outcomes such as repeat abortion (Schunmann & Glasier, 2006).

The effect of facility or unit type where a woman receives UE services on post-abortion contraceptive provision has been less commonly studied. In some settings, UE and family planning services are not provided within the same facility or unit, or by the same providers. This requires women to go to another part of the facility or to a pharmacy to receive her post-abortion contraceptive method, which may lead to gaps in post-abortion contraceptive provision, especially when there are no formal linkages between the units or facilities (Solo et al., 1999). An intervention study from Kenya demonstrated improved post-abortion contraceptive counseling and method provision when family planning services were provided in the same unit and by the same staff who provided UE services (Solo et al., 1999).

2.3. STUDY CONTEXT

2.3.1. Geography of Bangladesh

Bangladesh is a country in South Asia bordering India, Myanmar, and the Bay of Bengal to its south. In 1947, Bangladesh was partitioned from India to the newly formed Pakistan, and in 1971 Bangladesh achieved independence from Pakistan after the nine-month Bangladesh Liberation

War (NIPORT et al., 2013). Bangladesh's population is estimated to be more than 150 million people, and it is the world's most densely populated country (NIPORT et al., 2013). Ninety-eight percent of Bangladeshis are ethnic Bengalis, but the north and southeast regions of the country are home to an estimated three million indigenous peoples from over 50 ethnic groups (International Work Group for Indigenous Affairs, 2014). Bangla, also known as Bengali, is the official language of Bangladesh. The majority of Bangladeshis are Muslim (90%), but 9.5% of the population is Hindu (NIPORT et al., 2013). There are also small numbers of Buddhists (0.2%) and Christians (0.2%) (NIPORT et al., 2013). Bangladesh consists of seven administrative divisions (Figure 2.2), which are further divided into 64 districts and 545 upazilas (NIPORT et al., 2013). This dissertation uses data collected from four of the seven administrative divisions of Bangladesh: Dhaka, Sylhet, Chittagong, and Rajshahi.

2.3.2. Development and Women's Empowerment in Bangladesh

The United Nations Development Programme (UNDP) calculates two relevant indices of development, the Human Development Index (HDI) and the Gender Inequality Index (GII), to allow for comparisons across countries (United Nations Development Programme, 2014). The HDI is a summary measure of three indices of human development: health, education, and standard of living. In 2013, Bangladesh ranked 142 out of 187 countries with a HDI of 0.558 (United Nations Development Programme, 2014). Bangladesh ranks similarly to other countries in South Asia, slightly outranking Nepal and Pakistan, but falling behind Sri Lanka and India in HDI ranking (United Nations Development Programme, 2014). The GII is also a summary measure, but focuses on three dimensions of gender inequality: reproductive health, empowerment, and economic status (United Nations Development Programme, 2014). In 2013 Bangladesh ranked 115 out of 151 countries, with a GII value of 0.529 (United Nations Development Programme, 2014). Bangladesh also ranks similarly to other South Asian countries

on the GII. Bangladesh outranks Pakistan and India, but falls behind Nepal and Sri Lanka in GII ranking.

In Bangladesh, women's empowerment has been shown to be associated with the health and well-being of women and their children (NIPORT et al., 2013). The Bangladesh Demographic and Health Survey (DHS) uses two summary indices of women's empowerment: involvement in household decision-making and agreement with reasons for which wife beating is justified (NIPORT et al., 2013). One third of women agree with one or more reasons for which wife beating is justified, and 58% do not participate in all four household decision-making measures, including decision-making regarding their own healthcare, child healthcare, major household purchases, and visits to their family or relatives (NIPORT et al., 2013). Low scores on indices of women's empowerment, including involvement in household decision-making and agreement with reasons for which wife beating is justified, are correlated with constrained access to antenatal care, delivery assistance, and postnatal care (NIPORT et al., 2013). Infant and under-five mortality are highest for women who agree with three or four reasons for which wife beating is justified (infant mortality: 56 per 1,000 live births and under-five mortality: 71 per 1,000 live births), and lowest for women who do not think that wife beating is justified for any reason (infant mortality: 39 per 1,000 live births and under-five mortality: 49 per 1,000 live births) (NIPORT et al., 2013). Data suggest that women's empowerment is a critical factor in health service utilization both for women and their children in Bangladesh.

IPV is an aspect of women's power within the family that is of particular interest in Bangladesh, due to the high prevalence and its association with poor reproductive health outcomes (Silverman et al., 2007; Pallitto et al., 2013). The World Health Organization (WHO) Multi-country Study on Women's Health and Domestic Violence estimates that 50-60% of Bangladeshi women have experienced physical and/or sexual intimate partner violence in their lifetimes, and 30% have

experienced such violence in the past year (Garcia-Moreno et al., 2006). The United Nations (UN) Multi-country Study on Men and Violence in Asia and the Pacific found similar rates; over 60% of ever-partnered men in Bangladesh reported perpetrating IPV during their lifetimes (Fulu et al., 2013). Recent studies in Bangladesh have demonstrated IPV experience is associated with a 50-60% increase in unwanted pregnancy and over two times higher odds of abortion (AOR=2.60) (Silverman et al., 2007; Pallitto et al., 2013), suggesting that women who experience IPV have more limited control over their fertility.

2.3.3. Context of Reproductive Health in Bangladesh

The maternal mortality ratio (MMR) has decreased considerably over the past few decades in Bangladesh from an estimated 552 per 100,000 live births in 1990 to 243 per 100,000 live births in 2013 (Kassebaum et al., 2014). This decrease is attributed to increases in family planning use, which have facilitated fertility decline (Cleland et al., 2006) as well as increases in facility-based deliveries and expansion of emergency obstetric and newborn care at various levels of the health system (Health and Life Sciences Partnership, 2012; NIPORT et al., 2013).

Bangladesh has been a success story in family planning scale-up. In the 1970s, the total fertility rate (TFR) in Bangladesh was over 6 children per woman, and by 2011 the TFR was 2.3 children per woman (Cleland et al., 2006; NIPORT et al., 2013). Community-based distribution of oral contraceptive pills and condoms starting in the 1970s is credited with facilitating this dramatic decline in fertility (Cleland et al., 2006). In the general population, over half (52.1%) of married women of reproductive age (15-49) use a modern method of contraception (NIPORT et al., 2013). Most women use short-acting methods; oral contraceptive pills are the most common method used (27.2%) followed by injectables (11.2%), male condoms (5.5%), and female sterilization (5.0%) (NIPORT et al., 2013). Half of women in Bangladesh obtain contraceptive methods through the public sector, and community health workers (CHWs) provide the largest

share in the public sector, supplying 31.3% of pill users, 11.2% of male condom users, and 23.5% of injectable users (NIPORT et al., 2013). One third (33.3%) of women obtain contraceptives through private pharmacies, including 44.1% of pill users, 69.0% of male condoms users, and 13.7% of injectable users (NIPORT et al., 2013). Despite the widespread availability of contraception, abortion is still common in Bangladesh, illustrating that unwanted pregnancy has not been fully addressed through community-based contraceptive provision (Singh et al., 2012). Effective use of post-abortion contraception provides an opportunity to fill this gap and reduce unwanted pregnancy.

2.3.4. Context of Abortion in Bangladesh

Abortion is only legal in Bangladesh to save the life of the woman based on a law dating back to the Penal Code of India in 1860 and the British Offenses against the Person Act of 1861 (Chowdhury & Moni, 2004). However, in 1979 menstrual regulation (MR) was permitted to induce menstruation and establish non-pregnancy 6-10 weeks from the beginning of the last menstrual period (LMP) (Bart Johnston et al., 2010). This policy was put in place in response to rising abortion-related morbidity and mortality, and coincided with a decision by the Government of Bangladesh to allow abortion for the estimated 200,000-400,000 Bangladeshi rape victims during the Bangladesh Liberation War (Alam et al., 2013). In September 2014, the National Technical Committee (NTC) of the Ministry of Health and Family Welfare's Directorate General of Family Planning Services increased the limit to 6-12 weeks from the beginning of the last menstrual period to reduce the number of clients who were rejected for MR services because they exceeded the gestational age limit (Government of the People's Republic of Bangladesh Directorate General of Family Planning, 2014). The data used in this dissertation were collected prior to this policy change, and as a result, the 10-week limit is referred to in the chapters that follow. Under the MR program, pregnancy is typically not confirmed prior to the MR procedure

(Chowdhury & Moni, 2004). While MR can be performed to address menstrual disturbances other than pregnancy, this dissertation will consider MR to be equivalent to induced abortion.

In 1983, the Ministry of Health and Family Welfare began a formal MR training program, known as the Menstrual Regulation Training and Services Program (MRTSP) (Reproductive Health Services Training and Education Program, 2006). In 1989, MRTSP became a non-governmental organization (NGO) responsible for training government MR providers, and in 2000 this NGO became known as Reproductive Health Services Training and Education Program (RHSTEP) (Reproductive Health Services Training and Education Program, 2006). Currently, RHSTEP provides MR training to government providers, and RHSTEP clinics offer a full range of sexual and reproductive health services within some government health facilities (Reproductive Health Services Training and Education Program, 2006). Through this training effort MR services have become widely available in Bangladesh, but quality of care in government facilities has been poor (Chowdhury & Moni, 2004). Infection prevention has been a major concern for MR service provision due to the unhygienic conditions in government facilities, including shortage of gloves and failure to process MVA instruments after use (Chowdhury & Moni, 2004). In addition, MR services are meant to be free of charge in the government health system, but unofficial fees or “tips” are common and act as a barrier to accessing these services (Chowdhury & Moni, 2004; Vlassoff et al., 2012). In contrast to government health facilities, RHSTEP clinics do formally charge for MR services, which cost 1800 Taka (~\$25 USD) for MVA or MA procedures.

Bangladesh has a pregnancy termination rate of 37 per 1,000 women of reproductive age, which includes the MR rate of 18.3 per 1,000 and the abortion rate of 18.2 per 1,000 (Singh et al., 2012). That these two rates are equivalent indicates that many women with unwanted pregnancies are not utilizing MR services, and as a result, they are resorting to illegal and possibly unsafe abortions (Singh et al., 2012). MR is available at all levels of the government health system

(Chowdhury & Moni, 2004), but despite availability of MR services, economic, cultural and informational barriers lead women to access illegal induced abortion outside the health system (Singh et al., 1997; Bart Johnston et al., 2010). For example, though not an official policy, women are often asked for a witness's consent for a MR procedure in order to protect the provider from legal action and due to judgmental attitudes of providers (Chowdhury & Moni, 2004). Practices such as these may deter women from seeking legal MR services, and lead them to access illegal abortion. Illegal abortions occur outside the health system and may include self-inductions or abortion from private providers or traditional healers (Grimes et al., 2006). Women who access abortion outside the health system may have a lower success rate, resulting in incomplete abortion, and abortions provided under unhygienic conditions can lead to complications such as hemorrhage, sepsis, peritonitis, and trauma to the cervix, vagina and uterus (Grimes et al., 2006). Post-abortion care (PAC) to treat incomplete abortion and complications resulting from abortion is offered in public health facilities to meet the needs of these women. PAC clients may include women who have had a miscarriage, those who unsuccessfully induced abortion outside the health system, and those who had an unsuccessful legal MR procedure.

In government health facilities, most MR and PAC procedures are performed using MVA, but D&C is still used for some PAC procedures (Ipas, 2013). Though D&C is not a WHO-approved UE technology (World Health Organization, 2012), it is often still used for later gestational ages that PAC clients present with because larger cannulae for MVA are typically not procured through the government health system. MA, known as menstrual regulation with medication (MRM) in Bangladesh, has been less commonly used. The combined regimen of mifepristone and misoprostol was approved for use in government health facilities by the NTC in September 2014 (Government of the People's Republic of Bangladesh Directorate General of Family Planning, 2014), and is expected to take on a larger share of MR services once it is formally introduced. Pain management varies by procedure type. MVA is typically performed using local

anesthesia, in the form of a paracervical block, while D&C is typically performed under deep sedation using ketamine. In large teaching hospitals, D&C may be performed under general anesthesia. MA drugs are typically provided with non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen or diclofenac for pain management.

Provision of post-abortion contraception has been poor in government health facilities in Bangladesh. A recent study by the Guttmacher Institute found that among government facilities that provide MR services, post-abortion contraception is only provided to half of MR patients (Vlassoff et al., 2012). Post-abortion contraceptive provision is less common for PAC patients; only 34% of facilities that offered PAC services also offered contraceptive methods (Vlassoff et al., 2012). On the day of the UE procedure, women are typically provided with a three-month supply of short-acting methods, such as three cycles of oral contraceptive pills.

2.3.5. Government Health System in Bangladesh

Bangladesh has a bifurcated government health system administered under two directorates within the Ministry of Health and Family Welfare: the Directorate General of Family Planning (DGFP) and the Directorate General of Health Services (DGHS) (Figure 2.3). MR services are primarily provided in RHSTEP clinics located within Medical College Hospitals (MCHs) and District Hospitals (DHs), and through DGFP facilities, including Maternal and Child Welfare Centers (MCWCs) at the district level, the family planning unit of Upazila Health Complexes (UHCs) at the upazila level, and in family welfare centers (FWCs) at the union level. PAC services have primarily been provided in DGHS facilities, including the obstetrics and gynecology wards and emergency departments of the MCHs, DHs, and the health unit of the UHCs. Because contraceptive commodities are procured through DGFP rather than DGHS, provision of post-abortion contraception for PAC clients in DGHS facilities has been particularly poor (Vlassoff et al., 2012).

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Figure 2.1. Modified social-ecological model

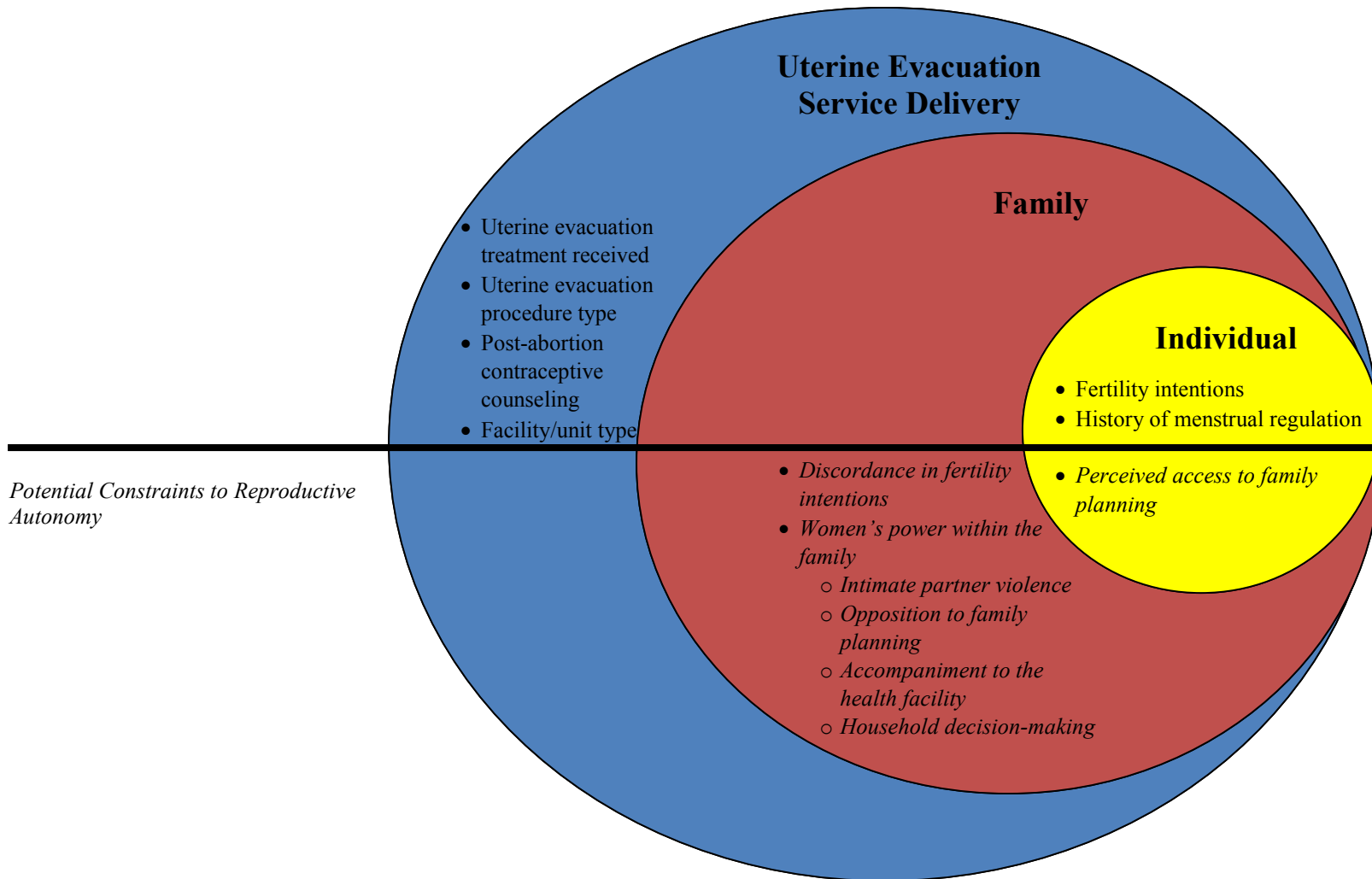
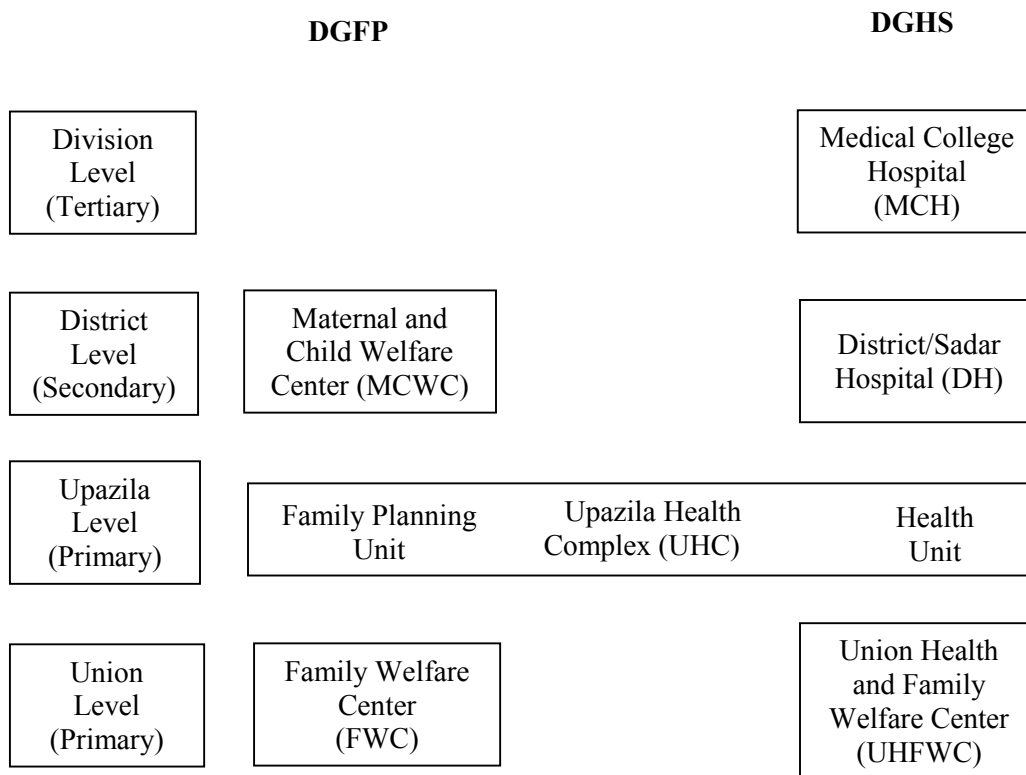


Figure 2.2. Map of Bangladesh



“Administrative Divisions of Bangladesh” by Khan Muhammad Nafee Mostafa Sadh

Figure 2.3. Bifurcated government health system in Bangladesh



CHAPTER 3:
METHODOLOGY

3.1. STUDY DESIGN

This prospective study uses data from a parent study initiated by Ipas that aimed to understand post-abortion contraceptive use among short-acting method acceptors. The parent study enrolled a facility-based sample of 498 uterine evacuation (UE) clients ages 18-49 who accepted a short-acting contraceptive method or no method after their UE procedures. Women completed two quantitative interviewer-administered surveys: first at the health facility following their UE procedure and a follow-up survey four months post-abortion. A total of 555 women were approached for participation and 498 were enrolled between March and June 2013; the response rate was 90%. A total of 457 women completed a follow-up interview between July and October 2013; the overall retention rate was 92%.

3.2. SAMPLE

The sample was drawn from among the pool of government and non-governmental organization (NGO) facilities receiving an intervention to train providers in woman-centered UE service provision and to ensure that appropriate equipment and infection prevention supplies were available. There are 5,301 public sector facilities in Bangladesh where UE services are provided (Vlassoff et al., 2012), and compared to the broader group of facilities where UE services are provided, facilities included in this study were more likely to be in urban settings such as Dhaka and Chittagong (Figure 3.1). A recent study using the Matlab Demographic Surveillance System (DSS) from 1989-2008 demonstrated that women receiving MR services in the comparison area, thought to be representative of rural Bangladesh, had a 2.5 times higher odds of maternal mortality compared to women who have a live birth (95% CI: 1.13-5.46), adjusting for key socio-demographic characteristics (Rahman et al., 2013). MR is a safe procedure, and these findings suggest poor quality of care for MR services in government facilities in rural Bangladesh. Government facilities sampled for this study included both those under the auspices of the Directorate General of Family Planning (DGFP) and the Directorate General of Health Services

(DGHS). Integration of MR, PAC and post-abortion contraceptive services in both DGFP and DGHS facilities was a goal of the intervention, and because all participating facilities received the intervention, study participants received approximately similar UE care.

A stratified one-stage cluster sampling approach was used to select women for the study. The list of facilities receiving the intervention served as the sampling frame for this study and consisted of 47 facilities: 18 primary, 16 secondary, 5 tertiary, and 8 NGO sexual and reproductive health (RHSTEP) clinics. Inclusion criteria for facilities included provision of MR and/or PAC services and provision of pills, injectables, or condoms as post-abortion contraceptive methods. Facilities were stratified by type: primary, secondary, tertiary, and RHSTEP clinics. A stratified approach was used to ensure representation from all facility types, as these facilities are thought to serve different populations of women. Sixteen facilities were randomly selected using probability proportional to size (PPS) sampling within facility type strata.

Within selected facilities, all women receiving MR or PAC services were screened for study eligibility. Inclusion criteria for study participation included:

- 18-49 years of age;
- Received MR or PAC services using any procedure; and
- Accepted pills, injectables, or condoms as a post-abortion contraceptive method, or selected no method

Women who selected a long-acting or permanent post-abortion contraceptive method such as implants, IUDs or sterilization were ineligible for participation in the parent study. Though the parent study did not collect data on the number of women ineligible for participation due to LARC or permanent method selection, facility logbook data from the study period demonstrate that approximately 14% of UE clients accepted long-acting or permanent methods (5% selected IUDs, 5% selected implants, and 4% selected sterilization) (Ipas, 2013a).

3.2.1. Analytic Samples

Each chapter in this dissertation uses an analytic sample specific to the goals of the analysis (Figure 3.2). Chapters 4 and 6 entail cross-sectional analysis of baseline data, while Chapter 5 takes advantage of the prospective design of the parent study. Chapter 4 focuses on acceptance of post-abortion contraception, and analysis is restricted to women who report at baseline that they do not intend to become pregnant within the next four months (n=479). The analysis in Chapter 6 is limited to women who have complete data on intimate partner violence (n=457), as this is the primary exposure of interest. Chapter 5 entails analysis of both baseline and four-month follow-up data to ascertain modern contraceptive use four months post-abortion and timing of acceptance of post-abortion contraception. Like Chapter 4, the sample was first restricted to the women who reported at baseline that they did not intend to become pregnant over the four-month follow-up period. Next, the sample was restricted to those who completed the four-month follow-up interview (n=440). Retention was found to be non-differential by age, education, urban or rural residence, rural to urban migrant status, household type, or division of residence; however, some differences were identified by parity. Next, 41 women were excluded because they were pregnant or intended to become pregnant at follow-up. Finally, one woman was excluded due to missing data on the primary outcome of interest. The final analytic sample for Chapter 5 was 398 women.

3.2.2. Sample Size Calculation

The sample size for the parent study was calculated to measure the prevalence of contraceptive discontinuation at four months post-abortion. The 2011 Bangladesh Demographic and Health Survey (DHS) preliminary report of discontinuation rates within 12 months of initiation were used to estimate discontinuation for this study. The follow-up period for the study was only four months, but as most contraceptive discontinuation occurs during the first months of use (Curtis

and Blanc, 1997), basing the sample size on the 12-month discontinuation rates was thought to be a reasonable proxy.

Sample size calculations were done based on a range of assumptions about the design effect (deff), ranging from 1.5-2.5, and the prevalence of discontinuation at the four-month follow-up, ranging from 30-70%, based on published discontinuation rates for pill, condom and injectable users in Bangladesh (NIPORT et al., 2013). The range used for the deff was based on the deff for current use of the pill in the 2011 Bangladesh DHS, which was of 1.505 (NIPORT et al., 2013). Equal allocation was used to select an equal number of facilities within each facility type stratum. In order to calculate variance estimates, there must be at least two clusters in each stratum. Since there were four facility type strata (primary, secondary, tertiary, and RHSTEP), the minimum number of clusters to be selected was eight. However, due to low caseload in many of the primary and secondary facilities, a larger number of clusters with fewer women per cluster were selected.

The final sample size was estimated using the Taylor linearization method with an alpha of 0.05 and a correction for the intraclass correlation (rho) due to the clustered sampling design. Rho was calculated based on an estimated deff of 2 as a conservative estimate, using the formula below, where m is the expected average size of the cluster:

$$\rho = (\text{deff} - 1) / (m - 1) = (2 - 1) / (25 - 1) = 0.04$$

The assumptions used in the final sample size calculation were: a discontinuation rate of 50%, a 10% margin of error, an intraclass correlation of 0.04, and selection of 16 clusters. This resulted in a total sample size estimate of 365 women from 16 facilities. Anticipated loss to follow-up was 30%; to account for this, an additional 135 women were added, making the total sample size

500 women. Table 3.1 presents a comparison of the anticipated and actual study enrollment and retention in addition to the effective sample size, assuming a deff of 2. Loss to follow-up was lower than anticipated (8% compared to 30% anticipated), as was the post-abortion contraceptive discontinuation rate (38% compared to 50% anticipated).

3.3. DATA COLLECTION PROCESS AND INSTRUMENTS

Two data collection instruments were used for this study: a baseline questionnaire administered on the day of a woman's UE procedure and a follow-up questionnaire administered four months after her procedure. Both the baseline and follow-up questionnaires were developed in English and translated to Bangla. The questionnaires were back-translated, and adjustments were made as necessary. The baseline questionnaire was first piloted in November 2012 for basic comprehension of the study domains. Additional field-testing was completed in March 2013 during data collector training, and the questionnaires were fine-tuned based on data collector feedback. At baseline, a trained female interviewer was posted at each study facility during all available clinic hours. After women recovered from their UE procedures, the interviewer recruited them for the study. Women who consented to study participation completed an interviewer-administered questionnaire in a private location within the health facility. In smaller facilities without a designated room, interviews took place in cubicles used for counseling with a white noise machine to ensure auditory privacy. The survey included questions on sensitive topics such as intimate partner violence, and consistent with international ethical standards for research on violence against women (World Health Organization, 2001), interviewers were prompted to confirm privacy before proceeding to the questions regarding violence experience. If privacy could not be assured, these questions were skipped. Interviews were conducted in Bangla and lasted 30-45 minutes.

At the time of the baseline interview, women were asked to provide a telephone number and home address, including landmarks, to facilitate contact for the follow-up survey. When possible, women were contacted by phone to schedule the follow-up interview at a time and location convenient for them. If the woman did not have a telephone, data collectors visited her home to schedule a time for her follow-up interview. Women were contacted a maximum of three times before being considered lost to follow-up. The majority of four-month follow-up interviews took place in-person (93%), but women were given the option to complete the follow-up interview by phone (7%) if an in-person interview was not possible.

3.4. MEASURES

This dissertation assesses women's post-abortion contraceptive outcomes as well as characteristics organized in three levels: individual, family, and UE service delivery. Table 3.2 provides an overview of the key measures used in each chapter of this dissertation.

3.4.1. Post-abortion Contraceptive Use

Chapters 4 and 5 focus on post-abortion contraceptive use outcomes. In Chapter 4, the primary outcome of interest was immediate acceptance of short-acting post-abortion contraception, and the secondary outcome of interest was the short-acting method selected, both assessed at baseline. *Immediate acceptance* was assessed by asking the woman, "Did you choose a method to prevent pregnancy today?" If she responded yes, she was asked, "Which primary method did you choose?" Acceptance was analyzed as a dichotomous variable. Women were considered acceptors if they selected a short-acting method, and non-acceptors if they did not select a method. *Method selected* was analyzed as a categorical variable (pills, condoms or injectables). Women who selected long-acting or traditional methods were ineligible for participation in the parent study.

In Chapter 5, the primary outcome of interest is *modern contraceptive use at the time of the four-month follow-up*. At follow-up women were asked, “Are you or your husband/partner currently using anything to avoid pregnancy?” If she responded yes, she was asked which method they were using. Women who reported using pills, condoms, injectables, implants, IUDs, or male or female sterilization were considered users, and those who reported using a traditional method or who reported that they were not currently using a method were considered non-users. The secondary outcome of interest was *timing of acceptance of modern contraception*, which was calculated among women using modern contraception at follow-up. Those who accepted a method at baseline were considered immediate acceptors, and those who did not were considered delayed acceptors.

3.4.2. Individual Level Characteristics

The individual level included measures of women’s fertility intentions, both regarding the terminated pregnancy and future pregnancies, perceived access to family planning, and history of MR.

Fertility Intentions

Fertility Intentions Regarding the Terminated Pregnancy

This dissertation measures three dimensions of fertility intentions for the terminated pregnancy based on the work of Santelli et al. (2009). Questions were adapted from recent population-based surveys: the 2010 FECOND survey, a sexual and reproductive health survey in France (Institut National D’etudes Demographiques, 2010) and the 2006-2010 National Survey of Family Growth (NSFG) in the United States (Centers for Disease Control, 2008). First, women were asked whether they were *using family planning at the time they became pregnant* to assess contraceptive behavior prior to pregnancy. Next, *pregnancy avoidance* was measured by showing women a scale on a card and asking, “Please look at the scale on the card. On this scale, a 1 means that

you did not want to avoid pregnancy, and 10 means you wanted very much to avoid pregnancy. Which number on the card best describes how much you wanted to avoid pregnancy at the time you became pregnant?” (Centers for Disease Control, 2008). The pregnancy avoidance score was analyzed as a continuous variable (range: 1-10), with a higher score indicating stronger pregnancy avoidance. Third, *intentions regarding the terminated pregnancy* were assessed directly by asking women, “Right before you became pregnant, did you want to become pregnant then, did you want to wait until later, did you not want to have any (more) children, or did you not think about it?” (Institut National D’etudes Demographiques, 2010). The woman’s intentions regarding the terminated pregnancy were dichotomized as pregnancy wanted then or ambivalent about timing of the pregnancy coded as zero, and pregnancy mistimed or unwanted coded as one.

Future Fertility Intentions

Future fertility intentions were assessed by asking women whether they wanted a/another child in the future. The woman’s future fertility intentions were dichotomized as want a/another child in the future or ambivalent coded as zero, or want no (more) children coded as one.

History of Menstrual Regulation

History of MR was measured by asking all women, “Have you ever used menstrual regulation before?” This was analyzed as a dichotomous measure indicating whether she had ever used MR before the day of her UE procedure.

Perceived Access to Family Planning

Perceived access to family planning was assessed through a series of yes/no questions regarding challenges accessing family planning: “Do you think that it is too difficult to obtain family planning methods, or that you would have to travel too far to obtain a method?”, “Do you think that it is too expensive to obtain family planning methods?”, and “Do you think that family

planning methods are inconvenient to use?”. Each measure was analyzed as a dichotomous variable to indicate her agreement with the statement.

3.4.3. Family Level Characteristics

Family characteristics were measured under the domains of discordance in fertility intentions and women’s power within the family. Discordance in intentions regarding the terminated pregnancy were assessed between the woman and her husband/partner, and between the woman and her in-laws. Discordance in future fertility intentions was assessed between the woman and her husband/partner; this measure was not available for in-laws. Women’s power within the family included measures of intimate partner violence (IPV), opposition to family planning, accompaniment to the health facility, and household decision-making.

Discordance in Fertility Intentions

Discordance in Intentions Regarding the Terminated Pregnancy

Discordance in intentions was measured by asking women about their husband/partner’s intentions and their in-laws’ intentions regarding the terminated pregnancy. *Discordance in intentions regarding the terminated pregnancy between the woman and her husband/partner* was assessed by asking women, “Right before you became pregnant, did your husband/partner want you to become pregnant then, did he want to wait until later, did he not want to have any (more) children, or he did not think about it?” The husband/partner’s intentions were ordered from highest to lowest desire for fertility (wanted then, ambivalent, mistimed or unwanted) and analyzed in three categories relative to the woman’s pregnancy intentions based on the work done by Schoen et al. (1999): concordant (both wanted pregnancy then, both felt that it was mistimed or unwanted, or both were ambivalent about the timing), discordant – higher (woman felt that pregnancy was mistimed or unwanted while husband/partner wanted it then or was ambivalent, or woman was ambivalent while husband/partner wanted it then), and discordant – lower (woman

wanted the pregnancy then while husband/partner was ambivalent or felt that it was mistimed or unwanted, or woman was ambivalent while husband/partner felt that it was mistimed or unwanted).

Discordance in intentions regarding the terminated pregnancy between the woman and her in-laws was assessed by asking women, “Right before you became pregnant, did your in-laws want you to become pregnant then, did they want to wait until later, did they not want you to have any (more) children, or they did not think about it?” A similar measure of discordance was constructed for the in-laws’ intentions, ordered from highest to lowest desire for fertility (wanted then, ambivalent, mistimed or unwanted) and analyzed in three categories relative to the woman’s pregnancy intentions based on the work done by Schoen et al. (1999): concordant (both the woman and her in-laws wanted pregnancy then, both felt that it was mistimed or unwanted, or both were ambivalent about the timing), discordant – higher (woman felt that pregnancy was mistimed or unwanted while in-laws wanted it then or were ambivalent, or woman was ambivalent while in-laws wanted it then), and discordant – lower (woman wanted the pregnancy then while in-laws were ambivalent or felt that it was mistimed or unwanted, or woman was ambivalent while in-laws felt that it was mistimed or unwanted). Approximately 35% of women reported that they did not know their in-laws’ intentions regarding the terminated pregnancy, and these were excluded from the analyses.

For both the measure of discordance with the husband/partner’s intentions and the in-laws’ intentions, the discordant – lower category was very small and was excluded from the analyses. Discordance in intentions regarding the terminated pregnancy was analyzed as a dichotomous variable with concordant intentions coded as zero and the discordant – higher category coded as one.

Discordance in Future Fertility Intentions

Discordance in future fertility intentions was assessed by asking the woman whether she thought that her husband/partner wanted a/another child in the future. Similar to intentions regarding the terminated pregnancy, the husband/partner's future fertility intentions were analyzed relative to the woman's intentions in three categories: concordant (both wanted a/another child, both want no (more) children, or both are ambivalent), discordant – higher (woman wants no (more) children, while husband/partner wants a/another or is ambivalent, or woman is ambivalent while husband/partner wants a/another), and discordant – lower (woman wants a/another while husband/partner is ambivalent or wants no (more) children, or woman is ambivalent while her husband/partner wants no (more) children). Like intentions regarding the terminated pregnancy, the discordant – lower category was very small and was excluded from the analyses. Discordance in future fertility intentions was analyzed as a dichotomous variable with concordant intentions coded as zero and the discordant – higher category coded as one.

Women's Power within the Family

Four domains of women's power within the family were considered in this study: IPV, opposition to family planning, accompaniment to the health facility, and household decision-making.

Intimate Partner Violence

This study measured physical and sexual violence perpetrated by the husband or sexual partner in the past year. Violence experience was assessed using the standard questions from the 2007 Bangladesh DHS (NIPORT et al., 2009), which are based on the validated and widely used Conflict Tactics Scales (CTS2) (Straus et al., 1996). Women were asked, "In the past year has your husband/partner hit, kicked, slapped or otherwise physically hurt you?" and "In the past year, has your husband/partner physically forced you to have sexual intercourse with him even

when you did not want to?” (NIPORT et al., 2009). For each Aim in this dissertation, physical and sexual IPV were first analyzed as separate measures. The two measures were analyzed as a single measure of past year physical or sexual IPV when the associations were of similar magnitude and statistical significance in bivariate analyses. In Chapter 4, physical and sexual IPV were analyzed separately as dichotomous variables because physical IPV was associated with immediate acceptance of post-abortion contraception at the bivariate level, but sexual IPV was not. In Chapters 5 and 6, the associations were similar, and a single IPV measure was used. Past year IPV was dichotomized as experience of past year IPV equal to one if women experienced physical or sexual violence, and equal to zero if they did not experience either type of violence in the past year.

Opposition to Family Planning

Opposition to family planning use was assessed for the respondent’s husband/partner, in-laws and religion. Women were asked three yes/no questions: “Is your husband/partner opposed to you using family planning methods?”, “Are your in-laws opposed to you using family planning methods?”, and “Does your religion prohibit you from using family planning methods?” These were analyzed as three separate dichotomous variables indicating opposition to family planning use.

Accompaniment to the Health Facility

Accompaniment to the health facility for the UE procedure was assessed at baseline by asking, “Did anyone come with you to the health facility today?”, and women who responded yes were asked, “Who came with you?” Multiple responses were possible. Accompaniment was analyzed in three categories: none/alone if no one came with her, accompanied by husband/partner if she listed him as accompanying her, and accompanied by someone else if she said that someone came with her but did not list her husband/partner as accompanying her.

Household Decision-making

Household decision-making was assessed through a set of questions adapted from the 2011 Bangladesh DHS to include the role of in-laws in decision-making. Women were asked, “For each question, I would like for you to tell me whether the decision is usually made by you, your husband/partner, your in-laws, or someone else, or whether you make these decisions jointly with others.” (NIPORT et al., 2013). The questionnaire asked about decision-making for her healthcare and whether she should use a family planning method. Each measure was dichotomized to indicate whether she was involved in decision-making.

3.4.4. Uterine Evacuation Service Delivery Level Characteristics

UE service delivery characteristics include five measures: type of UE treatment, UE procedure type, post-abortion contraceptive counseling received, time spent in post-abortion contraceptive counseling, and facility/unit type where UE procedure was performed.

Type of UE treatment the woman received was categorized as MR, PAC for abortion, or PAC for miscarriage. Though we are able to delineate between PAC clients with induced versus spontaneous abortion, we are not able to ascertain whether women receiving PAC for abortion have attempted illegal abortion outside the health system, or if women are being seen for incomplete abortion or complications resulting from legal MR services. The PAC for abortion category is likely to include both groups as illegal abortion is equally as common as MR in Bangladesh, and it is estimated that 10% of women who receive MR services are treated for MR-related complications (Singh et al., 2012).

Women were asked about the procedure they received, categorized as manual vacuum aspiration (MVA), medication abortion (MA), or dilatation and curettage (D&C). We also assessed whether the woman received post-abortion contraceptive counseling as a dichotomous measure, and time

spent in post-abortion contraceptive counseling, categorized as none/no counseling received, less than five minutes, or five minutes or longer. The measures of post-abortion contraceptive counseling were not used in the analysis of immediate acceptance in Chapter 4 because there was a nearly 1:1 relationship between receipt of counseling and acceptance of a method, suggesting that post-abortion contraceptive counseling was a marker of contraceptive acceptance rather than a correlate. These measures are assessed as independent predictors of modern contraceptive use four months post-abortion in Chapter 5. The facility or unit type was identified based on the facility or unit where the baseline interview was conducted, and was analyzed as a dichotomous measure with DGHS facilities or units equal to zero and DGFP or RHSTEP clinics equal to one.

3.4.5. Socio-demographic Characteristics

The baseline questionnaire collected information on socio-demographic characteristics such as age, education, marital status, number of children, urban or rural residence, and religion. In addition, women were asked to report their husband's age and education. Standard socio-demographic questions from the 2011 Bangladesh DHS were used when possible (NIPORT et al., 2013). *Place of residence* was assessed by asking, "Do you currently live in a city, in a town, or in a village?", and women were categorized as urban residents if they lived in a city or town and rural residents if they lived in a village. *Rural to urban migrant* status was assessed by asking women if they had ever lived anywhere else, and if so, if they lived in a city, town or village. Women who reported that they currently lived in a town or city, but previously lived in a village were considered rural to urban migrants. *Household type* was classified as nuclear if the woman reported currently living with only her husband/partner and/or children and extended if she reported living with any other family members. The *husband/partner's place of residence* was also assessed at baseline by asking, "Is your husband/partner staying with you now, or is he staying somewhere else?" Husband/partner's residence was assessed as a dichotomous measure. The measure of *division* was based on the division of Bangladesh where the facility she attended

for her UE procedure and baseline interview was located, rather than asking the respondent to identify her division of residence.

3.5. DATA ANALYSIS

Data used for this dissertation were checked for consistency and completeness by field supervisors employed by the data collection partner, Bangladesh Association for Prevention of Septic Abortion (BAPSA). The questionnaires were then sent to the BAPSA office in Dhaka for entry into EpiData version 3.1 with built-in data validation (EpiData Association, Odense, Denmark). Finally, data were converted to Stata/SE 12.1 and checked again for consistency by research staff (StataCorp LP, College Station, TX).

3.5.1. Data Analysis: Aim 1

Aim 1 (Chapter 4) sought to understand factors associated with immediate post-abortion contraceptive acceptance and method selection. First, socio-demographic characteristics associated with the primary outcome of interest, immediate acceptance of post-abortion contraception, were assessed using an F-test from simple logistic regression models of each characteristic regressed on the outcome. Next, the bivariate association between each potential correlate of immediate acceptance was assessed using an F-test from simple logistic regression models. Potential correlates are presented in three levels: individual, family, and UE service delivery. All measures presented in this chapter were assessed as potential correlates of immediate post-abortion contraceptive acceptance, but results are only presented for correlates that were statistically significant at the bivariate level or considered to be key correlates based on the literature. In Chapter 4, correlates that were assessed but not presented include: measures of perceived access to family planning, opposition to family planning, accompaniment to the health facility, discordance with in-laws' intentions regarding the terminated pregnancy, and post-abortion contraceptive counseling. As described in the Measures section, characteristics of post-

abortion contraceptive counseling were highly correlated with immediate acceptance of post-abortion contraception, but these are not presented in Chapter 4 because counseling is hypothesized to be a marker of contraceptive acceptance rather than a correlate.

Grouped by level, potential correlates significant at $p < 0.05$ at the bivariate level were included in a separate multivariable logistic regression model for each level to assess the association with immediate post-abortion contraceptive acceptance. A full model is presented that includes correlates from all three levels. The level-specific and full logistic regression models adjusted for socio-demographic characteristics including age, education and number of children. Education was included as an *a priori* hypothesized confounder. Age, husband/partner's age, and number of children were associated with immediate acceptance, but husband/partner's age was excluded due to multicollinearity with the woman's age. Multicollinearity was assessed using the variance inflation factor (VIF), and the husband/partner's age was removed due to a VIF higher than three. In addition, type of treatment received (PAC for miscarriage, MR, or PAC for abortion) and facility/unit type (DGHS or DGFP/RHSTEP) were *a priori* hypothesized confounders, and all models adjusted for these variables. Adjusted odds ratios and 95% confidence intervals are presented for each model.

Though facility/unit type was adjusted for in the models, there was a concern that the association between UE procedure type and immediate post-abortion contraceptive acceptance differed fundamentally by the facility/unit type where the woman received UE care. Sensitivity analyses were conducted that stratified by facility/unit type to determine whether the bivariate association between UE procedure type and immediate acceptance remained. We found that this association held in both the DGHS facilities/units and the DGFP and RHSTEP facilities/units, and present the non-stratified results, still adjusting for facility/unit type as an *a priori* hypothesized confounder.

Post-abortion contraceptive method selection, the secondary outcome of interest, was assessed among the 348 women who had immediate acceptance of post-abortion contraception. The same three levels of potential correlates (individual, family, and UE service delivery) were assessed, and are presented by the post-abortion contraceptive method selected. An F-test was used to assess bivariate associations between each potential correlate and the outcome in simple multinomial logistic regression models. A *post hoc* analysis of the association between treatment type and method selected stratified by facility/unit type (DGHS or DGFP/RHSTEP) was conducted to understand whether the distribution of method selection by treatment type differed by facility type. The results of the *post hoc* analysis are discussed but not presented. Finally, the reason for method selection is presented by method.

3.5.2. Data Analysis: Aim 2

Aim 2 (Chapter 5) assessed predictors of modern contraceptive use four months post-abortion and timing of acceptance of modern contraception, using a similar analytic approach to Chapter 4. Socio-demographic characteristics are presented for the sample as a whole, and by modern contraceptive use at the four-month follow-up, the primary outcome of interest. An F-test from simple logistic regression models of each characteristic regressed on the outcome was used to test bivariate associations. Potential baseline predictors were then presented for the sample as a whole and by modern contraceptive use at the four-month follow-up. An F-test was used to assess bivariate associations between potential predictors and the outcome of interest in simple logistic regression models. Potential predictors are presented in three levels: individual, family, and UE service delivery. All measures were assessed as potential predictors of immediate post-abortion contraceptive acceptance, but results are only presented for predictors that were statistically significant at the bivariate level or considered to be key predictors based on the literature. In Chapter 5, predictors that were assessed but not presented include: measures of

perceived access to family planning, opposition to family planning, and discordance with in-laws' intentions regarding the terminated pregnancy.

Grouped by level, potential predictors significant at $p < 0.05$ at the bivariate level were included in a separate multivariable logistic regression model for each level to assess the association with modern contraceptive use at the four-month follow-up. A full model is presented that includes predictors from the two levels with bivariate associations (individual and UE service delivery). Both the level-specific and full logistic regression models were adjusted for socio-demographic characteristics associated with the outcome, including number of children and husband/partner's residence. In addition, models were adjusted for the woman's education, which was not associated with the outcome, but was an *a priori* hypothesized confounder. Multicollinearity in the multivariable models was assessed using the VIF, and was not found to affect the models. Adjusted odds ratios and 95% confidence intervals are presented for each model.

Timing of acceptance of modern contraception, the secondary outcome of interest, was assessed among the 340 women who were using modern contraception at the time of the four-month follow-up. Three levels of potential predictors (individual, family, and UE service delivery) were assessed, and are presented for the overall sample and by timing of acceptance. An F-test was used to assess bivariate associations between potential predictors and the outcome in simple logistic regression models. A *post hoc* analysis of IPV experience is presented by timing of acceptance and stratified by accompaniment to the health facility to clarify whether there is an interaction between experience of IPV and spousal accompaniment on timing of acceptance. To test the bivariate association between timing of acceptance of post-abortion contraception and IPV experience, an F-test was used from simple logistic regression models for each stratum.

3.5.3. Data Analysis: Aim 3

Aim 3 (Chapter 6) seeks to understand the intersection of IPV with other potential constraints to reproductive autonomy, and uses a different analytic approach. IPV is treated as the primary exposure of interest, and the other domains of reproductive autonomy are treated as outcomes. In addition, we assess outcomes related to women's reproductive health, including history of MR and UE care characteristics. Each outcome is presented for the full sample and by IPV experience. Multivariable models were used to test the association between experience of IPV and each outcome measure, adjusting for socio-demographic characteristics associated with IPV. Adjusted prevalence ratios, the equivalent of risk ratios for cross-sectional studies, were calculated using multinomial logistic regression models for categorical outcome measures and generalized linear models using log-binomial maximum likelihood estimators for dichotomous outcome measures. The Poisson distribution was specified if the model failed to converge using the binomial distribution. This is a conservative approach, which is expected to result in valid point estimates with confidence intervals that are wider than those that would result from the log-binomial estimates (Spiegelman & Hertzmark, 2005). For the generalized linear models, 95% confidence intervals were hand-calculated by transforming the endpoints; this approach was used to match the confidence intervals calculated by Stata for the multinomial logistic regression models (Sribney & Wiggins, 2009). Adjusted prevalence ratios and 95% confidence intervals are presented for the association between IPV and each outcome measure assessed. All multivariable models adjusted for age, education, and rural to urban migrant status. Age and education were included as *a priori* hypothesized confounders. Rural to urban migrant status and division of residence were associated with IPV, but division was excluded due to the small number of facilities sampled in Chittagong and Rajshahi divisions. Sensitivity analyses were conducted, and division was excluded because adjusting for division in addition to accounting for the complex survey design led to unstable models with wide confidence intervals.

3.5.4. Power Calculations

Power calculations were performed for each bivariate association with the primary outcomes of interest using the DSS Research Statistical Power Calculator (DSS Research, Arlington, VA) (Table 3.3). For each association, a two sample, two-tail test was performed using an alpha of 0.05. Power calculations demonstrate that for some variables such as household decision-making there was not enough power to detect a difference between groups. However, we were powered for the key analyses presented in the dissertation.

3.5.5. Missing Data

Missing data in the analytic samples were addressed in two ways. For variables with less than 2% of cases missing, values were imputed to the mean. For variables with more than 2% of observations missing (up to a maximum of 8% missing), multiple imputation was used. Multiple imputation is the completion of missing values with multiple plausible values, which allows for uncertainty in missing data (Rubin, 1996). Multiple imputation is expected to yield more statistically valid results than mean value imputation, complete case or available data analysis (Rubin, 1996). A separate multiple imputation dataset was created for each chapter of this dissertation using the appropriate analytic sample.

In Chapter 4, two variables were multiply imputed, experience of past year physical IPV and experience of past year sexual IPV. In Chapter 5, the combined measure of IPV was multiply imputed. For each analytic sample ten imputations were generated with multivariate imputation using chained equations (MICE) (White & Carlin, 2010). The multivariate imputation model included the outcome variable, all variables considered potential predictors, socio-demographic characteristics, and variables used to identify the sampling clusters and strata (Rubin, 1996).

In Chapter 6, five outcome measures had more than 2% missing data, and were multiply imputed: husband/partner's opposition to family planning use, religious prohibition of family planning use, difficulty obtaining family planning, expense of obtaining family planning, and inconvenience of family planning use. Because these were outcome variables to be used in separate models, univariate imputation was used to generate ten imputations for each outcome measure. The imputation models included IPV as the exposure of interest, socio-demographic characteristics, and variables used to identify the clusters and strata. Analysis was conducted only on the ten imputations associated with each imputed outcome measure.

All analyses were conducted on the multiple imputation datasets using Stata/SE 12.1 accounting for the complex survey design, including non-independence of respondents within facilities and facility type strata. Survey weights were not used because oversampling resulting from the sampling plan was not expected to affect the associations of interest.

3.6. ETHICAL CONSIDERATIONS

3.6.1. Risk-benefit Analysis

Risks to women included discussion of potentially difficult topics such as violence experience and information about her MR or PAC procedure. To minimize risks, the study employed female interviewers and provided them with a one-week training, which included informed consent procedures, rapport-building, and techniques for interviewing on sensitive topics. White noise machines were used in facilities without appropriate auditory privacy to mitigate the risks to participant confidentiality at the time of the baseline interview within the health facility. Risks to women varied based on their selected method of follow-up. Women were given the option to complete their follow-up interview face-to-face in a place of the woman's choosing, or to complete it via telephone. With both follow-up methods there was a risk that others would learn of their participation in the study, but these risks were minimized by providing women with the

choice of how to provide the follow-up interview. Steps were taken to ensure privacy during the follow-up interview, regardless of the method of follow-up.

This study did not directly benefit individual participants. However, the study results will be used to indirectly benefit UE clients in Bangladesh by providing more information about the predictors of post-abortion contraceptive use so that programs can be designed to meet their needs. Results will also be used directly by Ipas Bangladesh to improve provider training on post-abortion contraception and to inform the program's community outreach strategy. Study results will also be shared with the Bangladesh Ministry of Health and Family Welfare, which may use the results to further improve post-abortion contraceptive provision in government health facilities. Study results will also be shared with the international community through journal manuscripts, which may benefit women more broadly by contributing to the evidence base on post-abortion contraception and constraints to reproductive autonomy.

3.6.2. Participant Incentives

Women participating in the study received 200 Bangladeshi Taka (\$2.50) at enrollment and an additional 200 Bangladeshi Taka (\$2.50) at the time of their follow-up interviews.

3.6.3. Ethical Approval

This dissertation was conducted under a parent study carried out by Ipas, an international NGO focusing on prevention of unsafe abortion, to understand patterns of post-abortion contraceptive use among short-acting method users. All study procedures received ethical approval from the Bangladesh Medical Research Council in Dhaka and the Allendale Investigational Review Board in the United States. This study was submitted for review by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) (IRB Number: 00005702), and the IRB

determined that review was not required because Erin Pearson was listed as a researcher on the original protocol for the parent study being conducted by another institution.

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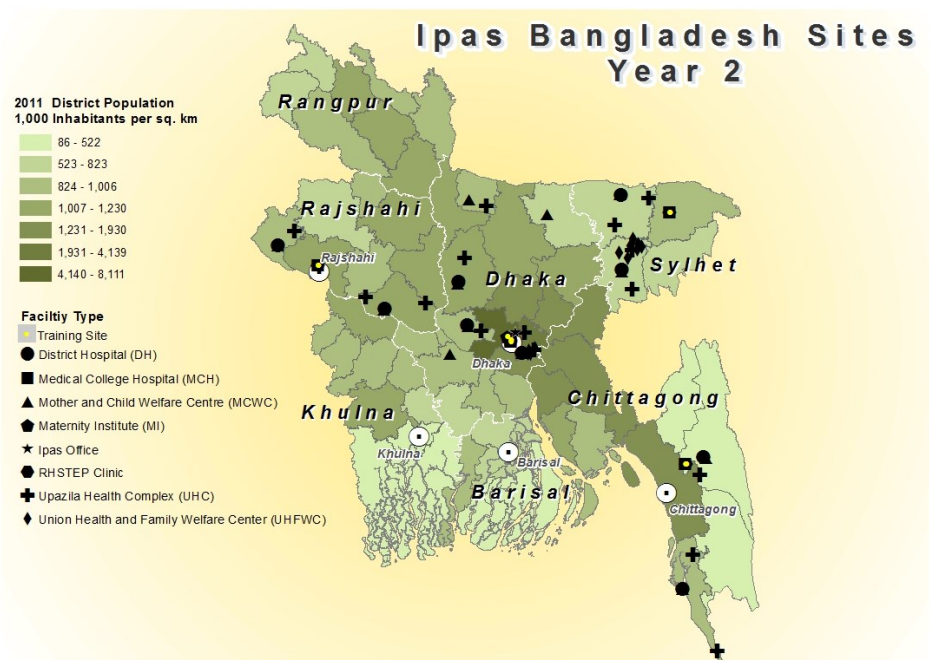
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Figure 3.1. Map of public sector facilities receiving Ipas intervention, 2013



“Ipas Bangladesh Sites: Year 2” by Ipas

Figure 3.2. Eligibility for inclusion in each analytic sample

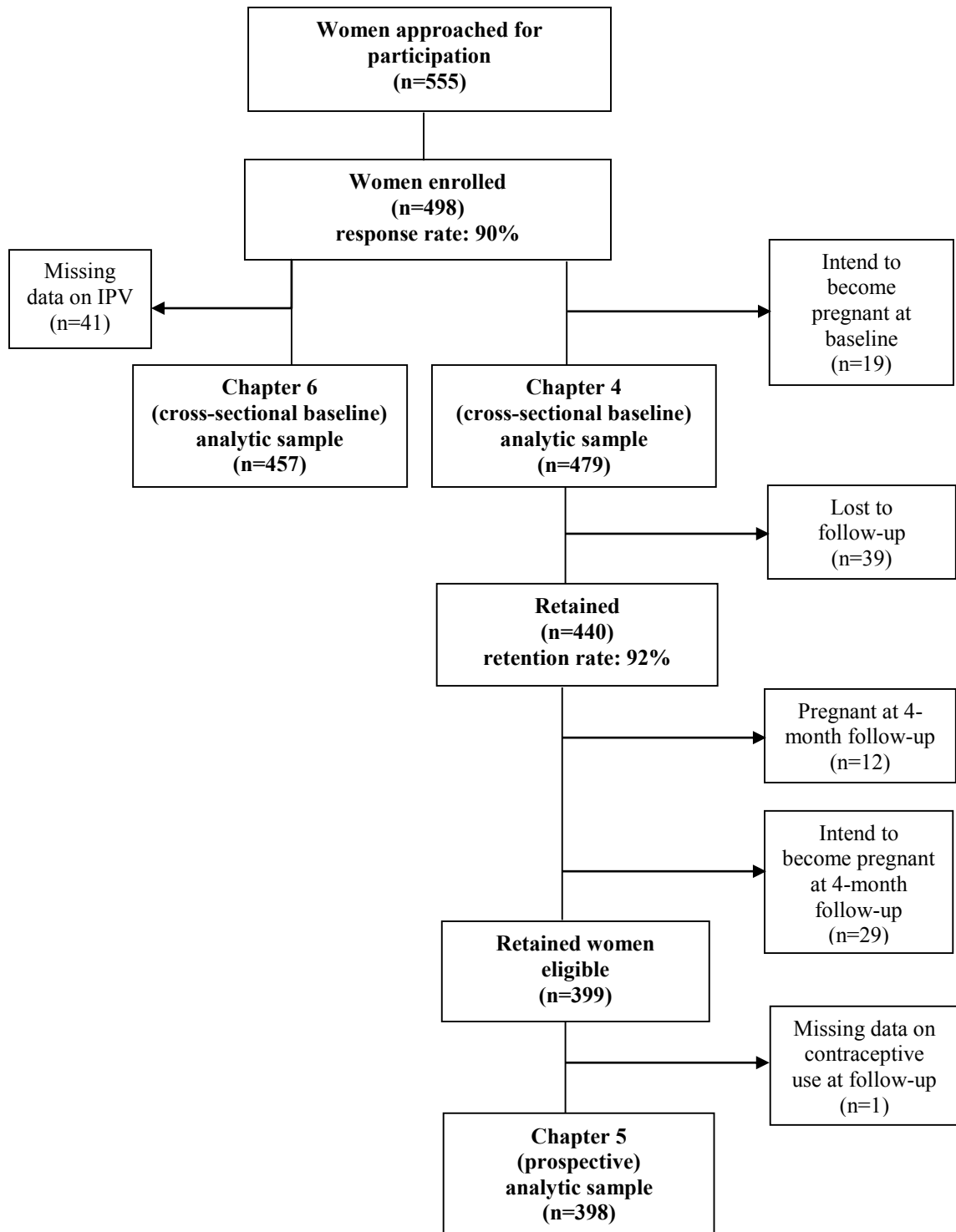


Table 3.1. Number of facilities and women enrolled and retained by facility type strata

Facility Type	Number of facilities selected	Number of women enrolled		Number of women retained		Effective sample size ^b
		Anticipated	Actual	Anticipated ^a	Actual	
Primary	5	125	126	88	110	55
Secondary	4	125	121	88	118	59
Tertiary	3	125	127	88	119	60
RHSTEP clinics	4	125	124	88	109	54
Total	16	500	498	352	456	228

^a Assuming a follow-up rate of 70%.

^b Based on actual number of women retained, assuming a design effect of 2.

Table 3.2. Definitions and sources of key variables

Variable	Question	Source	Definition
Chapter 4			
Primary outcome: Short-acting post-abortion contraceptive acceptance	Did you choose a method to prevent pregnancy today? If yes: Which primary method did you choose?	Baseline questionnaire	Calculated among all women: 0=Did not accept a method 1=Accepted a short-acting method
Secondary outcome: Short-acting post-abortion contraceptive method selected	Which primary method did you choose?	Baseline questionnaire	Calculated among women who accepted a method: 0=Pills 1=Condoms 2=Injectables
Chapter 5			
Primary outcome: Use of modern contraception at four months post-abortion	Are you or your husband/partner currently using anything to avoid pregnancy? If yes: What method(s) are you currently using?	Follow-up questionnaire	Calculated among all women who completed a follow-up interview: 0= No modern method use at the time of follow-up 1=Any modern method use at the time of follow-up
Secondary outcome: Timing of acceptance of modern contraception	At baseline: Did you choose a method to prevent pregnancy today? At follow-up: Are you or your husband/partner currently using anything to avoid pregnancy?	Baseline and Follow-up questionnaires	Calculated among women who were using modern contraception at follow-up: 0=Immediate acceptors 1=Delayed acceptors
Chapter 6			
Exposure of interest: Past year intimate partner violence (IPV)	Physical IPV: In the past year has your husband/partner hit, kicked, slapped or otherwise physically hurt you? Sexual IPV: In the past year, has your husband/partner physically forced you to have sexual intercourse with him even when you did not want to?	Baseline questionnaire	Calculated among women who answered both violence questions: 0=No experience of IPV in the past year 1=Experience of physical or sexual IPV in the past year

Table 3.3. Power calculations for bivariate associations with each primary outcome measure

Outcome Measure	Predictor	Power
Chapter 4		
Short-acting post-abortion contraceptive acceptance	UE procedure type MVA (ref) MA D&C	100% 100%
	Type of treatment received PAC for miscarriage (ref) MR PAC for abortion	99% 5%
	Facility/unit type DGHS (ref) DGFP or RHSTEP	99%
	Family planning use at the time of terminated pregnancy Not using family planning (ref) Using family planning	52%
	Mean avoidance score for terminated pregnancy	100%
	Woman's intentions regarding terminated pregnancy Wanted then or ambivalent (ref) Mistimed or unwanted	96%
	Husband/partner's relative pregnancy intentions for terminated pregnancy Concordant (ref) Discordant - Higher	81%
	Woman's future pregnancy intentions Want a/another child or ambivalent (ref) Want no (more) children	91%
	Husband/partner's relative future pregnancy intentions Concordant (ref) Discordant - Higher	4%
	Decision-making for family planning use Not involved (ref) Involved	9%
	Decision-making for her healthcare Not involved (ref) Involved	16%
	Physical intimate partner violence in past year No IPV (ref) IPV	93%
	Sexual intimate partner violence in past year No IPV (ref) IPV	45%

Outcome Measure	Predictor	Power
Chapter 5		
Use of modern contraception at four months post-abortion	Family planning use at the time of terminated pregnancy Not using family planning (ref) Using family planning	98%
	Mean avoidance score for terminated pregnancy	87%
	Woman's intentions regarding terminated pregnancy Wanted then or ambivalent (ref) Mistimed or unwanted	78%
	Husband/partner's relative pregnancy intentions for terminated pregnancy Concordant (ref) Discordant - Higher	5%
	Woman's future pregnancy intentions Want a/another child or ambivalent (ref) Want no (more) children	34%
	Husband/partner's relative future pregnancy intentions Concordant (ref) Discordant - Higher	21%
	Facility/unit type DGHS (ref) DGFP or RHSTEP	58%
	Type of treatment received PAC for miscarriage (ref) MR PAC for abortion	66% 63%
	UE procedure type MVA (ref) MA D&C	7% 36%
	Post-abortion contraceptive counseling received Not received (ref) Received	7%
	Accepted post-abortion contraceptive method at baseline Did not accept (ref) Accepted	51%
	Decision-making for family planning use Not involved (ref) Involved	31%
	Decision-making for her healthcare Not involved (ref) Involved	6%
	Physical intimate partner violence in past year No IPV (ref) IPV	21%

	Sexual intimate partner violence in past year No IPV (ref) IPV	8%
	Accompaniment to health facility for UE procedure Unaccompanied/alone (ref) Husband accompanied Someone else accompanied	4% 5%
Chapter 6		
Husband/partner's relative pregnancy intentions for terminated pregnancy	Past year IPV No IPV (ref) IPV	85%
In-laws' relative pregnancy intentions for terminated pregnancy		98%
Husband/partner's relative future pregnancy intentions		78%
Accompaniment to health facility for UE procedure		Husband: 61% Unaccompanied/alone: 65% Someone else: 14%
Husband/partner opposes family planning use		39%
In-laws oppose family planning use		95%
Religion prohibits family planning use		71%
Decision-making for family planning use		19%
Decision-making for her healthcare		35%
Family planning is too difficult to obtain		53%
Family planning is too expensive		84%
Family planning is too inconvenient to use		84%
History of previous MR		79%
Type of treatment received		MR: 99% PAC for abortion: 90% PAC for miscarriage: 12%
UE procedure type		MVA: 30% MA: 90% D&C: 5%
Post-abortion contraceptive method accepted at baseline		None: 91% Pills: 86% Condoms: 5% Injectables: 5%

CHAPTER 4:
FACTORS ASSOCIATED WITH IMMEDIATE POST-ABORTION CONTRACEPTIVE
ACCEPTANCE AND METHOD SELECTION AMONG UTERINE EVACUATION
CLIENTS IN BANGLADESH

4.1. ABSTRACT

The World Health Organization recommends provision of post-abortion contraception on the day of the uterine evacuation (UE) procedure as an effective strategy for reducing subsequent unwanted pregnancy and abortion. Bangladesh has a pregnancy termination rate that is considerably higher than the average for South Asia, making it an important setting for understanding the dynamics of post-abortion contraceptive use. The objective of this study was to examine the factors associated with acceptance of short-acting post-abortion contraception on the day of the UE procedure and method choice in Bangladesh. This cross-sectional analysis of baseline data was conducted on a facility-based sample of 479 UE clients aged 18-49 who did not intend pregnancy within the four months following their procedure. Findings suggest that immediate post-abortion contraceptive acceptance and method selection is associated with factors related to UE service delivery practices and relationship dynamics with a woman's husband/partner. Women receiving medication abortion (MA) and dilatation and curettage (D&C) had significantly lower odds of immediate acceptance of post-abortion contraception (AOR=0.07; 95% CI: 0.02 – 0.29 and AOR=0.18; 95% CI: 0.07 – 0.45, respectively), compared to women whose procedures were performed using manual vacuum aspiration (MVA). The post-abortion contraceptive method a woman selected was also associated with UE service delivery characteristics, including procedure type and facility type. Findings also suggest that women who have differing fertility intentions from their husband/partner are less likely to accept a post-abortion contraceptive method on the day of their procedures. Interventions should focus primarily on providers to ensure that women are counseled according to their needs and medical eligibility, and have access to their choice of post-abortion contraceptive methods, regardless of the UE service received.

4.2. BACKGROUND

Unwanted pregnancy is a significant contributor to maternal death and disability globally. It is estimated that if unplanned and unwanted pregnancy were prevented using family planning, 25-40% of maternal deaths could be averted (Campbell and Graham, 2006). Additionally, use of effective family planning methods could avert 90% of abortion-related morbidity and mortality among women who want to space or limit their births (Collumbien et al., 2004). Provision of post-abortion contraception is an effective way of reducing subsequent unwanted pregnancy and abortion (World Health Organization, 2012). Women can become at risk for pregnancy as soon as two weeks after their abortion procedures (World Health Organization, 2012). As a result, the current World Health Organization (WHO) guidelines on safe abortion care recommend that all uterine evacuation (UE)² clients receive information, counseling and family planning methods before leaving the health facility (World Health Organization, 2012). All family planning methods can be initiated immediately following a first trimester surgical abortion procedure using methods such as manual vacuum aspiration (MVA) or electric vacuum aspiration (EVA) (World Health Organization, 2012). For women who receive medication abortion (MA), hormonal methods can be initiated after the woman takes the first pill of the MA regimen, but intrauterine device (IUD) insertion and sterilization should be delayed until the abortion is confirmed to be complete (World Health Organization, 2012).

The total fertility rate (TFR) in Bangladesh is in decline, and is currently near replacement level fertility at 2.3 children per woman (NIPORT et al., 2013). Bangladesh has been successful in improving access to contraception through community-based distribution of short-acting methods, including oral contraceptive pills and condoms, and currently over 50% of married

² In this study, the term uterine evacuation (UE) will be used to include both induced abortion and post-abortion care (PAC) procedures. PAC procedures treat incomplete abortion resulting from either induced or spontaneous abortion (miscarriage).

women of reproductive age in Bangladesh use a modern method of contraception (Cleland et al., 2006; NIPORT et al., 2013). Also contributing to the fertility decline is the pregnancy termination rate, which is considerably higher than the average for South Asia, 37 per 1,000 women of reproductive age in Bangladesh compared to 26 per 1,000 women in South Asia (Singh et al., 2012; Sedgh et al., 2012). Although the law in Bangladesh restricts abortion except to save the life of a woman, since 1979 menstrual regulation (MR)³ has been allowed to induce menstruation and thus to establish non-pregnancy up to 10 weeks from the beginning of the last menstrual period (Bart Johnston et al., 2010). Despite availability of MR services, unsafe induced abortion still occurs in Bangladesh due to economic, cultural and informational barriers limiting women's access to safe MR services, as well as some gaps in quality of care (Singh et al., 1997; Bart Johnston et al., 2010). Post-abortion care (PAC) to treat incomplete abortion resulting from miscarriage or an induced abortion attempt is offered in public health facilities to meet the needs of these women. A recent study by the Guttmacher Institute found that among government facilities that provide MR services, post-abortion contraception is only provided to half of MR patients (Vlassoff et al., 2012). Post-abortion contraceptive provision is less common for PAC patients; only 34% of facilities that offered PAC services also offered contraceptive methods (Vlassoff et al., 2012). Though MR and PAC services are available in the public sector, provision of post-abortion contraception has been poor in these facilities. Scale-up of post-abortion contraception through the public sector requires an understanding of the factors associated with acceptance after an MR or PAC procedure.

In understanding post-abortion contraception, the type of method selected also has implications for preventing future unwanted pregnancies and abortions. Modern contraceptive methods can be

³ Though menstrual regulation (MR) is performed without confirming pregnancy and can theoretically be performed to address menstrual disturbances other than pregnancy, this study will consider MR to be equivalent to induced abortion.

categorized into permanent methods such as sterilization, long-acting and reversible contraception (LARC) including IUDs and implant, and short-acting methods such as condoms, oral contraceptive pills and injectables. Though short-acting methods have lower rates of effectiveness and higher rates of discontinuation compared to LARC methods, they are the most widely used methods both in the post-abortion and general populations (Cleland et al., 2006; Roberts et al., 2010). Currently, short-acting methods make up over 80% of the post-abortion contraceptive method mix in Bangladesh; oral contraceptive pills account for 47%, while injectables account for 20%, and condoms account for 15% (Ipas, 2013), which is a similar method mix to what is observed in the general population (NIPORT et al., 2013). Though short-acting methods can be 98-99% effective with correct and consistent use, some methods are more prone to user error than others, and effectiveness falls to 85% for condoms compared to 95% for pills and 97% for injectables as commonly used (World Health Organization, 2013). As a result, understanding method selection is important for predicting the potential success of post-abortion contraception in reducing subsequent unwanted pregnancies.

The factors associated with post-abortion contraceptive acceptance and method selection have not been studied in Bangladesh, but studies from other settings provide information about potentially important correlates. Findings from other developing countries indicate socio-demographic characteristics, specifically older age, urban residence, more education, exposure to mass media, and having at least one child were associated with post-abortion contraceptive acceptance (Zavier and Padmadas, 2012; Tavrow et al., 2012). Fertility intentions, especially intentions to limit childbearing, are associated with post-abortion contraceptive continuation (Akhter, 1987), but less is known about the role of fertility intentions in post-abortion contraceptive acceptance. Reproductive health characteristics such as previous experience with family planning and abortion are also associated with post-abortion contraceptive acceptance. Among post-abortion clients in Kenya, prior contraceptive use was associated with an increase in the odds of

acceptance (AOR=10.3; 95% CI: 4.1-25.6) (Tavrow et al., 2012), and studies in India and Kenya have found that a previous pregnancy termination was associated with an increased odds of post-abortion contraceptive acceptance (Zavier and Padmadas, 2012; Tavrow et al., 2012). Abortion procedure type is also associated with acceptance, with MA clients having delayed method initiation over the month following abortion compared to MVA clients in India (Kalyanwala et al., 2012).

Correlates of contraceptive use in the general population in Bangladesh can also provide information about factors potentially associated with post-abortion contraceptive acceptance in this setting. In Bangladesh, socio-demographic characteristics such as older age, higher levels of education, more living children, practicing a religion other than Islam, being exposed to mass media, currently working, and belonging to a non-governmental organization (NGO) are associated with current contraceptive use (Kamal & Islam, 2010; Kabir et al., 2013; Goni & Rahman, 2012; Kamal, 2011; Schuler et al., 1997). Family characteristics, including women's power within the family, have been shown to be associated with contraceptive use in the general population in Bangladesh, which demonstrates the important role that husbands and in-laws play in women's reproductive lives. For example, a woman discussing family planning with her husband was found to be the most important factor in current contraceptive use among married women in rural Bangladesh (OR=4.4; 95% CI: 4.0-5.0) (Kamal & Islam, 2010). In addition, women are less likely to use contraception if they perceive that their husbands do not approve of contraceptive use (Kamal, 2000; DeGraff, 1991). Evidence also suggests that intimate partner violence (IPV) is associated with unwanted pregnancy and abortion in Bangladesh and other South Asian countries (Silverman et al., 2007; Edmeades et al., 2010), and may have implications for post-abortion contraceptive use.

Guided by the social-ecological model, the present study explores factors associated with post-abortion contraceptive acceptance and method selection among UE clients in Bangladesh. Moving beyond the socio-demographic factors characteristics identified in the literature and extending past research into the domains of family relationships and UE service delivery, this study focuses on characteristics at three levels: individual, family, and UE service delivery.

4.3. METHODOLOGY

This cross-sectional analysis of baseline data uses data from a prospective parent study that aimed to understand post-abortion contraceptive use among short-acting method acceptors over the four months following a UE procedure. The parent study enrolled a facility-based sample of 498 UE clients aged 18-49 years. The parent study received ethical approval from the Bangladesh Medical Research Council in Dhaka and the Allendale Investigational Review Board in the United States. This study was submitted for review by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) (IRB Number: 00005702), and the IRB determined that review was not required because Erin Pearson was listed as a researcher on the original protocol for the parent study being conducted by another institution.

4.3.1. Sample

A stratified one-stage cluster sampling approach was used to select women for the parent study. There are 5,301 public sector facilities in Bangladesh where UE services are provided (Vlassoff et al., 2012). The sample was drawn from among the 47 government and NGO facilities receiving an intervention to train providers in woman-centered UE service provision and to ensure that appropriate equipment and infection prevention supplies were available. Compared to the broader group of facilities where UE services are provided, facilities included in this study are more likely to be in urban settings such as Dhaka. Government facilities sampled for this study

included both those under the auspices of the Directorate General of Family Planning (DGFP) and the Directorate General of Health Services (DGHS). In addition, NGO-run sexual and reproductive health clinics called RHSTEP clinics were included. Historically, MR services have been provided in RHSTEP clinics and DGFP facilities or units within lower level health facilities, and PAC services have been provided in DGHS facilities or units. Because contraceptive commodities are procured through DGFP rather than DGHS, provision of post-abortion contraception for PAC clients has been poor (Vlassoff et al., 2012). Integration of MR, PAC and post-abortion contraceptive services in RHSTEP, DGFP and DGHS facilities was a goal of the intervention, and because all participating facilities received the intervention, study participants received approximately similar quality of care in UE service and post-abortion contraceptive provision, including access to at least two modern methods of contraception. Facilities were stratified by type (primary, secondary, tertiary, and RHSTEP clinics), and 16 were randomly selected using probability proportional to size (PPS) sampling within facility type strata.

Within selected facilities, all women receiving MR or PAC services were screened for study eligibility. Inclusion criteria for study participation included: 18-49 years of age; received MR or PAC services using any procedure; and accepted pills, injectables, or condoms as a post-abortion contraceptive method, or selected no contraceptive method. Women who selected a long-acting or permanent post-abortion contraceptive method were ineligible for participation in the parent study. A total of 555 women were approached for study participation and 498 were enrolled; the response rate was 90%. Nineteen respondents were excluded from the present analysis because they reported at baseline that they intended to become pregnant within the next four months. The analytic sample consisted of the 479 respondents who did not intend to become pregnant within the four months following their UE procedure. Women completed a quantitative interviewer-administered survey at the health facility after their UE procedure, and a follow-up survey four months after their procedure. Surveys were conducted in Bangla and lasted 30-45 minutes.

Questionnaires were developed in English and translated to Bangla. The questionnaires were back-translated and pilot-tested, and adjustments were made as necessary. Parent study data collection occurred from March-October 2013.

4.3.2. Measures

The two outcome measures assessed in this study were acceptance of post-abortion contraception and the short-acting post-abortion contraceptive method selected. *Immediate acceptance* was assessed by asking the woman, “Did you choose a method to prevent pregnancy today?” If she responded yes, she was asked, “Which primary method did you choose?” Women were coded as being an acceptor if they selected a short-acting method (pills, condoms or injectables), and women who did not select a method were considered non-acceptors. The *method that the woman selected* was coded as a categorical variable identifying her as a pill, condom or injectable acceptor.

Potential factors associated with post-abortion contraceptive acceptance and method selection were assessed at three levels: individual, family, and UE service delivery. At the individual level, history of MR and fertility intentions for the terminated pregnancy and future pregnancies were considered. *History of MR* was analyzed as a dichotomous measure indicating whether the woman had ever used MR before the day of her UE procedure. Intentions regarding the terminated pregnancy were assessed using three measures. First, women were asked whether they were *using family planning at the time they became pregnant* to assess contraceptive behavior prior to pregnancy. Second, *pregnancy avoidance* was measured by showing women a scale on a card and asking, “Please look at the scale on the card. On this scale, a 1 means that you did not want to avoid pregnancy, and 10 means you wanted very much to avoid pregnancy. Which number on the card best describes how much you wanted to avoid pregnancy at the time you became pregnant?” (Centers for Disease Control, 2008). Pregnancy avoidance was analyzed

as a continuous variable (range: 1-10), with a higher score indicating stronger pregnancy avoidance. Third, *intentions regarding the terminated pregnancy* were assessed directly by asking women, “Right before you became pregnant, did you want to become pregnant then, did you want to wait until later, did you not want to have any (more) children, or did you not think about it?” (Institut National D’etudes Demographiques, 2010). The woman’s intentions regarding the terminated pregnancy were dichotomized with pregnancy wanted then or ambivalent about timing of the pregnancy equal to zero and pregnancy mistimed or unwanted equal to one. *Future pregnancy intentions* were assessed by asking whether she wanted a/another child in the future, and this measure was dichotomized as want a/another child in the future or ambivalent equal to zero, and want no (more) children equal to one.

At the family level, discordance in fertility intentions, and two domains of women’s power within the family, intimate partner violence (IPV) and household decision-making, were assessed. Discordance in fertility intentions between the woman and her husband/partner were assessed both for the terminated pregnancy and future pregnancies. To assess *discordance in intentions regarding the terminated pregnancy* women were asked, “Right before you became pregnant, did your husband/partner want you to become pregnant then, did he want to wait until later, did he not want to have any (more) children, or he did not think about it?” The husband/partner’s intentions were ordered from highest to lowest desire for fertility (wanted then, ambivalent, mistimed or unwanted) and analyzed in three categories relative to the woman’s intentions based on the work done by Schoen et al. (1999): concordant, discordant – higher, and discordant – lower. To assess *discordance in future fertility intentions*, women were asked about their husband/partner’s future pregnancy intentions, which were similarly ordered from highest to lowest desire for fertility (want a/another child, ambivalent, or want no (more) children) and analyzed relative to the woman’s intentions: concordant, discordant – higher, and discordant – lower. The discordant – lower category was excluded from the analysis for both measures of

discordance due to the small number of respondents in this category. *Experience of physical IPV* was assessed using the standard question from the 2007 Bangladesh DHS (NIPORT et al., 2009), which is based on the validated and widely used Conflict Tactics Scales (CTS2) (Straus et al., 1996). Women were asked, “In the past year has your husband/partner hit, kicked, slapped or otherwise physically hurt you?” (NIPORT et al., 2009). *Sexual IPV* was measured by asking, “In the past year, has your husband/partner physically forced you to have sexual intercourse with him even when you did not want to?” (NIPORT et al., 2009). Physical and sexual IPV were analyzed as separate dichotomous measures. *Household decision-making* was assessed through two questions adapted from the 2011 Bangladesh Demographic and Health Survey (DHS) (NIPORT et al., 2013). Women were asked, “For each question, I would like for you to tell me whether the decision is usually made by you, your husband or partner, your in-laws, or someone else, or whether you make these decisions jointly with others.” (NIPORT et al., 2013). Decision-making regarding her healthcare and whether she should use a family planning method were dichotomized to indicate whether or not she was involved in each type of decision-making.

UE service delivery characteristics included the type of UE service received, procedure type, and facility or unit type where they received their UE procedures. Women were asked about the *type of UE service they received*, and this was categorized as MR, PAC for abortion, or PAC for miscarriage. Women were also asked about their *procedure method*, which was categorized as manual vacuum aspiration (MVA), medication abortion (MA), or dilation and curettage (D&C). The *facility or unit type* was identified based on the facility or unit where the baseline interview was conducted, and was analyzed as a dichotomous measure with DGHS facilities or units equal to zero and DGFP or RHSTEP clinics equal to one.

The questionnaire also collected information on socio-demographic characteristics, and standard questions from the 2011 Bangladesh DHS were used when possible (NIPORT et al., 2013). Place

of residence was assessed by asking, “Do you currently live in a city, in a town, or in a village?”, and women were categorized as urban residents if they lived in a city or town and rural residents if they lived in a village. Migration was assessed by asking women if they had ever lived anywhere else, and if so, whether they had lived in a city, town or village. Women who reported that they currently lived in a town or city, but previously lived in a village were considered rural to urban migrants. Each woman was also asked about her husband or partner’s age and education. Household type was classified as nuclear if she reported currently living with only her husband/partner or children and extended if she reported living with any other family members. The measure of division was based on the division of Bangladesh where the facility she attended for her UE procedure was located.

Finally, women were asked about their reasons for selecting their post-abortion contraceptive method, including whether she chose it because the counselor recommended it, her husband/partner wanted to use it, she had used it before, she knew someone who had used it before, or because she heard about it through mass media. Women were asked about each reason separately, and multiple reasons could be listed.

4.3.3. Data Analysis

Socio-demographic characteristics are presented for the sample as a whole and by post-abortion contraceptive acceptance. Potential correlates were analyzed in three levels (individual, family, and UE service delivery) and are presented for the sample as a whole and by post-abortion contraceptive acceptance. An F-test was used to assess bivariate associations between potential correlates of immediate post-abortion contraceptive acceptance in simple logistic regression models. Significance was assessed at an alpha of 0.05 for all analyses.

Grouped by level, potential correlates significant at $p < 0.05$ at the bivariate level were included in a separate multivariable logistic regression model for each level to assess the association with immediate post-abortion contraceptive acceptance. A full model is presented that includes correlates from all three levels. The level-specific and full logistic regression models adjusted for socio-demographic characteristics including age, education and number of children. Education was included as an *a priori* hypothesized confounder. Age, husband/partner's age, and number of children were associated with the outcome, but husband/partner's age was excluded due to multicollinearity with the woman's age. Multicollinearity was assessed using the variance inflation factor (VIF), and the husband/partner's age was removed due to a VIF higher than three. In addition, type of treatment received (PAC for miscarriage, MR, or PAC for abortion) and facility/unit type (DGHS or DGFP/RHSTEP) were *a priori* hypothesized confounders, and all models adjusted for these variables. Adjusted odds ratios and 95% confidence intervals are presented for each model.

Post-abortion contraceptive method selection, the secondary outcome of interest, was assessed among the 348 women who had immediate acceptance of post-abortion contraception. The same three levels of potential correlates (individual, family, and UE service delivery) were assessed, and are presented by the post-abortion contraceptive method selected. An F-test was used to assess bivariate associations between potential predictors and the outcome in simple multinomial logistic regression models. *Post hoc* analysis of the association between treatment type and method selected stratified by facility/unit type (DGHS or DGFP/RHSTEP) was conducted to understand whether the distribution of method selection by treatment type differed by facility type. The results of the *post hoc* analysis are discussed but not presented. Finally, the reason for method selection is presented by method.

Missing data for the potential correlates were addressed in two ways. For variables missing data on less than 2% of observations, mean value imputation was used. For two variables (experience of physical IPV and experience of sexual IPV) approximately 8% of observations were missing, and multiple imputation was used. Ten imputations were generated with multivariate imputation using chained equations (MICE) (White & Carlin, 2010). The multivariate imputation model included the outcome variables, all variables considered potential correlates, socio-demographic characteristics, and variables used to identify the clusters and strata. All analyses were conducted on the multiple imputation dataset using Stata/SE 12.1, accounting for the complex survey design.

4.4. RESULTS

Women enrolled in the study were age 27 on average, 56.4% had secondary or higher education, and 82.3% had at least one child (Table 4.1). Women reported that their husbands/partners were age 35 on average, and 55.1% had secondary or higher education. Almost all women were currently married (99.8%), and 89.8% were Muslim, while 10.0% were Hindu and less than 1% were Buddhist. More than half of the sample (57.0%) lived in urban areas, and almost one quarter of respondents (23.6%) were rural to urban migrants. Almost half of the respondents (47.6%) were from Dhaka division, while 23.6% were from Sylhet, 16.3% from Rajshahi, and 12.5% from Chittagong. Almost three-quarters (72.7%) of women in the sample accepted a post-abortion contraceptive method on the day of their UE procedure. Immediate post-abortion contraceptive acceptance was associated with age of the woman; the average age was 27.9 years for women who had immediate acceptance, compared to 26.1 years for those who did not accept a method on the day of their UE procedure ($p=0.004$). Similarly, age of the husband/partner was associated with acceptance; the husband/partner was an average of 35.5 years among women who had immediate acceptance, compared to 33.5 years among those who did not ($p=0.016$). The number of children a woman had was also associated with acceptance. Only 57.6% of

nulliparous women had immediate acceptance, compared to 74.6% of women with one or two children, and 78.7% of women with three or more children ($p=0.004$).

At the bivariate level, post-abortion contraceptive acceptance was associated with potential correlates in all three levels (Table 4.2). Both intentions regarding the terminated pregnancy and future fertility intentions were associated with immediate acceptance. Women who accepted a method had an average avoidance score of 7.6 for the terminated pregnancy, while women who did not accept a method had an average score of 5.5 ($p=0.045$). In addition, 79.7% of women who wanted no more children accepted a method, compared to 66.1% of women who want another child in the future or are ambivalent about wanting another child ($p=0.003$). Family characteristics were also associated with immediate acceptance. Almost three quarters (74.8%) of women whose intentions regarding the terminated pregnancy were concordant with their husband/partner's had immediate acceptance, compared to only 52.6% of those whose husband/partner had higher desire for fertility ($p=0.031$). Women who experienced physical IPV in the past year were significantly less likely to accept a method compared to those who did not experience such violence (56.6% and 76.2%, respectively; $p=0.010$). Decision-making about family planning and women's healthcare were not associated with immediate acceptance. Type of UE procedure a woman received was associated with acceptance; 85.0% of women receiving MVA accepted a method, compared to only 42.9% of women who received MA and 36.3% of women who received D&C ($p<0.001$). The type of treatment received and facility/unit type were not associated with immediate post-abortion contraceptive acceptance.

Table 4.3 presents the results from the multivariable analyses. Model 1 demonstrates that women's intentions regarding the terminated pregnancy and future fertility intentions were not associated with acceptance after adjusting for potential confounders. Model 2 shows that discordance in fertility intentions regarding the terminated pregnancy was associated with

decreased odds of immediate acceptance (AOR=0.38; 0.15 – 0.99). Experience of physical IPV was not associated after adjusting for discordance in fertility intentions and potential confounders. Model 3 demonstrates that women receiving MA and D&C had significantly lower odds of immediate acceptance of post-abortion contraception (AOR=0.07; 95% CI: 0.02 – 0.28 and AOR=0.20; 95% CI: 0.07 – 0.55, respectively), compared to women whose procedures were performed with MVA. The full model (Model 4) demonstrates that when included in the same model, procedure type is the strongest independent predictor of immediate post-abortion contraceptive acceptance. Women receiving MA and D&C had significantly lower odds of accepting post-abortion contraception (AOR=0.07; 95% CI: 0.02 – 0.29 and AOR=0.18; 95% CI: 0.07 – 0.45, respectively), compared to women whose procedures were performed with MVA.

Most women who accepted a post-abortion contraceptive method selected oral contraceptive pills (61.8%), while 23.9% selected injectables, and 14.4% selected condoms. At the bivariate level, the short-acting method a woman accepted was associated with UE service delivery characteristics, but not the individual or family level characteristics assessed (Table 4.4). Almost half (46.7%) of women who received MA selected condoms, compared to 13.7% of women who received MVA and 6.1% of women who received D&C ($p=0.001$). Almost three-quarters (73.9%) of women receiving PAC for miscarriage received pills, compared to 57.9% of MR clients and 63.0% of women receiving PAC for an abortion ($p=0.030$). Facility/unit type was also correlated with method selected; 83.7% of women attending DGHS facilities selected pills, compared to only 48.9% of women attending DGFP or RHSTEP clinics ($p<0.001$). *Post hoc* analysis was conducted to determine whether the association between treatment received and method selected remained after stratifying by facility/unit type. This analysis demonstrated that type of treatment received was not associated with method selection after stratifying by facility/unit type. In DGHS facilities/units, pill provision was ubiquitous across treatment types; 77.6% of PAC for miscarriage clients, 85.2% of MR clients, and 100% of PAC for abortion

clients received pills (data not shown). In DGFP and RHSTEP facilities/units there was similarly little variation across treatment types, but the method mix was more varied with only approximately 50% of clients receiving pills (data not shown).

Women reported a variety of reasons for selecting their post-abortion contraceptive method, but women most commonly reported selecting condoms and pills because they had used it before or because their husband/partner wanted to use it (Figure 4.1). For women who selected injectables, their husband/partner wanting to use it was the most common reason, and the counselor's recommendation played an important role for more than 40% of injectable acceptors. Mass media was listed as a reason by approximately 30% of pill and injectable users, and over 40% of condom users.

4.5. DISCUSSION

This study extends past the individual level to identify correlates of immediate post-abortion contraceptive acceptance and method selection at the family and UE service delivery levels among UE clients in Bangladesh. Previous studies have focused on socio-demographic characteristics such as parity as key correlates of post-abortion contraceptive acceptance (Zavier and Padmadas, 2012; Tavrow et al., 2012), but we find that after adjusting for potential confounders, UE procedure type is the strongest correlate of immediate post-abortion contraceptive acceptance and method selection. We also find evidence that family characteristics such as discordance in intentions regarding the terminated pregnancy are associated with decreased likelihood of immediate post-abortion contraceptive acceptance. Findings suggest that UE service delivery characteristics are the primary drivers of immediate post-abortion contraceptive acceptance and method selection in Bangladesh, and relationship dynamics may also play a role.

MA and D&C clients had significantly lower odds of immediate acceptance of post-abortion contraception compared to MVA clients, and among MA clients who received a method, they were more likely to receive condoms. D&C clients may be less likely to accept a method due to deep sedation or general anesthesia used to perform the procedure, compared to MVA procedures which are performed using local anesthesia. However, this study collected data after women recovered from their UE procedures, and all women participating were capable of completing the interview, which suggests that they would also be able to receive post-abortion contraceptive counseling. Alternatively, D&C clients may be less likely to receive a method due to lack of provider training and discomfort providing post-abortion contraception immediately after a D&C procedure. Instead, providers may prefer that D&C clients return for a follow-up visit to assess post-procedure complications and provide them with post-abortion contraception. Findings regarding post-abortion contraceptive acceptance among MA clients are consistent with a recent study in India (Kalyanwala et al., 2012), and suggest that providers are hesitant to provide hormonal contraceptive methods to women on the day they receive their MA drugs, despite WHO recommendations to start hormonal methods such as pills and injectables on the day a woman receives the first dose in the MA regimen (World Health Organization, 2012).

Though the type of treatment received and facility/unit type were not associated with immediate acceptance, they were associated with receiving pills compared to the other short-acting methods. The vast majority (83.7%) of women seen in DGHS facilities or units, primarily PAC clients, received pills, compared to 48.9% of women seen in DGFP or RHSTEP clinics ($p < 0.001$). The *post hoc* analysis suggests that most of the difference in method selection by treatment type can be attributed to the higher proportion of PAC clients seen in DGHS facilities. We do not find evidence that method selection differs by treatment type, but we do see a bias toward pill provision in DGHS facilities. These findings suggest that pills are the default method provided to

women in DGHS facilities. While it is a sign of progress that there were no differences in immediate post-abortion contraceptive acceptance between DGHS facilities/units compared to DGFP and RHSTEP facilities/units, findings suggest that additional work is needed in DGHS facilities to ensure that women have access to a range of methods for which they are eligible, and receive the method of their choice, rather than receiving a method as a matter of protocol.

At the family level, discordance with the husband/partner's intentions regarding the terminated pregnancy was associated with immediate acceptance of post-abortion contraception. Women whose husband/partner had higher desire for the terminated pregnancy had decreased odds of immediate acceptance before adjusting for procedure type. This finding is consistent with evidence from Bangladesh and other Asian countries that couples in which the husband/partner has more pronatalist intentions have a higher likelihood of subsequent childbearing (DaVanzo, Peterson, & Jones 2003; Gipson & Hindin 2009). Findings suggest that in a patriarchal society such as Bangladesh, intentions of the husband/partner may be more strongly associated with post-abortion contraceptive acceptance than the woman's intentions. While only 56.6% of IPV victims accepted a method compared with 76.2% of non-victims ($p=0.010$); in adjusted models, physical IPV was not a significant correlate of post-abortion contraceptive acceptance. Even though discordance in fertility intentions and experience of physical IPV were not statistically significant in the full model, these measures may indicate constraints on women's reproductive autonomy, limiting their ability to immediately accept post-abortion contraception.

4.5.1. Limitations

The results of this study should be viewed in light of its limitations. The sample used for this study is unique in that it is one of the few samples of post-abortion clients in Bangladesh, but young women under age 18 and women selecting long-acting or permanent methods of post-abortion contraception were not included. In addition, women were recruited from facilities

receiving an intervention to improve UE service quality, and may not be representative of all UE clients in Bangladesh. In particular, the UE service delivery characteristics may not be representative of the broader group of government facilities providing UE services in Bangladesh, especially DGHS facilities providing PAC services. It is likely that we underestimate the role of service delivery characteristics in post-abortion contraceptive acceptance, as UE care is expected to be more uniform and of higher quality in the study facilities. Although we have assessed many potential correlates, there may be additional unmeasured factors that have been omitted from the full model. We also have some measurement limitations. For example, fertility intentions regarding the terminated pregnancy were collected retrospectively, asking women to recall how they felt just before they became pregnant. Consequently, these measures are subject to recall bias. In addition, the husband/partner's fertility intentions were reported by the woman, and may be based on her perceptions rather than the husband/partner's actual intentions.

4.5.2. Conclusions

Findings from this study suggest that immediate post-abortion contraceptive acceptance and method selection are associated primarily with factors related to UE service delivery practices. That UE procedure type is associated with short-acting post-abortion contraceptive acceptance suggests gaps in service provision. Providers should be trained on WHO guidelines (World Health Organization, 2012), to ensure that all women are offered a method on the day of their UE procedures, regardless of their UE procedure type. At the health system level, availability of a range of contraceptive methods should be ensured in all facilities where UE services are provided. In addition, service delivery protocols should include balanced post-abortion contraceptive counseling to assess women's needs and medical eligibility to ensure that women's choice drives post-abortion contraceptive method selection.

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Table 4.1. Post-abortion contraceptive acceptance by characteristics of study sample (n=479)

Socio-demographic Characteristics	Total (n=479)		Any Method (n=348)		No Method (n=131)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Post-abortion contraceptive acceptance	479	(100)	348	(72.7)	131	(27.3)	
Age (<i>mean (SE)</i>)	27.4	(0.40)	27.9	(0.46)	26.1	(0.43)	0.004
Husband/partner's age (<i>mean (SE)</i>)	35.0	(0.63)	35.5	(0.61)	33.5	(0.69)	0.016
Education							0.089
None	67	(14.0)	40	(59.7)	27	(40.3)	
Primary	142	(29.6)	108	(76.1)	34	(23.9)	
Secondary or higher	270	(56.4)	200	(74.1)	70	(25.9)	
Husband/partner's education							0.385
None	80	(16.7)	54	(67.5)	26	(32.5)	
Primary	135	(28.2)	100	(74.1)	35	(25.9)	
Secondary or higher	264	(55.1)	194	(73.5)	70	(26.5)	
Religion							0.975
Islam	430	(89.8)	312	(72.6)	118	(27.4)	
Hinduism	48	(10.0)	35	(72.9)	13	(27.1)	
Buddhism	1	(0.2)	1	(100)	0	(0)	
Marital status							--
Married	478	(99.8)	347	(72.6)	131	(27.4)	
Formerly married	1	(0.2)	1	(100)	0	(0)	
Number of children							0.004
No children	85	(17.7)	49	(57.6)	36	(42.4)	
1-2 children	272	(56.8)	203	(74.6)	69	(25.4)	
3 or more children	122	(25.5)	96	(78.7)	26	(21.3)	
Household structure							0.728
Nuclear	266	(55.5)	190	(71.4)	76	(28.6)	
Extended	213	(44.5)	158	(74.2)	55	(25.8)	
Husband/partner's residence							0.187
Husband/partner lives with her	442	(92.3)	327	(74.0)	115	(26.0)	
Husband/partner lives elsewhere	37	(7.7)	21	(56.8)	16	(43.2)	
Residence							0.091
Urban	273	(57.0)	174	(63.7)	99	(36.3)	
Rural	206	(43.0)	174	(84.5)	32	(15.5)	
Rural to urban migrant							0.102
Yes	113	(23.6)	64	(56.6)	49	(43.4)	
No	366	(76.4)	284	(77.6)	82	(22.4)	
Division							0.436
Dhaka	228	(47.6)	132	(57.9)	96	(42.1)	
Sylhet	113	(23.6)	100	(88.5)	13	(11.5)	
Chittagong	60	(12.5)	48	(80.0)	12	(20.0)	
Rajshahi	78	(16.3)	68	(87.2)	10	(12.8)	

^a Row percentages are reported

^b F-test p-value from simple logistic regression of socio-demographic characteristic on immediate acceptance of post-abortion contraception, accounting for complex survey design

Table 4.2. Potential correlates by immediate post-abortion contraceptive acceptance (n=479)

Characteristics	Total (n=479)		Any Method (n=348)		No Method (n=131)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Post-abortion contraceptive acceptance	479	(100)	348	(72.7)	131	(27.3)	
Individual Characteristics							
History of MR							0.974
No history of MR	348	(72.7)	253	(72.7)	95	(27.3)	
Previous MR experience	131	(27.3)	95	(72.5)	36	(27.5)	
Fertility Intentions							
<i>Terminated pregnancy intentions</i>							
Family planning use at time of pregnancy							0.191
Not using family planning	231	(48.2)	158	(68.4)	73	(31.6)	
Using family planning	248	(51.8)	190	(76.6)	58	(23.4)	
Avoidance score (<i>mean (SE)</i>)	7.0	(0.28)	7.6	(0.37)	5.5	(0.62)	0.045
Woman's intentions-terminated pregnancy							0.082
Wanted then or ambivalent	129	(26.9)	77	(59.7)	52	(40.3)	
Mistimed or unwanted	350	(73.1)	271	(77.4)	79	(22.6)	
<i>Future fertility intentions</i>							
Woman's future fertility intentions							0.003
Want a/another child or ambivalent	248	(51.8)	164	(66.1)	84	(33.9)	
Want no (more) children	231	(48.2)	184	(79.7)	47	(20.3)	
Family Characteristics							
Discordance in Fertility Intentions							
Husband/partner's relative intentions-terminated pregnancy ^c							0.031
Concordant	429	(91.9)	321	(74.8)	108	(25.2)	
Discordant – Higher	38	(8.1)	20	(52.6)	18	(47.4)	
Husband/partner's relative intentions-future pregnancies ^d							0.938
Concordant	450	(94.5)	326	(72.4)	124	(27.6)	
Discordant – Higher	26	(5.5)	19	(73.1)	7	(26.9)	
Women's Power within the Family							
<i>Intimate partner violence</i>							
Physical IPV in past year ^e							0.010
Did not experience physical IPV	359	(82.0)	275	(76.2)	84	(23.8)	
Experienced physical IPV	82	(18.0)	46	(56.6)	36	(43.4)	
Sexual IPV in past year ^e							0.161
Did not experience sexual IPV	371	(84.3)	277	(74.3)	94	(25.7)	
Experienced sexual IPV	71	(15.7)	45	(63.7)	26	(36.3)	
<i>Household decision-making</i>							
Decision-making for family planning use							0.679
Not involved	32	(6.7)	25	(78.1)	7	(21.9)	
Involved	447	(93.3)	323	(72.3)	124	(27.7)	
Decision-making for her healthcare							0.296
Not involved	81	(16.9)	69	(85.2)	12	(14.8)	
Involved	398	(83.1)	279	(70.1)	119	(19.9)	
UE Service Delivery Characteristics							
UE procedure type							<0.001
MVA	353	(73.7)	300	(85.0)	53	(15.0)	
MA	35	(7.3)	15	(42.9)	20	(57.1)	
D&C	91	(19.0)	33	(36.3)	58	(63.7)	
Type of treatment received							0.257
PAC for miscarriage	119	(24.8)	69	(58.0)	50	(42.0)	
MR	280	(58.5)	233	(83.2)	47	(16.8)	
PAC for abortion	80	(16.7)	46	(57.5)	34	(42.5)	
Facility/unit type							0.326
DGHS	209	(43.6)	129	(61.7)	80	(38.3)	
DGFP or RHSTEP clinic	270	(56.4)	219	(81.1)	51	(18.9)	

Acronyms: D&C, dilation and curettage; DGFP, Directorate General of Family Planning; DGHS, Directorate General of Health Services; IPV, intimate partner violence; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; RHSTEP, Reproductive Health Services Training and Education Program; UE, uterine evacuation

^a Row percentages are reported

^b F-test p-value from simple logistic regression of predictor on immediate acceptance of post-abortion contraception, accounting for complex survey design

^c One category of discordance in intentions regarding the terminated pregnancy, Discordant-Lower (n=12), was excluded from the analysis due to the small sample size

^d One category of discordance in future pregnancy intentions, Discordant-Lower (n=3), was excluded from the analysis due to the small sample size

^e Multiple imputation variable. Original n (i.e. n=479), and imputed percent and F-test p-value presented

Table 4.3. Logistic regression model results of the association between potential correlates and immediate post-abortion contraceptive acceptance (n=479)

Characteristics	Model 1: Individual Characteristics		Model 2: Family Characteristics		Model 3: UE Service Delivery Characteristics		Model 4: Full Model	
	AOR ^a	(95% CI)	AOR ^a	(95% CI)	AOR ^a	(95% CI)	AOR ^a	(95% CI)
Individual Characteristics								
<i>Fertility Intentions</i>								
Avoidance score-terminated pregnancy	1.10	(0.96-1.26)					1.08	(0.91-1.30)
Woman's future pregnancy intentions								
Want no (more) children (ref)	1.00						1.00	
Want a/another child or ambivalent	0.98	(0.48-2.01)					1.10	(0.52-2.35)
Family Characteristics								
<i>Discordance in Fertility Intentions</i>								
Husband/partner's relative intentions-terminated pregnancy								
Concordant (ref)			1.00				1.00	
Discordant – Higher ^c			0.38	* (0.15-0.99)			0.41	(0.15-1.14)
<i>Women's Power within the Family</i>								
Physical IPV in past year								
Did not experience physical IPV (ref)			1.00				1.00	
Experienced physical IPV			0.52	(0.24-1.14)			0.47	(0.19-1.17)
UE Service Delivery Characteristics								
UE procedure type								
MVA (ref)					1.00		1.00	
MA					0.07	* (0.02-0.28)	0.07	* (0.02-0.29)
D&C					0.20	* (0.07-0.55)	0.18	* (0.07-0.45)

Acronyms: D&C, dilation and curettage; DGFP, Directorate General of Family Planning; DGHS, Directorate General of Health Services; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; RHSTEP, Reproductive Health Services Training and Education Program; UE, uterine evacuation

* p<0.05

^a All models adjust for age, education, number of children, type of treatment received (PAC for miscarriage, MR, or PAC for abortion), facility/unit type (DGHS or DGFP/RHSTEP), and variables in column

Table 4.4. Potential correlates by post-abortion contraceptive method selected among women who had immediate post-abortion contraceptive acceptance (n=348)

Characteristics	Condoms (n=50)		Pills (n=215)		Injectables (n=83)		p-value ^b
	n	(%) ^a	n	(%) ^a	n	(%) ^a	
Post-abortion contraceptive method selected	50	(14.4)	215	(61.8)	83	(23.9)	
Individual Characteristics							
History of MR							0.197
No history of MR	32	(12.6)	162	(64.0)	59	(23.3)	
Previous MR experience	18	(18.9)	53	(55.8)	24	(25.3)	
Fertility Intentions							
<i>Terminated pregnancy intentions</i>							
Family planning use at time of pregnancy							0.706
Not using family planning	18	(11.4)	101	(63.9)	39	(24.7)	
Using family planning	32	(16.8)	114	(60.0)	44	(23.2)	
Avoidance score (<i>mean (SE)</i>)	7.5	(0.59)	7.2	(0.42)	8.2	(0.64)	0.219
Woman's intentions-terminated pregnancy							0.067
Wanted then or ambivalent	7	(9.1)	60	(77.9)	10	(13.0)	
Mistimed or unwanted	43	(15.9)	155	(57.2)	73	(26.9)	
<i>Future fertility intentions</i>							
Woman's future fertility intentions							0.723
Want a/another child or ambivalent	26	(15.9)	103	(62.8)	35	(21.3)	
Want no (more) children	24	(13.0)	112	(60.9)	48	(26.1)	
Family Characteristics							
Discordance in Fertility Intentions							
Husband/partner's relative intentions-terminated pregnancy ^c							0.979
Concordant	47	(14.6)	198	(61.7)	76	(23.7)	
Discordant – Higher	3	(15.0)	12	(60.0)	5	(25.0)	
Husband/partner's relative intentions-future pregnancies ^d							0.314
Concordant	46	(14.1)	206	(63.2)	74	(22.7)	
Discordant – Higher	4	(21.0)	9	(47.4)	6	(31.6)	
Women's Power within the Family							
<i>Intimate partner violence</i>							
Physical IPV in past year ^e							0.960
Did not experience physical IPV	42	(14.6)	167	(61.4)	66	(24.0)	
Experienced physical IPV	6	(12.9)	29	(64.1)	11	(23.0)	
Sexual IPV in past year ^e							0.399
Did not experience sexual IPV	38	(13.6)	175	(62.9)	64	(23.5)	
Experienced sexual IPV	9	(19.4)	24	(54.5)	12	(26.1)	
<i>Household decision-making</i>							
Decision-making for family planning use							0.102
Not involved	4	(16.0)	10	(40.0)	11	(44.0)	
Involved	46	(14.2)	205	(63.5)	72	(22.3)	
Decision-making for her healthcare							0.094
Not involved	4	(5.8)	41	(59.4)	24	(34.8)	
Involved	46	(16.5)	174	(62.4)	59	(21.1)	
UE Service Delivery Characteristics							
UE procedure type							0.001
MVA	41	(13.7)	182	(60.7)	77	(25.7)	
MA	7	(46.7)	5	(33.3)	3	(20.0)	
D&C	2	(6.1)	28	(84.8)	3	(9.1)	
Type of treatment received							0.030
PAC for miscarriage	9	(13.0)	51	(73.9)	9	(13.0)	
MR	36	(15.5)	135	(57.9)	62	(26.6)	
PAC for abortion	5	(10.9)	29	(63.0)	12	(26.1)	
Facility/unit type							<0.001
DGHS	9	(7.0)	108	(83.7)	12	(9.3)	
DGFP or RHSTEP clinic	41	(18.2)	107	(48.9)	71	(32.4)	

Acronyms: D&C, dilation and curettage; DGFP, Directorate General of Family Planning; DGHS, Directorate General of Health Services; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; RHSTEP, Reproductive Health Services Training and Education Program; UE, uterine evacuation

^a Row percentages are reported

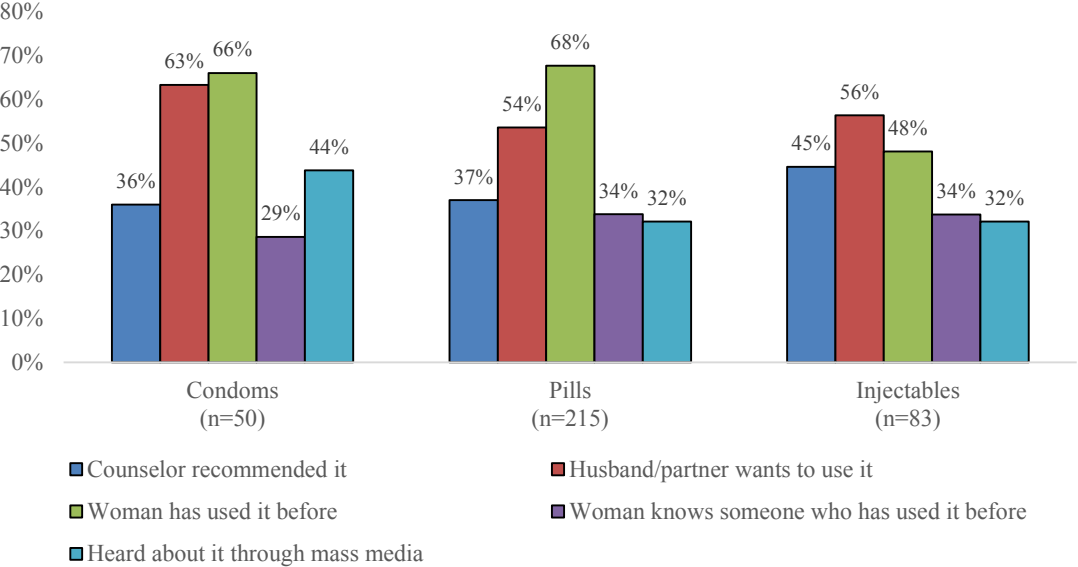
^b F-test p-value from simple logistic regression of predictor on immediate acceptance of post-abortion contraception, accounting for complex survey design

^c One category of discordance in intentions regarding the terminated pregnancy, Discordant-Lower (n=12), was excluded due to small sample size

^d One category of discordance in future pregnancy intentions, Discordant-Lower (n=3), was excluded due to small sample size

^e Multiple imputation variable. Original n (i.e. n=479) and imputed percent and F-test result reported

Figure 4.1. Reasons for selection of post-abortion contraceptive method by type of method selected (n=348)



CHAPTER 5:
PREDICTORS OF MODERN CONTRACEPTIVE USE FOUR MONTHS POST-
ABORTION: FINDINGS FROM A PROSPECTIVE STUDY OF UTERINE
EVACUATION CLIENTS IN BANGLADESH

5.1. ABSTRACT

Post-abortion contraception is recommended for reducing subsequent unwanted pregnancy and abortion, but little is known about the predictors of contraceptive use after a uterine evacuation (UE) procedure. This prospective study seeks to understand the predictors of modern contraceptive use four months following abortion and timing of acceptance among UE clients in Bangladesh. This study includes a facility-based sample of 398 UE clients who did not intend pregnancy, either in the four months following their UE procedures or in the month following their four-month follow-up interviews. Respondents completed a baseline quantitative interview on the day of their UE procedures and a follow-up interview four months later. This study finds that use of modern contraception four months post-abortion is high among women who do not intend pregnancy (85.4%). The primary predictor of modern contraceptive use four months post-abortion was family planning use at the time of the terminated pregnancy (AOR=2.94; 95% CI: 1.33 – 6.47). We find no significant differences in modern contraceptive use four months post-abortion by family or UE service delivery characteristics, but we do find differences in timing of acceptance. Women who experienced recent intimate partner violence and those whose husbands had discordant pregnancy intentions were more likely to have delayed acceptance of post-abortion contraception (i.e. after the day of the UE procedure), particularly if the woman's husband/partner accompanied her to the health facility for her UE procedure. In addition, women who had medication abortion (MA) and dilation and curettage (D&C) procedures were more likely to have delayed acceptance, compared to women who had manual vacuum aspiration (MVA) procedures. Findings suggest that though most women are using modern contraception four months following abortion, many have a need for post-abortion contraception that is not being met on the day of their UE procedures, potentially putting them at risk of unwanted pregnancy. Interventions should focus on ensuring availability of a range of contraceptive commodities in health facilities to increase access to post-abortion contraception on the day of a woman's UE procedure, and on training providers in comprehensive, confidential counseling to

understand relationship dynamics, and provide appropriate post-abortion contraceptive methods, according to women's needs and intentions.

5.2. BACKGROUND

Unwanted pregnancy contributes to maternal morbidity and mortality globally, especially in countries where abortion is illegal or provided under unsafe conditions (Campbell and Graham, 2006). It is estimated that if unplanned and unwanted pregnancy were prevented using family planning, 25-40% of maternal deaths could be averted (Campbell and Graham, 2006). Abortion clients can become at risk for pregnancy within two weeks of their abortion procedures, and provision of modern methods of contraception is a recommended strategy for reducing subsequent unwanted pregnancy (World Health Organization, 2012). Modern methods of contraception include condoms, oral contraceptive pills, emergency contraception, lactational amenorrhea method, injectables, implants, intrauterine devices (IUD), and sterilization (World Health Organization, 2013). Service delivery statistics provide useful information on post-abortion contraceptive acceptance, which varies considerably based on facility characteristics (Vlassoff et al., 2012), but less is known about the contextual factors such as family dynamics associated with post-abortion contraceptive use in this population.

Available evidence suggests that the most important predictors of contraceptive use following abortion are high quality post-abortion contraceptive counseling, acceptance of contraception on the day of the uterine evacuation (UE) procedure⁴, and selection of more effective methods. Recent evidence from Bangladesh demonstrates that quality of post-MR contraceptive counseling was predictive of modern contraceptive use three months post-MR (Sultana et al., 2013). In addition, a study from Turkey found that introducing a modern contraceptive method immediately after abortion was the most important predictor of modern method use at the one-year follow-up (Ceylan et al., 2009). In South Asia, studies focusing on contraceptive continuation have found that selection of more effective methods of contraception after abortion,

⁴ In this study, the term uterine evacuation (UE) will be used to include both induced abortion and post-abortion care (PAC) procedures.

such as long-acting reversible contraception (LARC), is associated with contraceptive continuation (Puri et al., 2014; Kalyanwala et al., 2012; Akhter, 1987). Because of the higher continuation rates, much of the focus has been on increasing post-abortion LARC acceptance. However, ensuring contraceptive choice is important, and in settings such as Bangladesh where short-acting methods make up over 80% of the contraceptive method mix in the general population (NIPORT et al., 2013), most women will select a short-acting method following their abortion. Until there is a shift in the method mix in the general population, it is likely that abortion clients will prefer the predominant methods due to the influence of social networks on contraceptive method selection (Entwisle et al., 1996). As a result, it is important to understand the predictors of post-abortion modern contraceptive use beyond use of LARC methods in settings where these are uncommon. Though most studies of post-abortion contraception have focused on contraceptive *continuation*, modern contraceptive *use* post-abortion may be more important for understanding risk of unwanted pregnancy in a context where short-acting methods dominate and are widely available at the community level (NIPORT et al., 2013). Studies of post-abortion contraceptive *continuation* must define acceptance within a specific timeframe, typically ranging from one to three months post-abortion (Puri et al., 2014; Kalyanwala et al., 2012). Focusing on post-abortion contraceptive *use* allows for greater analytic flexibility to understand contraceptive behavior of women who begin using contraception in the months following their UE procedures.

Bangladesh has seen a steep decline in the total fertility rate (TFR) over the past four decades, from over six children per woman in the 1970s to 2.3 children per woman in the 2011 Bangladesh Demographic and Health Survey (DHS) (Cleland et al., 2006; NIPORT et al., 2013).

Bangladesh's success in fertility reduction has been facilitated by community-based distribution of short-acting methods, including oral contraceptive pills and condoms starting in the 1970s (Cleland et al., 2006). Currently, over 50% of married women of reproductive age in Bangladesh

use a modern method of contraception (NIPORT et al., 2013). Despite these successes, 15.0% of births in Bangladesh are mistimed, 12.7% are unwanted, and the pregnancy termination rate is considerably higher than the average for South Asia, 37 per 1,000 women of reproductive age in Bangladesh compared to 26 per 1,000 women in South Asia (Singh et al., 2012; Sedgh et al., 2012; NIPORT et al., 2013). Though abortion is legally restricted in Bangladesh, menstrual regulation (MR) is permitted to induce menstruation and establish non-pregnancy up to 10 weeks from the last menstrual period (LMP) (Bart Johnston et al, 2010)⁵. Though MR services are widely available, illegal and possibly unsafe abortion is equally common, making provision of post-abortion care (PAC)⁶ an important element of UE service provision in Bangladesh (Singh et al., 2012).

Little is known about the predictors of post-abortion modern contraceptive use in Bangladesh, but available evidence suggests multiple levels of influence on women's contraceptive use. At the individual level, a 1987 study on post-abortion contraceptive continuation in urban Bangladesh found that older age and not wanting more children were associated with continuation (Akhter, 1987). In the general population in Bangladesh, history of contraceptive use is associated with an increased odds of current contraceptive use (Koenig et al., 1997; Schuler et al., 1997). At the family level, women's power within the family, especially women's ability to control or influence their own reproductive health, may also be associated with post-abortion contraceptive use. The most recent Bangladesh DHS showed that only 63.0% of women participate in decision-making for their own healthcare (NIPORT et al., 2013), and husbands and in-laws may be key decision-makers for contraceptive use. Khan (2003) found that women whose husbands were not supportive of pill use were more likely to discontinue over a six-month follow-up period

⁵ Though menstrual regulation (MR) is performed without confirming pregnancy and can theoretically be performed to address menstrual disturbances other than pregnancy, this study will consider MR to be equivalent to induced abortion.

⁶ Post-abortion care (PAC) in this study will refer to treatment for incomplete abortion, due to unsuccessful induced abortion provided under safe conditions, complications of unsafe abortion, or spontaneous abortion (miscarriage).

(OR=1.9; 95% CI: 1.51-2.40). Additionally, qualitative evidence from rural Bangladesh demonstrates that husband or in-laws' disapproval of pill use and husband's dissatisfaction with the method are important reasons for discontinuation of pills (Ullah & Humble, 2006). Intimate partner violence (IPV) may also be an important predictor, as approximately 30% of women in Bangladesh have experienced IPV within the past year (Garcia-Moreno et al., 2006), and IPV has been shown to be associated with unwanted pregnancy and induced abortion in Bangladesh (Silverman et al., 2007; Rahman et al., 2012; Pallitto et al., 2013).

Timing of acceptance of post-abortion contraception has not been studied in Bangladesh, but a study in India found differences in timing of acceptance by abortion procedure type. In the first month following abortion, women whose abortion was performed using medication abortion (MA) were significantly less likely to accept a contraceptive method, compared to those who had a manual vacuum aspiration (MVA) procedure (Kalyanwala et al., 2012). Despite the initial differences in timing of acceptance, women were equally likely to be using reversible methods of contraception, regardless of procedure type six months following their abortion procedures (Kalyanwala et al., 2012). As previously mentioned, studies of post-abortion contraceptive continuation define initiation of a method within a timeframe ranging from one to three months post-abortion (Puri et al., 2014; Kalyanwala et al., 2012). Using this timeframe may not provide a complete picture of women's protection from unwanted pregnancy as it extends beyond the two-week period of natural protection after abortion, and does not take into account that immediate provision of post-abortion contraception, on the day of the UE procedure, is recommended (World Health Organization, 2012). As a result, it is important to understand differences in timing of acceptance of modern contraception following abortion to identify women who may be at increased risk for unwanted pregnancy. The present study assesses predictors of contraceptive use four months post-abortion and timing of acceptance of modern contraception among UE clients in Bangladesh who do not intend pregnancy, either in the four

months following their UE procedures or in the month following their four-month follow-up interviews.

5.3. METHODOLOGY

This prospective study uses data from a parent study that aimed to understand post-abortion contraceptive use among short-acting method acceptors. The parent study enrolled a facility-based sample of 498 UE clients aged 18-49 years. All study procedures received ethical approval from the Bangladesh Medical Research Council in Dhaka and the Allendale Investigational Review Board in the United States. This study was submitted for review by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) (IRB Number: 00005702), and the IRB determined that review was not required because Erin Pearson was listed as a researcher on the original protocol for the parent study being conducted by another institution.

5.3.1. Sample

A stratified one-stage cluster sampling approach was used to select women for this study. There are 5,301 public sector facilities in Bangladesh where UE services are provided (Vlassoff et al., 2012). The sample was drawn from among the 47 government and non-governmental organization (NGO) facilities receiving an intervention to train providers in woman-centered UE service provision and to ensure that appropriate equipment and infection prevention supplies were available. Compared to the broader group of facilities where UE services are provided, facilities included in this study are more likely to be in urban settings such as Dhaka. Government facilities sampled for this study included both those under the auspices of the Directorate General of Family Planning (DGFP) and the Directorate General of Health Services (DGHS). In addition, NGO-run sexual and reproductive health clinics (RHSTEP clinics) were included. Historically, MR services have been provided in RHSTEP clinics and DGFP facilities or units, and PAC

services have been provided in DGHS facilities or units. Because contraceptive commodities are procured through DGFP rather than DGHS, provision of post-abortion contraception for PAC clients has been poor (Vlassoff et al., 2012). Integration of MR, PAC and post-abortion contraceptive services in RHSTEP, DGFP and DGHS facilities was a goal of the intervention, and because all participating facilities received the intervention, study participants received approximately similar quality of care in UE service and post-abortion contraceptive provision, including access to at least two modern methods of contraception. Facilities were stratified by type (primary, secondary, tertiary, and RHSTEP clinics), and 16 were randomly selected using probability proportional to size (PPS) sampling within facility type strata.

Within selected facilities, all women receiving MR or PAC services were screened for study eligibility. Inclusion criteria for participation in the parent study included: 18-49 years of age; received MR or PAC services using any procedure; and accepted pills, injectables, or condoms as a post-abortion contraceptive method, or selected no method. The parent study focused on users of short-acting post-abortion contraceptive methods and non-users, and as a result, women who selected a long-acting or permanent post-abortion contraceptive method were ineligible for participation. A total of 555 women were approached for participation and 498 were enrolled; the response rate was 90%. Women completed a quantitative interviewer-administered survey at the health facility after recovering from their UE procedures, and a follow-up quantitative interview four months after their procedures, either in-person (93%) or by telephone (7%), depending on the woman's preference. A total of 457 women were interviewed at follow-up; the retention rate was 92%. Both the baseline and follow-up questionnaires were developed in English and translated to Bangla. The questionnaires were back-translated, and adjustments were made as necessary. Baseline data collection occurred from March to June 2013, and follow-up data collection occurred from July to October 2013.

The final analytic sample for this study included 398 women who did not intend pregnancy, either in the four months following their UE procedures or in the month following their four-month follow-up interview (Figure 5.1). The sample was first restricted to the women who reported at baseline that they did not intend to become pregnant over the four-month follow-up period. Next, the sample was restricted to those who completed the four-month follow-up interview (n=440). Retention was found to be non-differential by age, education, urban or rural residence, rural to urban migrant status, household type, or division of residence; however, some differences were identified by parity. Next, 41 women were excluded because they were pregnant or intended to become pregnant at follow-up. Finally, one woman was excluded due to missing data on the primary outcome of interest. The analysis of the primary outcome of interest, modern contraceptive use at the four-month follow-up, was conducted among the full analytic sample of 398 women. Timing of acceptance over the four-month follow-up, the secondary outcome of interest, was analyzed among the 340 women who were users of modern contraception at follow-up.

5.3.2. Measures

The primary outcome of interest was *modern contraceptive use at the time of the four-month follow-up survey*. This was assessed at follow-up by asking, “Are you or your husband/partner currently using anything to avoid pregnancy?” Women who responded yes, were asked, “What method(s) are you currently using?” Women who reported using pills, condoms, injectables, implants, IUDs, or male or female sterilization were categorized as using modern contraception at follow-up. Women who reported using a traditional method such as withdrawal or periodic abstinence, or who reported that they were not currently using a method were categorized as not using modern contraception at follow-up. *Timing of acceptance*, the secondary outcome of interest, was analyzed among women using contraception at the time of the four-month follow-up in two categories: immediate acceptance if women accepted a method at baseline (on the day of

the UE procedure) and delayed acceptance if they did not accept at baseline but reported modern method use at the four-month follow-up.

All potential predictors were assessed at baseline in three levels: individual, family, and UE service delivery. At the individual level, history of MR and fertility intentions for the terminated pregnancy and future pregnancies were considered. *History of MR* was analyzed as a dichotomous measure indicating whether the woman had ever used MR before the day of her UE procedure. Fertility intentions regarding the terminated pregnancy were assessed using three measures. First, women were asked whether they were *using family planning at the time they became pregnant* to assess contraceptive behavior prior to pregnancy. Second, *pregnancy avoidance* was measured by showing women a scale on a card and asking, “Please look at the scale on the card. On this scale, a 1 means that you did not want to avoid pregnancy, and 10 means you wanted very much to avoid pregnancy. Which number on the card best describes how much you wanted to avoid pregnancy at the time you became pregnant?” (Centers for Disease Control, 2008). Pregnancy avoidance was analyzed as a continuous variable (range: 1-10), with a higher score indicating stronger pregnancy avoidance. Third, *intentions regarding the terminated pregnancy* were assessed directly by asking women, “Right before you became pregnant, did you want to become pregnant then, did you want to wait until later, did you not want to have any (more) children, or did you not think about it?” (Institut National D’etudes Demographiques, 2010). The woman’s intentions regarding the terminated pregnancy were dichotomized as pregnancy wanted then or ambivalent about timing of the pregnancy coded as zero, and pregnancy mistimed or unwanted coded as one. *Future fertility intentions* were assessed by asking whether she wanted a/another child in the future, and this measure was dichotomized as want a/another child in the future or ambivalent equal to zero, and want no (more) children equal to one.

At the family level, discordance in fertility intentions as well as three domains of women's power within the family were assessed: IPV, accompaniment to the health facility, and household decision-making. Measures of discordance in fertility intentions between the woman and her husband/partner were constructed both for the terminated pregnancy and future pregnancies. To measure *discordance in intentions regarding the terminated pregnancy*, women were asked, "Right before you became pregnant, did your husband/partner want you to become pregnant then, did he want to wait until later, did he not want to have any (more) children, or he did not think about it?" The husband/partner's intentions were ordered from highest to lowest desire for fertility (wanted then, ambivalent, mistimed or unwanted) and analyzed in three categories relative to the woman's intentions based on the work done by Schoen et al. (1999): concordant, discordant – higher, and discordant – lower. To measure *discordance in future fertility intentions*, women were asked about their husband/partner's future pregnancy intentions, which were similarly ordered from highest to lowest desire for fertility (want a/another child, ambivalent, or want no (more) children) and analyzed relative to the woman's intentions: concordant, discordant – higher, and discordant – lower. The discordant – lower category was excluded from the analysis for both measures of discordance due to the very small number of respondents in this category. Experience of past year *physical or sexual IPV* was assessed using the standard questions from the 2007 Bangladesh DHS (NIPORT et al., 2009), which are based on the validated and widely used Conflict Tactics Scales (CTS2) (Straus et al., 1996). To assess physical IPV, women were asked, "In the past year has your husband/partner hit, kicked, slapped or otherwise physically hurt you?" (NIPORT et al., 2009). Sexual IPV was measured by asking, "In the past year, has your husband/partner physically forced you to have sexual intercourse with him even when you did not want to?" (NIPORT et al., 2009). A dichotomous measure was constructed to indicate whether women experienced either physical or sexual IPV in the past year. *Accompaniment to the health facility* for the UE procedure was measured at baseline by asking women, "Did anyone come with you to the health facility today?". Women who responded yes

were asked, “Who came with you?” Multiple responses were possible. Accompaniment was analyzed in three categories: none/alone if no one accompanied her, accompanied by husband/partner if she listed him as accompanying her, and accompanied by someone else if she said that someone came with her but did not list her husband/partner as accompanying her.

Household decision-making was assessed through two questions adapted from the 2011 Bangladesh Demographic and Health Survey (DHS) (NIPORT et al., 2013). Women were asked, “For each question, I would like for you to tell me whether the decision is usually made by you, your husband or partner, your in-laws, or someone else, or whether you make these decisions jointly with others.” (NIPORT et al., 2013). Decision-making regarding her healthcare and whether she should use a family planning method were dichotomized to indicate whether she was involved in each type of decision-making.

UE service delivery characteristics were also assessed at baseline. The *facility or unit type* was identified by the facility or unit where the baseline interview was conducted, and was analyzed as a dichotomous measure with DGHS facilities or units equal to zero and DGFP or RHSTEP clinics equal to one. Women were asked about the *type of treatment they received*, which was assessed as a categorical variable (MR, PAC for abortion, or PAC for miscarriage). Women were also asked about their *UE procedure type*, which was categorized as manual vacuum aspiration (MVA), medication abortion (MA), or dilation and curettage (D&C). Two measures of post-abortion contraceptive counseling were assessed: a dichotomous measure of whether they *received post-abortion contraceptive counseling* after their UE procedures, and *time spent in post-abortion contraceptive counseling*, categorized as none/no counseling received, less than five minutes, or five minutes or longer. Finally, *baseline post-abortion contraceptive acceptance* was assessed as a dichotomous measure.

The questionnaire also collected information on the woman's socio-demographic characteristics at baseline, and standard questions from the 2011 Bangladesh DHS were used when possible (NIPORT et al., 2013). Women were asked about the number of children they have, and this variable was categorized as no children, 1-2 children, or 3 or more children. Place of residence was assessed by asking, "Do you currently live in a city, in a town, or in a village?", and women were categorized as urban residents if they lived in a city or town and rural residents if they lived in a village. Migration was assessed by asking women if they had ever lived anywhere else, and if so, had they lived in a city, town or village. Women who reported that they currently lived in a town or city, but previously lived in a village were considered rural to urban migrants. Each woman was also asked about her husband or partner's age and education. Household type was classified as nuclear if she reported currently living with only her husband/partner or children and extended if she reported living with any other family members. The husband/partner's place of residence was also assessed at baseline by asking, "Is your husband/partner staying with you now, or is he staying somewhere else?" Husband/partner's residence was assessed as a dichotomous measure.

5.3.3. Data Analysis

Socio-demographic characteristics are presented for the sample as a whole, and by modern contraceptive use at the four-month follow-up, the primary outcome of interest. Bivariate associations with the outcome were assessed using an F-test from simple logistic regression models of each characteristic regressed on modern contraceptive use at the four-month follow-up. Similarly, potential predictors were divided into three levels (individual, family, and UE service delivery), and presented for the sample as a whole and by modern contraceptive use at the four-month follow-up. An F-test was used to assess bivariate associations between potential predictors and the outcome of interest in simple logistic regression models. Significance was assessed at an alpha of 0.05 for all analyses.

Grouped by level, potential predictors significant at $p < 0.05$ at the bivariate level were included in a separate multivariable logistic regression model for each level to assess the association with modern contraceptive use at the four-month follow-up. A full model is presented that includes predictors from the two levels with bivariate associations (individual and UE service delivery). Both the level-specific and full logistic regression models were adjusted for socio-demographic characteristics associated with the outcome, including number of children and husband/partner's residence. In addition, models were adjusted for the woman's education, which was not associated with the outcome, but was an *a priori* hypothesized confounder. Multicollinearity in the multivariable models was assessed using the variance inflation factor (VIF), and was not found to affect the models. Adjusted odds ratios and 95% confidence intervals are presented for each model.

Timing of acceptance of modern contraception, the secondary outcome of interest, was assessed among the 340 women who were using modern contraception at the time of the four-month follow-up. Three levels of potential predictors (individual, family, and UE service delivery) were assessed, and are presented for the overall sample and by timing of acceptance. An F-test was used to assess bivariate associations between potential predictors and the outcome in simple logistic regression models. *Post hoc* analysis of IPV experience is presented by timing of acceptance and stratified by accompaniment to the health facility to clarify whether there is an interaction between experience of IPV and spousal accompaniment on timing of acceptance. To test the bivariate association between timing of acceptance of post-abortion contraception and IPV experience, an F-test was used from simple logistic regression models for each stratum.

Missing data for the potential predictors were addressed in two ways. For predictor variables missing data on less than 2% of observations, mean value imputation was used. For experience

of past year IPV, approximately 8% of observations were missing, and multiple imputation was used. Ten imputations were generated with multivariate imputation using chained equations (MICE) (White & Carlin, 2010). The multivariate imputation model included the outcome variables, all variables considered potential predictors, socio-demographic characteristics, and variables used to identify the sampling clusters and strata. All analyses were conducted on the multiple imputation dataset using Stata/SE 12.1, accounting for the complex survey design.

5.4. RESULTS

On average, women in the sample were 28 years of age, more than half (56.0%) had secondary or higher education, and 86.9% had at least one child (Table 5.1). More than half of women (54.8%) reported that their husbands/partners had secondary or higher education and were 35 years of age on average. Almost all women were currently married (99.7%), and 89.4% were Muslim, while 10.3% were Hindu and less than 1% were Buddhist. More than half of the sample (56.5%) lived in urban areas, and almost one quarter of respondents were rural to urban migrants (23.6%). Almost half of the respondents were from Dhaka division (47.7%), while 23.4% were from Sylhet, 16.3% from Rajshahi, and 12.6% from Chittagong. At the time of the four-month follow-up 85.4% of women were using a modern method of contraception, and only 14.6% were not using a method. Modern contraceptive use at follow-up was associated with having at least one child and the husband/partner residing with her at baseline (Table 5.1).

At the bivariate level, modern contraceptive use at follow-up was associated with potential predictors in two of the three levels assessed, individual and UE service delivery characteristics (Table 5.2). Ninety-two percent of women who were using family planning at the time of the terminated pregnancy were using modern contraception at the time of the four-month follow-up, compared to only 76.9% of those who were not using at the time of the terminated pregnancy

($p=0.002$). Women using modern contraception at follow-up had an average pregnancy avoidance score of 7.7 for the terminated pregnancy, compared to 6.3 among women not using modern contraception at follow-up ($p=0.017$). The woman's intentions regarding the terminated pregnancy were also associated with use, with 88.2% of women who reported that the pregnancy was mistimed or unwanted using modern contraception at follow-up, compared to only 76.3% of women who said that they wanted the pregnancy then or were ambivalent about the timing ($p<0.001$). Future fertility intentions, as reported at baseline, were not associated with modern contraceptive use at the four-month follow-up. The type of UE treatment received was associated with modern contraceptive use at the four-month follow-up; 90.6% of women who had PAC for abortion were using modern contraception at follow-up, compared to 87.3% of women who had MR and 76.4% of women who had PAC for miscarriage ($p=0.034$). None of the family characteristics assessed were associated with modern contraceptive use at the four-month follow-up.

Table 5.3 presents the results from the multivariable analyses. At the individual level, Model 1 demonstrates that women using family planning at the time of the terminated pregnancy had 2.96 times higher odds of using modern contraception at follow-up, compared to women who were not using family planning at the time of the terminated pregnancy (95% CI: 1.31 – 6.68). The UE service delivery level (Model 2) shows that type of treatment received was not associated with modern contraceptive use at the four-month follow-up after adjusting for socio-demographic characteristics. The full model (Model 3) demonstrates that only family planning use at the time of the terminated pregnancy predicts modern contraceptive use at the four-month follow-up. Women using family planning at the time of the terminated pregnancy had 2.94 times higher odds of use at follow-up, compared to women who were not using family planning (95% CI: 1.33 – 6.47).

Among women who were using modern contraception at the four-month follow-up (n=340), the timing of acceptance was associated with characteristics at the individual, family, and UE service delivery levels (Table 5.4). At the individual level, future pregnancy intentions were associated with timing of acceptance. Delayed acceptance was more common among women who want a/another child or are ambivalent about future fertility (31.4%), compared to those who want no (more) children (17.4%; $p=0.009$). At the family level, among women who reported intentions regarding the terminated pregnancy that were concordant with her husband/partner's, only 21.9% had delayed acceptance, compared to 44.4% of women whose husbands had discordant intentions with a higher desire for fertility ($p=0.041$). Delayed acceptance was also associated with past year experience of IPV. Among women who reported past year IPV, 36.8% had delayed acceptance, compared to 19.5% of women who did not experience IPV ($p=0.026$). At the UE service delivery level, procedure type was associated with delayed acceptance; 56.7% of MA clients and 57.1% of D&C clients had delayed acceptance, compared to only 12.6% of MVA clients ($p<0.001$).

The interaction between experience of IPV and spousal accompaniment on timing of acceptance was analyzed to explore a possible explanation for delayed acceptance in this population. Table 5.5 demonstrates that the bivariate association between past year IPV and timing of acceptance differs by accompaniment to the health facility on the day of the UE procedure. Among women whose husband/partners accompanied them, 49.3% of women who experienced IPV had delayed acceptance, compared to 19.7% of women who did not experience past year IPV ($p=0.031$). Significant differences were not observed for women who attended the facility alone or who were accompanied by someone other than their husbands.

5.5. DISCUSSION

This prospective study finds that modern contraceptive use four months post-abortion is high (85.4%), and family planning use at the time of the terminated pregnancy was the primary predictor of modern contraceptive use four months post-abortion. Though family and UE service delivery characteristics were not associated with modern contraceptive use at the time of the four-month follow-up, they were associated with timing of acceptance. MA and D&C clients demonstrated delayed acceptance compared to MVA clients, suggesting that these clients have a need for post-abortion contraception that is not being met on the day of their UE procedures, potentially putting them at risk of unwanted pregnancy. Women whose fertility intentions were discordant from their husband/partner's, and those who experienced IPV in the past year were significantly more likely to have delayed acceptance of contraception. Evidence suggests that the association between past year IPV experience and delayed acceptance differs by accompaniment to the health facility for the UE procedure, with IPV victims significantly more likely to have delayed acceptance if accompanied by their husband/partner to the UE procedure.

Modern contraceptive use four months post-abortion was only associated with family planning use at the time of the terminated pregnancy in the fully adjusted model. Women who were using family planning at the time of the terminated pregnancy had almost three times higher odds of using modern contraception four months post-abortion, compared to those who were not using at the time of the terminated pregnancy. This finding is consistent with studies in other settings, which have shown that history of contraceptive use is associated with post-abortion contraceptive acceptance (Tavrow et al., 2012). As a result, it is important to understand the patterns of contraceptive use that led to unwanted pregnancy. Evidence from Bangladesh suggests that myths and misperceptions that pill users should take “short breaks” from the method for health reasons are a reason for discontinuation (Ullah & Humble, 2006). Post-abortion contraceptive counseling provides an opportunity for providers to assess women's previous contraceptive use

patterns, and provide accurate information so that subsequent unwanted pregnancy can be avoided.

At the bivariate level, we also found evidence that women who received PAC for abortion were most likely to be using modern contraception at the time of the four-month follow-up; 90.6% of women receiving PAC for abortion were using modern contraception at the time of the four-month follow-up, compared to 87.3% of MR clients and 76.4% of PAC for miscarriage clients ($p=0.034$). This finding was not statistically significant after adjusting for socio-demographic characteristics, but does provide some evidence consistent with other studies, which have suggested that women experiencing complications of induced abortion are more motivated for post-abortion contraceptive use (Tavrow et al., 2012; Johnson et al., 2002).

Consideration of timing of acceptance over the four months following UE provided valuable additional information that might have been overlooked with an analysis of modern contraceptive continuation. At the individual level, among women using modern contraception at follow-up, women who want another child or who are ambivalent about future pregnancy were more likely to have delayed acceptance. This finding likely reflects the motivation to prevent subsequent pregnancy by using contraception immediately after abortion for women who want no more children. At the UE service delivery level, we find no differences in modern contraceptive use between MA and MVA users four months post-abortion, consistent with findings from India (Kalyanwala et al., 2012). However, we do observe delayed acceptance for MA and D&C clients. These findings suggest that MA and D&C clients do “catch up” in terms of contraceptive use over the four months following abortion, but it also indicates that they have a need for post-abortion contraception that is not being met on the day of their procedures, potentially putting them at risk of unwanted pregnancy. Interventions should focus on ensuring availability of a

range of contraceptive commodities in health facilities to increase access to methods for which the woman is medically eligible on the day of her UE procedure.

Family characteristics, especially characteristics of the woman's relationship with her husband/partner were also associated with timing of acceptance of modern contraception following a UE procedure. Women whose husband/partner had higher desire for the terminated pregnancy were significantly more likely to have delayed acceptance than those with concordant intentions (44.4% and 21.9%, respectively; $p=0.041$). Past year experience of physical or sexual IPV was also associated with delayed acceptance. Taken together, the findings in this paper suggest that while there are no differences in modern contraceptive use four months post-abortion by concordance of intentions and experience of IPV, the timing of acceptance differs. Since fertility can return within two weeks of an abortion procedure, it is important that women are able to accept a contraceptive method on the day of their UE procedures if they wish (World Health Organization, 2012). Studies from a variety of settings have shown that women who experience violence have less power within their relationships to negotiate contraceptive use, putting them at increased risk for unwanted pregnancy (Miller et al., 2010; Emenike et al., 2008). Women who experience these types of relationship dynamics may need additional support in accepting a method on the day of their UE procedures to enable them to control their fertility after an abortion experience.

This study identifies spousal accompaniment as a potential explanation for delayed acceptance among women who have experienced past year IPV. Among women whose husband/partner accompanied them to the health facility, 49.3% of women who experienced past year IPV had delayed acceptance, compared to only 19.7% of women who did not experience IPV ($p=0.031$). No differences were observed in timing of acceptance based on IPV experience when the husband/partner did not accompany the woman. While husband/partner accompaniment to

abortion services is seen as positive and supportive for some women in the South Asian context (Ganatra et al., 2010), it may be experienced as controlling or coercive for other women, especially when violence is present. We did not have power to detect an interaction between discordance in fertility intentions and spousal accompaniment on timing of acceptance. UE service providers should be trained in provision of confidential counseling conducted in a private place within the health facility to screen for violence if indicated (World Health Organization, 2013) and identify women's reproductive goals in comparison to her husband/partner's (Silverman & Raj, 2014). Women who experience these relationship dynamics may have a greater need for woman-controlled methods such as injectables and IUDs, and post-abortion contraceptive counseling provides an opportunity for providers to identify a woman's needs, match post-abortion contraceptive provision to these needs, and provide her with information on available support services (Silverman & Raj, 2014).

5.5.1. Limitations

The primary limitation of this study is the short follow-up period. Similar studies have used six-month or one-year follow-up periods, which provided power to assess important outcomes such as subsequent pregnancy (Puri et al., 2014; Kalyanwala et al., 2012). Another limitation of this study is that women without children were more likely to be lost to follow-up, which may result in selection bias. Modern contraceptive use four months post-abortion is likely to be lowest among nulliparous women, and the differential loss of these respondents could lead to an overestimate of modern contraceptive use at the time of the four-month follow-up. Another limitation is that we did not have calendar data on contraceptive use over the follow-up period, which would have provided a more detailed understanding of the timing of acceptance of modern contraception over time. In addition, we did not have data on sexual activity or resumption of menses after the UE procedure, and as a result, we do not know whether women were at risk for pregnancy at the time of the four-month follow-up interview. Finally, the external validity of the

findings is limited as the sample was restricted to government and NGO health facilities receiving an intervention to improve UE service provision, and neither long-acting method acceptors nor women under age 18 were included in the sample. In particular, the UE care characteristics may not be representative of the broader group of government facilities providing UE services in Bangladesh, especially DGHS facilities providing PAC services.

5.5.2. Conclusions

Among women receiving UE care, use of modern contraception four months post-abortion is high among women not intending pregnancy (85.4%), and family planning use at the time of the terminated pregnancy was the primary predictor. Post-procedure contraceptive counseling should assess contraceptive failure and inconsistent contraceptive use that led to unwanted pregnancy, and dispel myths and misperceptions about contraception that could lead to subsequent unwanted pregnancy.

Though no differences in modern contraceptive use four months post-abortion were observed based on family or UE service delivery characteristics, these characteristics were important in understanding timing of acceptance. Findings suggest that women “catch up” in terms of contraceptive use over the four months following abortion, but they also indicate that many women have a need for post-abortion contraception that is not being met on the day of their UE procedures, potentially putting them at risk of unwanted pregnancy. A woman’s relationship dynamic with her husband/partner, including discordance in fertility intentions and experience of IPV, was associated with delayed acceptance of contraception. Findings also suggest that the association between IPV experience and delayed acceptance can be explained by husband/partner accompaniment to the health facility for the UE procedure. Though male involvement in reproductive health is positive for many women, it is important for healthcare providers to recognize that this involvement may be coercive for some women. Abortion care may be an

important point of contact with the healthcare system for women experiencing violence, and an opportunity to regain control of their fertility through abortion and receipt of effective post-abortion contraception. Interventions should focus on ensuring that contraceptive commodities are available to women on the day of their UE procedures to prevent gaps in coverage, and on training providers in confidential counseling to appropriately match post-abortion contraceptive provision with women's needs.

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Figure 5.1. Study eligibility and outcomes of interest

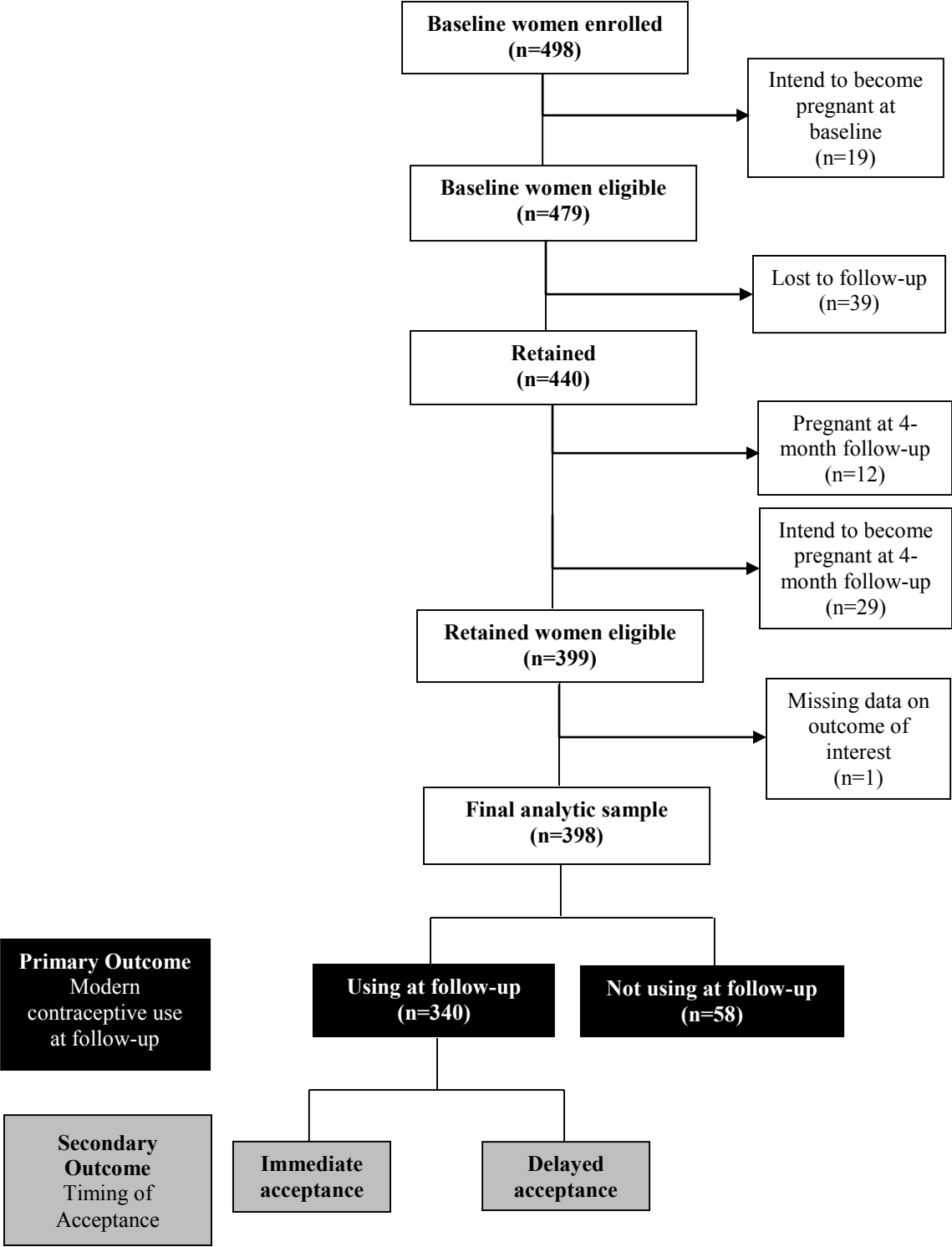


Table 5.1. Modern contraceptive use at four-month follow-up by characteristics of study sample (n=398)

Socio-demographic Characteristics	Total (n=398)		Not Using (n=58)		Using (n=340)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Modern contraceptive use at follow-up	398	(100)	58	(14.6)	340	(85.4)	
Age (<i>mean (SE)</i>)	27.8	(0.44)	27.7	(1.24)	27.8	(0.45)	0.972
Husband/partner's age (<i>mean (SE)</i>)	35.3	(0.60)	35.7	(1.17)	35.3	(0.65)	0.772
Education							0.504
None	55	(13.8)	12	(21.8)	43	(78.2)	
Primary	120	(30.2)	18	(15.0)	102	(85.0)	
Secondary or higher	223	(56.0)	28	(12.6)	195	(87.4)	
Husband/partner's education							0.749
None	64	(16.1)	12	(18.8)	52	(81.2)	
Primary	116	(29.1)	16	(13.8)	100	(86.2)	
Secondary or higher	218	(54.8)	30	(13.8)	188	(86.2)	
Religion							0.436
Islam	356	(89.4)	54	(15.2)	302	(84.8)	
Hinduism	41	(10.3)	4	(9.8)	37	(90.2)	
Buddhism	1	(0.3)	0	(0)	1	(100)	
Marital status							---
Married	397	(99.7)	58	(14.6)	339	(85.4)	
Formerly married	1	(0.3)	0	(0)	1	(100)	
Number of children							0.002
No children	52	(13.1)	14	(26.9)	38	(73.1)	
1-2 children	235	(59.0)	26	(11.1)	209	(88.9)	
3 or more children	111	(27.9)	18	(16.2)	93	(83.8)	
Household structure							0.082
Nuclear	223	(56.0)	28	(12.6)	195	(87.4)	
Extended	175	(44.0)	30	(17.1)	145	(82.9)	
Husband/partner's residence							0.014
Husband/partner lives with her	369	(92.7)	49	(13.3)	320	(86.7)	
Husband/partner lives elsewhere	29	(7.3)	9	(31.0)	20	(67.0)	
Residence							0.262
Urban	225	(56.5)	29	(12.9)	196	(87.1)	
Rural	173	(43.5)	29	(16.8)	144	(83.2)	
Rural to urban migrant							0.694
Yes	94	(23.6)	13	(13.8)	81	(86.2)	
No	304	(76.4)	45	(14.8)	259	(85.2)	
Division							0.660
Dhaka	190	(47.7)	24	(12.6)	166	(87.4)	
Sylhet	93	(23.4)	13	(14.0)	80	(86.0)	
Chittagong	50	(12.6)	12	(24.0)	38	(76.0)	
Rajshahi	65	(16.3)	9	(13.8)	56	(86.2)	

^a Row percentages are reported

^b F-test p-value from simple logistic regression of socio-demographic characteristic on modern contraceptive use at follow-up, accounting for complex survey design

Table 5.2. Potential predictors by modern contraceptive use at four-month follow-up (n=398)

	Total (n=398)		Not Using (n=58)		Using (n=340)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Baseline Predictors							
Modern contraceptive use at follow-up	398	(100)	58	(14.6)	340	(85.4)	
Individual Characteristics							
History of MR							0.058
No history of MR	284	(71.4)	45	(15.8)	239	(84.2)	
Previous MR experience	114	(28.6)	13	(11.4)	101	(88.6)	
Fertility Intentions							
<i>Terminated pregnancy intentions</i>							
Family planning use at time of pregnancy							0.002
Not using family planning	173	(43.5)	40	(23.1)	133	(76.9)	
Using family planning	225	(56.5)	18	(8.0)	207	(92.0)	
Avoidance score (<i>mean (SE)</i>)	7.5	(0.28)	6.3	(0.47)	7.7	(0.30)	0.017
Woman's intentions-terminated pregnancy							<0.001
Wanted then or ambivalent	93	(23.4)	22	(23.7)	71	(76.3)	
Mistimed or unwanted	305	(76.6)	36	(11.8)	269	(88.2)	
<i>Future fertility intentions</i>							
Woman's future fertility intentions							0.282
Want a/another child or ambivalent	189	(47.5)	33	(17.5)	156	(82.5)	
Want no (more) children	209	(52.5)	25	(12.0)	184	(88.0)	
Family Characteristics							
Discordance in Fertility Intentions							
Husband/partner's relative intentions-terminated pregnancy ^c							0.804
Concordant	360	(92.1)	54	(15.0)	306	(85.0)	
Discordant – Higher	31	(7.9)	4	(12.9)	27	(87.1)	
Husband/partner's relative intentions-future pregnancies ^d							0.192
Concordant	372	(93.9)	57	(15.3)	315	(84.7)	
Discordant – Higher	24	(6.1)	1	(4.2)	23	(95.8)	
Women's Power within the Family							
<i>Intimate partner violence</i>							
Physical or sexual IPV in past year ^e							0.751
Did not experience IPV	268	(73.8)	40	(14.3)	228	(85.7)	
Experienced IPV	95	(26.2)	15	(15.5)	80	(84.5)	
<i>Accompaniment to the health facility</i>							
Accompaniment to health facility for UE procedure							0.952
None/alone	42	(10.5)	6	(14.3)	36	(85.7)	
Husband accompanied	206	(51.8)	31	(15.0)	175	(85.0)	
Someone else accompanied	150	(37.7)	21	(14.0)	129	(86.0)	
<i>Household decision-making</i>							
Decision-making for family planning use							0.137
Not involved	25	(6.3)	6	(24.0)	19	(76.0)	
Involved	373	(93.7)	52	(13.9)	321	(86.1)	
Decision-making for her healthcare							0.696
Not involved	63	(15.8)	8	(12.7)	55	(87.3)	
Involved	335	(84.2)	50	(14.9)	285	(85.1)	

Table 5.2. Potential predictors by modern contraceptive use at four-month follow-up (n=398), continued

Baseline Predictors	Total (n=398)		Not Using (n=58)		Using (n=340)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Modern contraceptive use at follow-up	398	(100)	58	(14.6)	340	(85.4)	
UE Service Delivery Characteristics							
Facility/unit type							0.119
DGHS	161	(40.5)	31	(19.3)	130	(80.7)	
DGFP or RHSTEP clinic	237	(59.5)	27	(11.4)	210	(88.6)	
Type of treatment received							0.034
PAC for miscarriage	89	(22.4)	21	(23.6)	68	(76.4)	
MR	245	(61.5)	31	(12.7)	214	(87.3)	
PAC for abortion	64	(16.1)	6	(9.4)	58	(90.6)	
UE procedure type							0.325
MVA	294	(73.9)	40	(13.6)	254	(86.4)	
MA	33	(8.3)	3	(9.1)	30	(90.9)	
D&C	71	(17.8)	15	(21.1)	56	(78.9)	
Post-abortion contraceptive counseling received							0.415
No	95	(23.9)	18	(18.9)	77	(85.1)	
Yes	303	(76.1)	40	(13.2)	263	(86.8)	
Time spent in post-abortion contraceptive counseling							0.696
None	95	(23.9)	18	(18.9)	77	(81.1)	
Less than 5 minutes	113	(28.4)	14	(12.4)	99	(87.6)	
5 minutes or longer	190	(47.7)	26	(13.7)	164	(86.3)	
Accepted contraceptive method at baseline							0.106
No	102	(25.6)	21	(20.6)	81	(79.4)	
Yes	296	(74.4)	37	(12.5)	259	(87.5)	

Acronyms: D&C, dilation and curettage; DGFP, Directorate General of Family Planning; DGHS, Directorate General of Health Services; IPV, intimate partner violence; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; RHSTEP, Reproductive Health Services Training and Education Program; UE, uterine evacuation

^a Row percentages are reported

^b F-test p-value from simple logistic regression of predictor on modern contraceptive use at follow-up, accounting for complex survey design

^c One category of discordance in intentions regarding the terminated pregnancy, Discordant-Lower (n=7), was excluded from the analysis due to the small sample size

^d One category of discordance in future pregnancy intentions, Discordant-Lower (n=2), was excluded from the analysis due to the small sample size

^e Multiple imputation variable. Original n (i.e. n≠398), and imputed percent and F-test p-value presented

Table 5.3. Logistic regression results of association between modern contraceptive use at four-month follow-up and potential predictors (n=398)

Baseline Predictors	Model 1: Individual Characteristics AOR^a (95% CI)	Model 2: Uterine Evacuation Service Delivery Characteristics AOR^a (95% CI)	Model 3: Full Model AOR^a (95% CI)
Individual Characteristics			
<i>Terminated pregnancy intentions</i>			
Family planning use at time of terminated pregnancy			
Not using family planning (ref)	1.00		1.00
Using family planning	2.96 * (1.31 – 6.68)		2.94 * (1.33 – 6.47)
Avoidance score-terminated pregnancy	1.08 (0.95 – 1.23)		1.09 (0.92 – 1.27)
Woman’s intentions-terminated pregnancy			
Pregnancy wanted then or ambivalent (ref)	1.00		1.00
Mistimed or unwanted	1.05 (0.26 – 4.31)		1.04 (0.26 – 4.11)
UE Service Delivery Characteristics			
Type of treatment received			
PAC for miscarriage (ref)		1.00	1.00
MR		1.71 (0.96 – 3.05)	0.99 (0.39 – 2.53)
PAC for abortion		2.60 (0.88 – 7.71)	1.81 (0.52 – 6.37)

Acronyms: MR, menstrual regulation; PAC, post-abortion care; UE, uterine evacuation

* p<0.05

^a All models adjust for education, number of children and husband’s residence and all variables listed in column

Table 5.4. Bivariate association between timing of acceptance of modern contraception and potential predictors, among women using modern contraception at four-month follow-up (n=340)

Baseline Predictors	Total (n=340)		Immediate Acceptance (n=259)		Delayed Acceptance (n=81)		p-value^b
	n	(%)	n	(%)^a	n	(%)^a	
Timing of acceptance	340	(100)	259	(76.2)	81	(23.8)	
Individual Characteristics							
History of MR							0.345
No history of MR	239	(71.4)	186	(77.8)	53	(22.2)	
Previous MR experience	101	(28.6)	73	(72.3)	28	(27.7)	
Fertility Intentions							
<i>Terminated pregnancy intentions</i>							
Family planning use at time of pregnancy							0.810
Not using family planning	133	(43.5)	100	(75.2)	33	(24.8)	
Using family planning	207	(56.5)	159	(76.8)	48	(23.2)	
Avoidance score (<i>mean (SE)</i>)	7.5	(0.28)	8.1	(0.27)	6.2	(0.79)	0.067
Woman's intentions-terminated pregnancy							0.182
Wanted then or ambivalent	71	(23.4)	46	(64.8)	25	(35.2)	
Mistimed or unwanted	269	(76.6)	213	(79.2)	56	(20.8)	
<i>Future fertility intentions</i>							
Woman's future fertility intentions							0.009
Want a/another child or ambivalent	156	(47.5)	107	(68.6)	49	(31.4)	
Want no (more) children	184	(52.5)	152	(82.6)	32	(17.4)	
Family Characteristics							
Discordance in Fertility Intentions							
Husband/partner's relative intentions-terminated pregnancy ^c							0.041
Concordant	306	(92.1)	239	(78.1)	67	(21.9)	
Discordant – Higher	27	(7.9)	15	(55.6)	12	(44.4)	
Husband/partner's relative intentions-future pregnancies ^d							0.726
Concordant	315	(93.9)	239	(75.9)	76	(24.1)	
Discordant – Higher	23	(6.1)	18	(78.3)	5	(21.7)	
Women's Power within the Family							
<i>Intimate partner violence</i>							
Physical or sexual IPV in past year ^e							0.026
Did not experience IPV	228	(74.7)	183	(80.5)	45	(19.5)	
Experienced IPV	80	(25.3)	50	(63.2)	30	(36.8)	
<i>Accompaniment to the health facility</i>							
Accompaniment to health facility for UE							0.768
None/alone	36	(10.5)	30	(83.3)	6	(16.7)	
Husband accompanied	175	(51.8)	130	(74.3)	45	(25.7)	
Someone else accompanied	129	(37.7)	99	(76.7)	30	(23.3)	
<i>Household decision-making</i>							
Decision-making for family planning use							0.269
Not involved	19	(6.3)	17	(89.5)	2	(10.5)	
Involved	321	(93.7)	242	(75.4)	79	(24.6)	
Decision-making for her healthcare							0.222
Not involved	55	(15.8)	49	(89.1)	6	(10.9)	
Involved	285	(84.2)	210	(73.7)	75	(26.3)	

Table 5.4. Bivariate association between timing of acceptance of modern contraception and potential predictors, among women using modern contraception at four-month follow-up (n=340), continued

Baseline Predictors	Total (n=340)		Immediate Acceptance (n=259)		Delayed Acceptance (n=81)		p-value^b
	n	(%)	n	(%)^a	n	(%)^a	
Timing of acceptance	340	(100)	259	(76.2)	81	(23.8)	
<i>UE Service Delivery Characteristics</i>							
Facility/unit type							0.437
DGHS	130	(40.5)	86	(66.2)	44	(33.8)	
DGFP or RHSTEP clinic	210	(59.5)	173	(82.4)	37	(17.6)	
Type of treatment received							0.304
PAC for miscarriage	68	(22.4)	41	(60.3)	27	(39.7)	
MR	214	(61.5)	184	(86.0)	30	(14.0)	
PAC for abortion	58	(16.1)	34	(58.6)	24	(41.4)	
UE procedure type							<0.001
MVA	254	(73.9)	222	(87.4)	32	(12.6)	
MA	30	(8.3)	13	(43.3)	17	(56.7)	
D&C	45	(17.8)	24	(42.9)	32	(57.1)	

Acronyms: D&C, dilation and curettage; DGFP, Directorate General of Family Planning; DGHS, Directorate General of Health Services; IPV, intimate partner violence; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; RHSTEP, Reproductive Health Services Training and Education Program; UE, uterine evacuation

^a Row percentages are reported

^b F-test p-value from simple logistic regression of predictor on timing of acceptance, accounting for complex survey design

^c One category of discordance in intentions regarding the terminated pregnancy, Discordant-Lower (n=7), was excluded from the analysis due to the small sample size

^d One category of discordance in future pregnancy intentions, Discordant-Lower (n=2), was excluded from the analysis due to the small sample size

^e Multiple imputation variable. Original n (i.e. n≠340) and imputed percent reported

Table 5.5. Immediate or delayed post-abortion contraceptive acceptance over four-month follow-up by past year experience of physical or sexual IPV, stratified by accompaniment to the health facility on the day of the uterine evacuation procedure (n=340)

	Total (n=340)		Immediate Acceptance (n=259)		Delayed Acceptance (n=81)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
<i>Attended facility alone</i>	36	(10.5)					
Physical or sexual IPV in past year ^c							0.422
Did not experience IPV	20	(83.3)	17	(86.8)	3	(13.2)	
Experienced IPV	13	(16.7)	10	(77.4)	3	(22.6)	
<i>Husband/partner accompanied</i>	175	(51.8)					
Physical or sexual IPV in past year ^c							0.031
Did not experience IPV	122	(74.3)	98	(80.3)	24	(19.7)	
Experienced IPV	34	(25.7)	17	(50.7)	17	(49.3)	
<i>Someone else accompanied</i>	129	(37.7)					
Physical or sexual IPV in past year ^c							0.373
Did not experience IPV	86	(76.7)	68	(79.1)	18	(20.9)	
Experienced IPV	33	(23.3)	23	(70.9)	10	(29.1)	

Acronym: IPV, intimate partner violence

^a Row percentages are reported

^b F-test p-value from simple logistic regression of IPV on timing of acceptance, accounting for complex survey design

^c Multiple imputation variable. Original n (i.e. n≠340) and imputed percent reported

CHAPTER 6:

**THE INTERSECTION OF INTIMATE PARTNER VIOLENCE AND CONSTRAINTS
TO REPRODUCTIVE AUTONOMY AND REPRODUCTIVE HEALTH: A CROSS-
SECTIONAL STUDY OF UTERINE EVACUATION CLIENTS IN BANGLADESH**

6.1. ABSTRACT

Intimate partner violence (IPV) negatively impacts women's health and well-being, particularly in Bangladesh where an estimated 30% of women have experienced physical and/or sexual IPV in the past year. The present study seeks to understand the intersection of experience of past year IPV and other domains of women's constrained reproductive autonomy, and the influence of IPV on abortion-related reproductive health outcomes. This cross-sectional analysis of baseline data was conducted on a facility-based sample of 457 UE clients in Bangladesh aged 18-49. Over 25% of women in the sample experienced past year physical or sexual IPV. Past year IPV was associated with higher prevalence of discordance in fertility intentions between women and their husband/partner and in-laws. IPV was also associated with in-law opposition to family planning use (PR=3.21; 95% CI: 1.50 – 6.87) and religious prohibition of family planning use (PR=1.63; 95% CI: 1.09 – 2.44). Women who experienced IPV also had higher prevalence of coming to the health facility alone for their UE procedures, compared to being accompanied by their husbands/partners (PR=2.25; 95% CI: 1.05 – 4.85). IPV was associated with reproductive health outcomes, including a higher prevalence of post-abortion care for abortion, compared to menstrual regulation (MR) (PR=2.39; 95% CI: 1.01 – 5.70). IPV was also associated with higher prevalence of seeking medication abortion (MA), compared to manual vacuum aspiration (MVA) as the UE procedure type (PR=2.38; 95% CI: 1.57 – 3.62). Findings suggest that IPV is common among UE clients, and is associated with multiple other potential constraints to women's reproductive autonomy and reproductive health. Since UE care is a point of interaction with the healthcare system, it offers an opportunity to provide women with support, information, and services that can allow them to regain reproductive control. At the health facility level, policies should ensure that women can access MR services unaccompanied and without family consent. In addition, UE provider training should be considered to ensure provision of confidential post-abortion contraceptive counseling, which could improve providers' ability to appropriately match post-abortion contraceptive provision to women's needs, including greater focus on woman-

controlled contraceptive methods such as IUDs and injectables. Beyond the health facility, provision of MA through pharmacies provides an opportunity for increasing access to safe MR and restoring reproductive control to women who face multiple threats to their reproductive autonomy.

6.2. BACKGROUND

Intimate partner violence (IPV) negatively impacts women's health and well-being and is a major contributor to poor reproductive health (World Health Organization et al., 2013; Silverman & Raj, 2014). Globally, one in three women experiences physical or sexual IPV during her lifetime (World Health Organization et al., 2013). In Bangladesh, the rates are higher; the World Health Organization (WHO) Multi-country Study on Women's Health and Domestic Violence found that an estimated 50-60% of Bangladeshi women have experienced physical and/or sexual intimate partner violence in their lifetimes, and 30% have experienced such violence in the past year (Garcia-Moreno et al., 2006). The United Nations (UN) Multi-country Study on Men and Violence in Asia and the Pacific found similar rates; over 60% of ever-partnered men in Bangladesh reported perpetrating IPV during their lifetimes (Fulu et al., 2013).

IPV is associated with poor reproductive health outcomes in a variety of settings, including Bangladesh (World Health Organization et al., 2013; Silverman & Raj, 2014; Silverman et al., 2007; Pallitto et al., 2013). Recent studies in Bangladesh have demonstrated that IPV experience is associated with a 50-60% increase in unwanted pregnancy and over two times higher odds of abortion (AOR=2.60) (Silverman et al., 2007; Pallitto et al., 2013), suggesting that women who experience IPV have more limited control over their fertility. This lack of control may be a direct result of reproductive coercion from their husband/partner, or an indirect result of restrictions on mobility or autonomous decision-making. The increased risk of abortion among women who experience IPV is of particular concern in settings such as Bangladesh where abortion services are often unsafe (Singh et al., 2012), presenting an increased risk of maternal mortality (Silverman & Raj, 2014). Abortion clients are a key population for understanding IPV and its influence on women's reproductive health.

In addition to physical and sexual violence, women in Bangladesh experience gender-based inequality in reproductive health and empowerment (United Nations Development Program, 2014). The Gender Inequality Index (GII) assesses three dimensions of inequality: reproductive health, measured by maternal mortality and adolescent fertility rates; empowerment measured by the proportion of parliamentary seats held by each gender and secondary or higher educational attainment by each gender; and economic activity measured through labor market participation for each gender (United Nations Development Program, 2014). In 2013 Bangladesh ranked 115 out of 151 countries, with a GII value of 0.529 (United Nations Development Program, 2014). Beyond the macro level, husbands and other family members such as in-laws play an important role in women's lives in Bangladesh, often acting as gatekeepers for health service utilization due to patriarchal cultural norms and women's economic dependence (Schuler et al., 1995). In addition to IPV, both individual level and family level factors are of interest in relation to women's reproductive autonomy. At the individual level, perceived access to family planning may be related to women's sense of reproductive agency. At the family level, discordance in fertility intentions within the family and three domains of women's power within the family are of interest: opposition to family planning, accompaniment to the health facility, and involvement in household decision-making.

At the individual level, perceptions about access to family planning can be related to barriers such as distance from a health facility or other family planning depot holder or cost of family planning methods. However, in the context of IPV, perceptions about access to family planning may be related to women's sense of reproductive agency. Studies have demonstrated that women who experience IPV have lower reproductive agency, including decreased ability to use contraception effectively due to partner refusal and contraceptive sabotage (Fanslow, et al., 2008; Miller et al., 2007).

At the family level, discordance in fertility intentions, the most common form being more pronatalist preferences of the husband/partner, has been shown to be associated with increased fertility (DaVanzo, Peterson, and Jones 2003; Gipson and Hindin 2009). Discordance in fertility intentions between a woman and her husband/partner in the context of IPV may indicate pressure by the husband/partner either to continue a pregnancy that she wants to terminate or to terminate a pregnancy that she wishes to continue (Silverman & Raj, 2014; Silverman et al., 2010). Less is known about discordance with in-laws' intentions, but failing to obey the in-laws has been cited as a reason for IPV in rural Bangladesh, suggesting the higher status and power of in-laws within the household (Schuler et al., 1996). Recent studies in Sierra Leone found high rates of in-law abuse and reproductive control (Gupta et al., 2012) as well as co-occurrence between IPV and in-law perpetrated reproductive coercion (McCauley et al., 2014), which highlights the influence of in-laws and suggests multiple layers of reproductive control within the family. Beyond discordance in fertility intentions women may experience limited power within the family, including constrained decision-making authority, mobility and direct opposition to family planning use. A study in two rural areas of Bangladesh demonstrated that women's autonomy is inversely related to IPV experience; women who are free to move unaccompanied, who are involved in household decision-making, and who have control over financial resources are less likely to experience IPV (Koenig et al., 2003). Ethnographic work in Bangladesh has shown that even women who do not face direct opposition to family planning from their husbands and in-laws lack support for family planning use (Schuler et al., 1995). Women feel solely responsible for potential ill effects of contraception, and fear violence that could result from lost fertility or productivity (Schuler et al., 1995).

While studies have demonstrated the multiple vulnerabilities of women who experience IPV, less is known about the intersection of IPV and other domains of reproductive autonomy among UE clients. The present study seeks to understand the connection between experience of past year

IPV and other potential constraints to reproductive autonomy, and ultimately the influence of IPV on abortion-related reproductive health outcomes among UE clients in Bangladesh.

6.3. METHODOLOGY

This study entails cross-sectional analysis of baseline data collected under a prospective parent study that aimed to understand short-acting post-abortion contraceptive use. The parent study enrolled a facility-based sample of 498 UE clients aged 18-49 years. All study procedures received ethical approval from the Bangladesh Medical Research Council in Dhaka and the Allendale Investigational Review Board in the United States. This study was submitted for review by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) (IRB Number: 00005702), and the IRB determined that review was not required because Erin Pearson was listed as a researcher on the original protocol for the parent study being conducted by another institution.

6.3.1. Sample

The sample was drawn from among the pool of government and non-governmental organization (NGO) facilities receiving an intervention to train providers in woman-centered UE service provision and to ensure that appropriate equipment and infection prevention supplies were available. There are 5,301 public sector facilities in Bangladesh offering UE services (Vlassoff et al., 2012), and compared to the broader group of facilities where UE services are provided, facilities included in this study are more likely to be in urban settings such as Dhaka. Because all participating facilities received the intervention, study participants received approximately similar UE care. A stratified one-stage cluster sampling approach was used to select women for this study. Facilities were stratified by type and were randomly selected using probability proportional to size (PPS) sampling within facility type strata. The sampling frame consisted of

47 facilities (18 primary, 16 secondary, 5 tertiary, and 8 NGO facilities), and 16 were randomly selected for inclusion in this study.

Within selected facilities, all women receiving UE⁷ services, including menstrual regulation (MR)⁸ or post-abortion care (PAC)⁹, were screened for study eligibility. Inclusion criteria for parent study participation included: 18-49 years of age; received MR or PAC services using any procedure type; and accepted pills, injectables, or condoms as a post-abortion contraceptive method, or selected no method. The parent study focused on users of short-acting post-abortion contraceptive methods and non-users, and as a result, women who selected a long-acting or permanent post-abortion contraceptive method were ineligible for participation. A total of 555 women were approached for participation and 498 were enrolled in the parent study; the response rate was 90%. Women completed an interviewer-administered survey at the health facility after their UE procedures (including MR or PAC services), and a follow-up survey four months post-UE. Interviewer-administered surveys were conducted in Bangla and lasted 30-45 minutes. Questionnaires were developed in English and translated to Bangla. The questionnaires were back-translated and pilot-tested, and adjustments were made as necessary. Data collection occurred from March to October 2013.

Consistent with international ethical standards for research on violence against women (World Health Organization, 2001), interviewers were prompted to confirm privacy before proceeding to the questions regarding violence experience. If privacy could not be assured, these questions

⁷ In this study, the term uterine evacuation (UE) will be used to include both induced abortion and post-abortion care (PAC) procedures.

⁸ Menstrual regulation (MR) procedures are legal and widely available in Bangladesh to induce menstruation and establish non-pregnancy up to ten weeks from the last menstrual period. Though MR is performed without confirming pregnancy, and can theoretically be performed to address menstrual disturbances other than pregnancy, this study will consider MR to be equivalent to induced abortion.

⁹ PAC procedures treat incomplete abortion and complications resulting from either induced or spontaneous abortion (miscarriage).

were skipped. As a result, 41 women (8%) had incomplete IPV data. Missingness was assessed by socio-demographic characteristics, and was found to be differential by division of residence and rural to urban migrant status. This was due to clustering of missingness in a few facilities where privacy was difficult to obtain, and is not expected to introduce selection bias, as missingness was associated with the facility rather than key characteristics of the woman, such as age, education or parity. The analytic sample for this study is restricted to the 457 women who had complete data on IPV.

6.3.2. Measures

The exposure of interest in this study was past year experience of IPV. The measure for IPV included experience of either physical or sexual violence perpetrated by the woman's husband or sexual partner. The standard questions from the 2007 Bangladesh Demographic and Health Survey (DHS) were used (NIPORT et al., 2009), which are based on the validated and widely used Conflict Tactics Scales (CTS2) (Straus et al., 1996). Women were asked, "In the past year has your husband/partner hit, kicked, slapped or otherwise physically hurt you?" and "In the past year, has your husband/partner physically forced you to have sexual intercourse with him even when you did not want to?" (NIPORT et al., 2009). If a woman answered yes to either of these questions, she was coded as having experienced past year IPV.

Outcomes assessed in this study included individual and family level measures of constrained reproductive autonomy, and measures of women's reproductive health. At the individual level, perceived access to family planning was assessed. At the family level, discordance in fertility intentions within the family, and three domains of women's power within the family were assessed: opposition to family planning, accompaniment to the health facility, and involvement in household decision-making. Reproductive health outcomes included history of MR, UE treatment received, and UE procedure type.

At the individual level, *perceived access to family planning* was assessed through a series of three yes/no questions regarding her perceptions about challenges to family planning use. Women were asked how difficult it is to obtain family planning, whether family planning is too expensive, or too inconvenient to use. Each was assessed as a dichotomous measure of whether she agreed with the statement.

At the family level, discordance in fertility intentions was assessed both for intentions regarding the terminated pregnancy and for future fertility intentions. Women's fertility intentions regarding the terminated pregnancy were assessed using a question from the 2010 FECOND survey, "Right before you became pregnant, did you want to become pregnant then, did you want to wait until later, did you not want to have any (more) children, or did you not think about it?" (Institut National D'études Demographiques, 2010). Women were asked the same question about her husband/partner's and in-laws' intentions. The husband/partner's intentions were ordered from highest to lowest desire for fertility (wanted then, ambivalent, mistimed or unwanted), and *discordance in husband/partner's intentions regarding the terminated pregnancy* was analyzed in three categories relative to the woman's intentions based on the work done by Schoen et al. (1999): concordant, discordant – higher, and discordant – lower. A similar measure was constructed for *discordance in in-laws' intentions regarding the terminated pregnancy*. Future fertility intentions were assessed by asking women whether they wanted a/another child in the future, and they were asked the same question about their husband's preferences. As described for intentions regarding the terminated pregnancy, the husband/partner's preferences were ordered from highest to lowest desire for fertility and categorized as: want a/another child, ambivalent, or want no (more) children. The husband/partner's future pregnancy intentions were again analyzed relative to the woman's intentions, and *discordance in husband/partner's future fertility intentions* was analyzed in three categories: concordant, discordant – higher, and discordant –

lower. For all three measures of discordance in fertility intentions, the discordant – lower category was excluded from the analysis due to the small number of respondents in this category.

Also at the family level, women’s power within the family was assessed under three domains: opposition to family planning, accompaniment to the health facility, and household decision-making. *Opposition to family planning* was measured by asking women a series of yes/no questions about whether their husband/partner, in-laws and religion oppose family planning use: “Is your husband/partner opposed to using family planning methods?”, “Are your in-laws opposed to you using family planning methods?”, and “Does your religion prohibit you from using family planning methods?” Measures were analyzed as three separate dichotomous variables. *Accompaniment to the health facility* was measured by asking women to list the people who accompanied them to the health facility for their UE procedures. This variable was analyzed in three categories: none/alone if no one accompanied her, accompanied by husband/partner if she listed him as accompanying her, and accompanied by someone else if she said that someone came with her but did not list her husband/partner. *Household decision-making* was measured through two questions adapted from the 2011 Bangladesh DHS (NIPORT et al., 2013). Women were asked, “For each question, I would like for you to tell me whether the decision is usually made by you, your husband or partner, your in-laws, or someone else, or whether you make these decisions jointly with others.” (NIPORT et al., 2013). Decision-making regarding her healthcare and whether she should use a family planning method were dichotomized to indicate whether she was involved in each type of decision-making.

Reproductive health outcomes included history of MR, UE treatment received, and UE procedure type. *History of MR* was measured by asking women whether they had used MR in the past, and this was analyzed as a dichotomous variable. Though abortion is only legal to save the life of a woman in Bangladesh, MR is widely available to induce menstruation and establish non-

pregnancy within ten weeks of the last menstrual period (Bart Johnston et al., 2010). The type of UE treatment received is typically categorized as MR or PAC in Bangladesh. PAC clients may include women who have had a spontaneous abortion (miscarriage), those who unsuccessfully induced abortion outside the health system, and those who had an unsuccessful legal MR procedure. In this study, *type of UE treatment received* is categorized as MR, PAC for abortion, or PAC for miscarriage. Though we are able to delineate between PAC clients with induced versus spontaneous abortion, we are not able to ascertain whether women receiving PAC for abortion have attempted illegal abortion outside the health system, or if women are being seen for incomplete abortion or complications resulting from legal MR services. The PAC for abortion category is likely to include both groups as illegal abortion is equally as common as MR in Bangladesh, and it is estimated that 10% of women who receive MR services are treated for MR-related complications (Singh et al., 2012). In addition to the type of treatment received, we also measured *UE procedure type*, which was categorized as manual vacuum aspiration (MVA), medication abortion (MA), or dilatation and curettage (D&C).

Socio-demographic characteristics were assessed using the standard questions from the 2011 Bangladesh DHS when possible (NIPORT et al., 2013). Place of residence was assessed by asking, “Do you currently live in a city, in a town, or in a village?”, and women were categorized as urban residents if they lived in a city or town and rural residents if they lived in a village. Migration was assessed by asking women if they had ever lived anywhere else, and if so, whether they had lived in a city, town or village. Women who reported that they currently lived in a town or city, but previously lived in a village were considered rural to urban migrants. Each woman was also asked about her husband or partner’s age and education. Household type was classified as nuclear if she reported currently living with only her husband/partner or children and extended if she reported living with any other family members.

6.3.3. Data Analysis

Socio-demographic characteristics are presented for the full sample and by IPV experience. Means are presented for continuous variables, and percentages are presented for categorical variables. To test bivariate associations between socio-demographic characteristics and IPV experience on the multiply imputed data, an F-test was used from simple logistic regression models.

Each potential constraint to reproductive autonomy and reproductive health outcome is presented for the full sample and by IPV experience. Multivariable models were used to test the association between experience of IPV and each outcome measure, adjusting for socio-demographic characteristics. Adjusted prevalence ratios, the equivalent of risk ratios for cross-sectional studies, were calculated using multinomial logistic regression models for categorical outcome measures and generalized linear models using log-binomial maximum likelihood estimators for dichotomous outcome measures. The Poisson distribution was specified if the model failed to converge using the binomial distribution. This is a conservative approach, which is expected to result in valid point estimates with confidence intervals that are wider than those that would result from the log-binomial estimates (Spiegelman & Hertzmark, 2005). For the generalized linear models, 95% confidence intervals were hand-calculated by transforming the endpoints; this approach was used to match the confidence intervals calculated by Stata for the multinomial logistic regression models (Sribney & Wiggins, 2009). All multivariable models adjusted for age, education, and rural to urban migrant status. Age and education were included as *a priori* hypothesized confounders. Rural to urban migrant status and division of residence were associated with IPV, but division was excluded due to the small number of facilities sampled in Chittagong and Rajshahi divisions. Sensitivity analyses were conducted, and division was excluded because adjusting for division in addition to accounting for the complex survey design led to unstable models with wide confidence intervals.

Missing data were addressed in two ways. For variables with less than 2% of cases missing, values were imputed to the mean. For five outcome variables (husband/partner's opposition to family planning use, religious prohibition of family planning use, difficulty obtaining family planning, expense of obtaining family planning, and inconvenience of family planning use) more than 2% of observations were missing (up to a maximum of 8% missing for religious prohibition of family planning use). As these were outcome variables to be used in separate models, univariate imputation was used to generate ten imputations for each variable. The imputation models included IPV as the exposure of interest, socio-demographic characteristics, and variables used to identify the clusters and strata. All analyses were run on the multiple imputation dataset using Stata/SE 12.1, accounting for the complex survey design. Significance was assessed at an alpha of 0.05 for all analyses.

6.4. RESULTS

In this sample, women were an average of 27 years old, 81.8% had at least one child, over half (55.0%) had secondary or higher education, most (88.8%) were Muslim, and almost all (99.8%) were currently married (Table 6.1). Over half of the sample (58.9%) resided in urban areas, and one quarter (25.4%) were rural to urban migrants. More than half (55.4%) of women lived in nuclear households, while 44.6% lived in extended households. Almost one tenth (8.1%) of women in the sample had a husband who was living away from home at the time of her UE procedure. Husbands were an average of 35 years old, and half (54.3%) had secondary or higher education. One quarter of women in the sample (25.8%) experienced IPV in the past year. Among women who experienced IPV, 71.2% experienced physical IPV and 61.9% experienced sexual IPV (data not shown). One third (33.1%) of the women who experienced IPV in the past year experienced both physical and sexual IPV (data not shown). No differences were observed in socio-demographic characteristics by IPV experience, except by rural to urban migrant status

and division. Over one-third (35.3%) of women who were rural to urban migrants experienced IPV in the past year, compared to 22.6% of women who were not rural to urban migrants ($p=0.007$). IPV was prevalent among over 30% of women from Dhaka and Rajshahi divisions (32.6% and 30.4%, respectively), compared to only 23.0% in Chittagong and 12.0% in Sylhet divisions ($p=0.041$).

IPV experience was associated with potential constraints to reproductive autonomy at the individual and family levels (Table 6.2). At the individual level, experience of IPV was associated with perceived access to family planning. Women who experienced IPV had 1.81 times higher prevalence of reporting that family planning is too difficult to obtain (95% CI: 1.05 – 3.09), and 1.73 times higher prevalence of reporting that family planning is too inconvenient to use (95% CI: 1.01 – 2.95). At the family level, discordance with the husband/partner's intentions regarding the terminated pregnancy was associated with IPV; women experiencing IPV had 2.41 times higher prevalence of having a husband/partner with higher desire for fertility, compared to a husband/partner with concordant intentions regarding the terminated pregnancy (95% CI: 1.46 – 3.98). In addition, IPV experience was associated with discordance with in-laws' intentions regarding the terminated pregnancy. Among women who knew their in-laws' preferences, discordance with higher desire for fertility was common (28.1% overall), but this was especially true for women experiencing IPV, 43.2% of whom reported that their in-laws had higher desire for the terminated pregnancy. In the adjusted model, women who experienced past year IPV had a 1.98 times higher prevalence of having in-laws with higher desire for fertility at the time of the terminated pregnancy, compared to concordant intentions (95% CI: 1.44 – 2.74). In addition, women who experienced IPV had 2.92 times higher prevalence of discordance in future pregnancy intentions (95% CI: 1.62 – 5.26), indicating that they were more likely to perceive that their husband/partner wanted more children when they did not. IPV was also associated with measures of women's power within the family. Past year IPV was associated with a 3.21 times

higher prevalence of reporting that their in-laws were opposed to family planning use (95% CI: 1.50 – 6.87), and a 1.63 times higher prevalence of reporting that their religion prohibits family planning use (95% CI: 1.09 – 2.44). Coming alone to the health facility for the UE procedure was rare (9.6% of women overall), but women who experienced IPV had a 2.25 times higher prevalence of coming to the health facility unaccompanied for their UE procedures (95% CI: 1.05 – 4.85).

Past year IPV experience was also associated with women's reproductive health outcomes (Table 6.3). Women who experienced IPV had 1.49 times higher prevalence of history of MR (95% CI: 1.08 – 2.07). IPV experience was also associated with a 2.39 times higher prevalence of PAC for abortion, compared to MR (95% CI: 1.01 – 5.70). In addition, women who experienced IPV had a 2.38 times higher prevalence of using medication abortion (MA), which can be used covertly, compared to manual vacuum aspiration (MVA) (95% CI: 1.57 – 3.62).

6.5. DISCUSSION

One quarter of women in the sample reported IPV in the past year, which in turn was associated with other potential constraints to reproductive autonomy and reproductive health outcomes. Findings suggest that husbands/partners, in-laws, and religious communities play a role in women's reproductive lives, with women who experience IPV facing discordance in fertility intentions within the family, and in-law and religious opposition to family planning use. Evidence linking IPV with PAC services for abortion rather than legal MR suggests that women who experience IPV may be more likely to attempt abortion outside of the health system illegally. Finally, as this is a care-seeking population, findings provide potential insights into strategies used by women experiencing IPV to control their fertility. Women experiencing IPV were more likely to seek UE services unaccompanied, and to select MA as their UE procedure method,

which may be a strategy used by women to simulate miscarriage and terminate a pregnancy covertly, without the abusive husband/partner knowing that the abortion was induced. Findings from this study help identify the multiple threats to reproductive autonomy faced by women who experience IPV, and begin to understand strategies women may use to control their fertility in the presence of violence.

At the individual level, we find evidence that women who experience IPV perceive impeded access to family planning. Despite widespread availability of short-acting methods at the community level, IPV was associated with reporting that family planning is too difficult to obtain and too inconvenient to use. Almost one quarter of current contraceptive users in Bangladesh receive their method free of charge from government field workers, and one third of current users access family planning through pharmacies (NIPORT et al., 2013). Our findings may indicate that women who experience violence lack reproductive agency, which makes family planning use difficult. Alternatively, IPV may more directly impact access to family planning if women have restricted mobility or are subject to reproductive coercion, which makes them feel that family planning is difficult to obtain and too inconvenient in light of their circumstances.

At the family level, IPV was associated with discordance in fertility intentions and aspects of women's power within the family. Women who experienced IPV were more likely to report fertility intentions that were discordant from their husband/partner's and in-laws' intentions, indicating comparatively more pronatalist attitudes among family members of women who experience IPV. Women who experience IPV may be subject to fertility pressure or pregnancy coercion, and have a greater need for long-acting contraceptive methods that can be used covertly. IPV was also associated with in-law opposition to family planning use. Little is known about the role of in-laws in women's reproductive lives, but a study in Sierra Leone found high co-occurrence between IPV and in-law abuse and in-law perpetrated reproductive coercion

(McCauley et al., 2014). That IPV was associated with discordance in in-laws' fertility preferences and opposition to family planning use suggests that women who experience IPV face pressure for childbearing that may extend to experiences of abuse or reproductive coercion from their in-laws in addition to their husbands/partners. Ethnographic work in Bangladesh has demonstrated the interplay between fulfilling in-laws' role expectations and IPV (Schuler et al., 1996), and expectations about childbearing likely contribute to abuse experiences. IPV was also associated with religious prohibition of family planning use. Other studies have found that Muslim women are more likely to experience IPV compared to Hindu women (Silverman et al., 2007; Koenig et al., 2003). This study finds equivalent rates of past year IPV among Muslim and Hindu women (25.9% and 26.0%, respectively), but findings could indicate higher rates of violence among those who are more religiously conservative or who live in more culturally conservative areas. Finally, though coming unaccompanied to the health facility was rare (9.6%), women who experienced IPV were more likely to come alone on the day of their UE procedures. This may indicate that women who experience IPV are more likely to access UE services covertly, without the knowledge of their families.

The association between IPV and reproductive health outcomes gives insight into possible patterns. Women who experienced past year IPV were more likely to have a history of MR, which suggests barriers to contraceptive use over time. Women experiencing IPV also had a higher prevalence of accessing PAC for abortion, compared to care for legal MR. This may indicate that women who experience violence are more likely to access abortion care outside of the health system, possibly covertly, though this study cannot ascertain the safety or quality of that care. Women seeking care for incomplete abortion or complications of abortion could range from those who have attempted to self-induce using herbs or instruments, to those who access MA through pharmacies and present at the facility to ensure that the abortion is complete. This study also finds that women who experience violence are more likely to select MA compared to

MVA, which suggests that women who experience violence seek UE methods that could be considered covert. There is some qualitative evidence from Bangladesh that women who experience violence select MA in order to appear as if they are having a miscarriage in order to hide the termination from their families (Marlow et al., forthcoming). Taken together, these findings suggest that women who experience violence may have a need for more effective, long-acting woman-controlled methods such as injectables and IUDs that can be provided on the day of their UE procedures without anyone's knowledge.

To address disparities in reproductive health outcomes for women who experience violence, interventions should be considered at multiple levels. At the community level, interventions should engage husbands/partners, in-laws and religious communities to ease constraints to women's reproductive autonomy. At the national level, legalization of MA provision through pharmacies should be considered as a harm reduction strategy to reduce recourse to unsafe abortion. MA holds great promise as a safe method of abortion that may have particular benefits as a covert method of abortion for women experiencing violence (Marlow et al., forthcoming; Silverman & Raj, 2014). For women who experience violence, covertly accessing MA from a pharmacy may be more feasible and confidential than accessing it through a public sector health facility (Silverman & Raj, 2014). In addition, access to contraceptive commodities, especially woman-controlled methods such as IUDs and injectables, should be increased throughout the public sector health system. Currently, the full range of contraceptive methods is primarily available in public sector facilities under the auspices of the Directorate General of Family Planning (DGFP) and in NGO-run sexual and reproductive health clinics known as RHSTEP clinics. The majority of PAC clients seek care from facilities under the auspices of the Directorate General of Health Services (DGHS), which have limited supply of contraceptive commodities (Vlassoff et al., 2012). Findings from this study suggest that women who

experience violence are more likely to seek PAC for abortion, and as a result, access to woman-controlled methods should be ensured through DGHS facilities.

At the health facility level, policies should ensure that women are able to access confidential UE services without consent of a family member. Though not an official policy, women are often asked for a witness's consent for a MR procedure in order to protect the provider from legal action and due to judgmental attitudes of providers (Chowdhury & Moni, 2004). The witness is often the person accompanying the woman to the health facility, but can also be a member of the health facility staff. It is likely that this practice is inconsistently applied across facilities, and women may perceive that they need consent from their husband/partner for MR care. Facilities should eliminate the practice of requiring a witness's consent to ensure that women who may not have the support of their spouse, such as those experiencing IPV, are not deterred from accessing legal MR care.

In addition, all women should receive confidential post-abortion contraceptive counseling to understand women's fertility goals and any barriers they face to achieving their goals (Silverman & Raj, 2014). WHO recommends assessment of IPV experience for specific clinical conditions, including multiple pregnancy terminations and if the husband/partner is intrusive in healthcare consultations (World Health Organization, 2013a), and findings suggest that post-abortion contraceptive counseling should include IPV assessment for women who meet these criteria. Even for women who do not meet these criteria, confidential and respectful counseling is expected to provide an opportunity for women to disclose experiences of violence and reproductive coercion (Silverman & Raj, 2014; Miller et al., 2010). A recent study in India found that over two-thirds of women seeking infant immunization services would be willing to tell a doctor or nurse about violence and would want to receive information or assistance from the provider (Decker et al., 2013), suggesting that violence disclosure in the healthcare setting is

feasible in South Asia. Improved post-abortion contraceptive counseling could provide women with an opportunity to disclose violence experience, which would in turn improve providers' ability to more appropriately match contraceptive provision to women's needs and link them with available support services such as domestic violence hotlines and shelters.

6.5.1. Limitations

This study's findings are limited by the available data on IPV. Information on frequency of violence experience as well as broader measures of violence such as reproductive coercion would have provided a more complete picture of women's experience. The sample used for this study is unique in that it is one of the few samples of UE clients in Bangladesh, but women were only recruited from facilities receiving an intervention to improve UE service quality. In addition, young women under age 18 and long-acting and permanent method acceptors were excluded. As a result, women included in this study may not be representative of all UE clients in Bangladesh. Finally, fertility intentions of women's husbands and in-laws are based on the respondent's perception of their intentions rather than the husband and in-laws' reports of their intentions. It is possible that women who experience IPV report discordance in intentions due to family discord and violence rather than true discordance in fertility preferences.

6.5.2. Conclusions

Overall, study findings suggest that women who experience violence face multiple constraints to reproductive autonomy, and that IPV is associated with reproductive health outcomes, including accessing PAC for abortion compared to legal MR services. Interventions are needed at multiple levels to mitigate the impact of violence and lack of reproductive autonomy on women's reproductive health (Silverman & Raj, 2014). Findings from this study suggest that increasing access to MA is a potential strategy for improving women's ability to control their fertility covertly in the context of violence. In addition, health facility policies should be supportive of

women who come unaccompanied for UE services, and not deter women from legal MR care by requiring witness consent. Finally, at the community level, husbands/partners, in-laws, and religious communities should be engaged by interventions aiming to improve women's access to reproductive health services, including safe, legal UE care

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Table 6.1. Characteristics of study sample by past year experience of IPV (n=457)

Socio-demographic Characteristics	Total (n=457)		No IPV (n=339)		Past Year IPV (n=118)		p-value ^b
	n	(%)	n	(%) ^a	n	(%) ^a	
Past year experience of IPV	457	(100)	339	(74.2)	118	(25.8)	
Age (<i>mean (SE)</i>)	27.3	(0.46)	27.1	(0.57)	27.8	(0.67)	0.434
Husband/partner's age (<i>mean (SE)</i>)	34.8	(0.70)	34.8	(0.90)	35.1	(0.78)	0.784
Education							0.357
None	66	(14.4)	47	(71.2)	19	(28.8)	
Primary	140	(30.6)	96	(68.6)	44	(31.4)	
Secondary or higher	251	(55.0)	196	(78.1)	55	(21.9)	
Husband/partner's education							0.416
None	78	(17.1)	54	(69.2)	24	(30.8)	
Primary	131	(28.7)	95	(72.5)	36	(27.5)	
Secondary or higher	248	(54.3)	190	(76.6)	58	(23.4)	
Religion							0.983
Islam	406	(88.8)	301	(74.1)	105	(25.9)	
Hinduism	50	(10.9)	37	(74.0)	13	(26.0)	
Buddhism	1	(0.2)	1	(100)	0	(0)	
Marital status							--
Married	456	(99.8)	339	(74.3)	117	(25.7)	
Formerly married	1	(0.2)	0	(0)	1	(100)	
Number of children							0.941
No children	83	(18.2)	63	(75.9)	20	(24.1)	
1-2 children	257	(56.2)	191	(74.3)	66	(25.7)	
3 or more children	117	(25.6)	85	(72.6)	32	(27.4)	
Household structure							0.739
Nuclear	253	(55.4)	185	(73.1)	68	(26.9)	
Extended	204	(44.6)	154	(75.5)	50	(24.5)	
Husband/partner's residence							0.115
Husband/partner lives with her	420	(91.9)	318	(75.7)	102	(24.3)	
Husband/partner lives elsewhere	37	(8.1)	21	(56.8)	16	(43.2)	
Residence							0.102
Urban	269	(58.9)	187	(69.5)	82	(30.5)	
Rural	188	(41.1)	152	(80.9)	36	(19.1)	
Rural to urban migrant							0.007
Yes	116	(25.4)	75	(64.7)	41	(35.3)	
No	341	(74.6)	264	(77.4)	77	(22.6)	
Division							0.041
Dhaka	233	(51.0)	157	(67.4)	76	(32.6)	
Sylhet	117	(25.6)	103	(88.0)	14	(12.0)	
Chittagong	61	(13.3)	47	(77.0)	14	(23.0)	
Rajshahi	46	(10.1)	32	(69.6)	14	(30.4)	

^a Row percentages are reported^b F-test p-value from simple logistic regression of socio-demographic characteristic on IPV, accounting for complex survey design

Table 6.2. Regression results of past year experience of IPV and potential constraints to reproductive autonomy (n=457)

Outcome	Total (n=457)		No IPV (n=339)		Past Year IPV (n=118)		Prevalence Ratio ^b	(95% CI)
	n	(%)	n	(%) ^a	n	(%) ^a		
Past year experience of IPV	457	(100)	339	(74.2)	118	(25.8)		
Individual Level								
<i>Perceived Access to Family Planning</i>								
Family planning is too difficult to obtain ^f								
Not too difficult (ref)	401	(90.0)	302	(91.7)	99	(85.1)	1.00	
Too difficult	44	(10.0)	27	(8.3)	17	(14.9)	1.81	* (1.05 – 3.09)
Family planning is too expensive ^f								
Not too expensive (ref)	384	(88.1)	291	(90.9)	93	(80.1)	1.00	
Too expensive	52	(11.9)	29	(9.1)	23	(19.9)	2.04	(0.74 – 5.61)
Family planning is too inconvenient to use ^f								
Not too inconvenient (ref)	333	(78.6)	257	(82.1)	76	(68.6)	1.00	
Too inconvenient	89	(21.4)	54	(17.9)	35	(31.4)	1.73	* (1.01 – 2.95)
Family Level								
<i>Discordance in Fertility Intentions</i>								
Husband/partner's relative intentions-terminated pregnancy ^c								
Concordant (ref)	414	(90.6)	316	(93.2)	98	(83.1)	1.00	
Discordant – Higher	43	(9.4)	23	(6.8)	20	(16.9)	2.41	* (1.46 – 3.98)
In-laws' relative intentions-terminated pregnancy ^d								
Concordant (ref)	200	(71.9)	158	(77.5)	42	(56.8)	1.00	
Discordant – Higher	78	(28.1)	46	(22.5)	32	(43.2)	1.98	* (1.44 – 2.74)
Husband/partner's relative intentions-future pregnancies ^e								
Concordant (ref)	431	(94.3)	326	(96.2)	105	(89.0)	1.00	
Discordant – Higher	26	(5.7)	13	(3.8)	13	(11.0)	2.92	* (1.62 – 5.26)

Table 6.2. Regression results of past year experience of IPV and potential constraints to reproductive autonomy (n=457), continued

Outcome	Total (n=457)		No IPV (n=339)		Past Year IPV (n=118)		Prevalence	
	n	(%)	n	(%) ^a	n	(%) ^a	Ratio ^b	(95% CI)
Past year experience of IPV	457	(100)	339	(74.2)	118	(25.8)		
<i>Women's Power within the Family</i>								
<i>Household Decision-making</i>								
Decision-making for family planning use								
Not involved (ref)	33	(7.2)	22	(6.5)	11	(9.3)	1.00	
Involved	424	(92.8)	317	(93.5)	107	(90.7)	0.97	(0.90 – 1.05)
Decision-making for her healthcare								
Not involved (ref)	76	(16.6)	51	(15.0)	25	(21.2)	1.00	
Involved	381	(83.4)	288	(85.0)	93	(78.8)	0.92	(0.82 – 1.04)
<i>Opposition to Family Planning</i>								
Husband/partner opposes family planning use ^f								
Not opposed (ref)	422	(95.7)	319	(96.6)	103	(93.0)	1.00	
Opposed	18	(4.3)	11	(3.4)	7	(7.0)	2.09	(0.58 – 7.40)
In-laws oppose family planning use ^g								
Not opposed (ref)	293	(92.1)	228	(95.0)	65	(83.3)	1.00	
Opposed	25	(7.9)	12	(5.0)	13	(16.7)	3.21 *	(1.50 – 6.87)
Religion prohibits family planning use ^f								
Does not prohibit (ref)	319	(76.1)	245	(79.1)	74	(67.4)	1.00	
Prohibits family planning use	100	(23.9)	63	(20.9)	37	(32.6)	1.63 *	(1.09 – 2.44)
<i>Accompaniment to the Health Facility</i>								
Accompaniment to health facility for UE procedure								
Husband accompanied (ref)	246	(53.8)	193	(56.9)	53	(44.9)	1.00	
None/alone	44	(9.6)	26	(7.7)	18	(15.3)	2.25 *	(1.05 – 4.85)
Someone else accompanied	167	(36.6)	120	(35.4)	47	(39.8)	1.42	(0.74 – 2.75)

^a Column percentages are reported

^b All models adjusted for socio-demographic characteristics, including age, education and rural to urban migrant status.

^c One category of discordance in husband/partner's intentions regarding the terminated pregnancy, Discordant-Lower (n=12), was excluded from the analysis due to the small sample size

^d One category of discordance in in-laws' intentions regarding the terminated pregnancy, Discordant-Lower (n=8), was excluded from the analysis due to the small sample size. In addition, women who did not know their in-laws' intentions regarding the terminated pregnancy (37.4%) were excluded from the analysis.

^e One category of discordance in future pregnancy intentions, Discordant-Lower (n=3), was excluded from the analysis due to the small sample size

^f Multiple imputation variable. Original n (i.e. n≠457) and imputed percent presented.

^g Women who did not know whether their in-laws opposed family planning use (30.4%) were excluded from the analysis.

* Indicates significance at p<0.05

Table 6.3. Regression results of past year experience of IPV and reproductive health outcomes (n=457)

Outcome	Total (n=457)		No IPV (n=339)		Past Year IPV (n=118)		Prevalence Ratio ^b	(95% CI)
	n	(%)	n	(%) ^a	n	(%) ^a		
Past year experience of IPV	457	(100)	339	(74.2)	118	(25.8)		
History of MR								
No (ref)	332	(72.6)	258	(76.1)	74	(62.7)	1.00	
Yes	125	(27.4)	81	(23.9)	44	(37.3)	1.49	* (1.08 – 2.07)
Type of UE treatment received								
MR (ref)	270	(59.1)	209	(61.7)	61	(51.7)	1.00	
PAC for abortion	74	(16.2)	87	(12.7)	31	(26.3)	2.39	* (1.01 – 5.70)
PAC for miscarriage	113	(24.7)	43	(25.7)	26	(22.0)	0.93	(0.38 – 2.28)
UE procedure type								
MVA (ref)	340	(74.4)	258	(76.1)	82	(69.5)	1.00	
MA	35	(7.7)	20	(5.9)	15	(12.7)	2.38	* (1.57 – 3.62)
D&C	82	(17.9)	61	(18.0)	21	(17.8)	0.99	(0.39 – 2.52)

Acronyms: D&C, dilation and curettage; IPV, intimate partner violence; MA, medication abortion; MR, menstrual regulation; MVA, manual vacuum aspiration; PAC, post-abortion care; UE, uterine evacuation

^a Column percentages are reported

^b All models adjusted for socio-demographic characteristics, including age, education, and rural to urban migrant status.

* Indicates significance at p<0.05

CHAPTER 7:
CONCLUSIONS

7.1. SUMMARY OF FINDINGS

Post-abortion contraceptive provision supports women in controlling fertility and preventing unwanted pregnancy after a spontaneous or induced abortion, but it is an often overlooked component of uterine evacuation (UE) care. Key to successful scale-up of post-abortion contraceptive provision is an understanding of the multiple levels of influence, including the individual, family and UE service delivery factors that impact women's ability to use modern contraception effectively after a UE procedure.

The first manuscript in this dissertation (Chapter 4) explores the factors associated with post-abortion contraceptive acceptance and method selection on the day of the UE procedure among women who do not intend pregnancy within the four months following their procedure. Findings suggest that UE service delivery practices drive immediate post-abortion contraceptive acceptance and method selection. UE procedure type was the strongest correlate of immediate post-abortion contraceptive acceptance and method selection; both MA and D&C clients had significantly lower odds of accepting a method on the day of their UE procedures, compared to MVA clients after adjusting for socio-demographic characteristics, type of treatment received, facility type, and fertility intentions (AOR=0.07; 95% CI: 0.02 – 0.29 and AOR=0.18; 95% CI: 0.07 – 0.45, respectively). World Health Organization (WHO) guidelines state that women who receive MA can begin hormonal methods after taking the first pill in the MA regimen, but IUD insertion and sterilization should be delayed until the abortion is confirmed to be complete (World Health Organization, 2012). All modern contraceptive methods can be initiated immediately following a surgical abortion procedure (World Health Organization, 2012). As a result, we would not expect to see differences in short-acting post-abortion contraceptive provision for D&C or MA clients based on international clinical practice guidelines. We also find evidence of a bias toward pill provision in DGHS facilities despite having at least two methods of contraception available in each facility. Previous studies have demonstrated very low provision

of post-abortion contraception in DGHS facilities (Vlassoff et al., 2012), and it is a sign of progress that no differences in immediate post-abortion contraceptive acceptance were identified by facility type. However, findings suggest that additional work is needed in DGHS facilities to ensure that women have access to a range of methods for which they are medically eligible, and receive the method of their choice, rather than receiving a method as a matter of protocol.

The second manuscript (Chapter 5) is a prospective study which seeks to understand the predictors of modern contraceptive use four months following abortion and timing of acceptance of post-abortion contraception among UE clients not intending pregnancy in the four months following the UE procedure or in the month following the four-month follow-up interview. This study found that modern contraceptive use four months post-abortion was high (85.4%), and family planning use at the time of the terminated pregnancy was the primary predictor of modern contraceptive use four months post-abortion (AOR=2.94; 95% CI: 1.33 – 6.47). Post-abortion contraceptive counseling provides an opportunity for providers to assess women's previous contraceptive use patterns that led to unwanted pregnancy, and provide accurate information so that subsequent unwanted pregnancy can be avoided. Characteristics of UE service delivery and family characteristics were not associated with modern contraceptive use at the time of the four-month follow-up, but they were associated with timing of acceptance of modern contraception. MA and D&C clients demonstrated delayed acceptance compared to MVA clients, suggesting that these clients have a need for post-abortion contraception that is not being met on the day of their UE procedures. In addition, women whose fertility intentions were discordant from their husband/partner's and those who experienced physical or sexual IPV in the past year were significantly more likely to have delayed acceptance of modern contraception. Evidence suggests that the association between past year IPV and delayed acceptance differs by spousal accompaniment, and women whose husband/partner accompanied them to the health facility for the UE procedure were least likely to accept a post-abortion contraceptive method. Taken

together, findings suggest that women who experience these relationship dynamics are able to access modern contraception in the months following abortion, but may experience a delay in acceptance, especially if their husband/partner accompanies them to the health facility for the UE procedure.

The third manuscript (Chapter 6) is a cross-sectional study, which seeks to understand the intersection of experience of past year IPV and other potential constraints to women's reproductive autonomy, and ultimately the influence of IPV on reproductive health outcomes among UE clients in Bangladesh. One quarter (25.8%) of women in the sample reported physical or sexual IPV in the past year, which is consistent with population-based estimates (Garcia-Moreno et al., 2006). Women who experienced IPV also experienced other potential constraints to reproductive autonomy in multiple domains. Women who experienced past year IPV were more likely to face discordance in fertility intentions, with both the husband/partner and in-laws desiring higher fertility than the woman, possibly indicating family pressure for childbearing. This study also found that women who experienced IPV were more likely to encounter opposition to family planning from their in-laws and their religion, and to perceive that family planning is difficult to access, suggesting a lack of reproductive agency among women experiencing IPV. Past year IPV was also associated with women's reproductive health outcomes. Women who experienced IPV were more likely to report a history of MR, and to be treated for PAC for abortion, compared to care for legal MR. PAC for abortion may indicate higher prevalence of recourse to illegal and possibly unsafe abortion among women who experience IPV, but additional research is needed to understand women's pathways to UE care in Bangladesh. Finally, women experiencing IPV were more likely to come unaccompanied to the health facility for their UE procedure and to select MA as their UE procedure method, which may be a strategy used by women to simulate miscarriage in order to hide the termination from their families (Marlow et al., forthcoming). Findings from this study shed light on the multiple potential

constraints to reproductive autonomy faced by women who experience IPV, and help begin to understand strategies used by women to control their fertility in the presence of violence.

Overall, this dissertation finds that UE service delivery practices and family characteristics play a critical role in post-abortion contraceptive use. Use of post-abortion contraception was found to be higher four months post-abortion than on the day of the UE procedure (85.4% compared to 72.7%). Though this is a positive finding, it also highlights a need for post-abortion contraception that is not being met on the day of the UE procedure. Findings suggest that gaps in UE service delivery and relationship dynamics are responsible for this unmet need. Disparities were observed in outcomes for MA and D&C clients as well as women who attended DGHS facilities. In addition, women who experienced IPV and who reported discordance in fertility intentions with their husband/partner were more likely to have delayed acceptance, especially if accompanied to the facility by their spouse. The third manuscript provided more context for these findings, recognizing the intersection between experience of IPV and other potential constraints to women's reproductive autonomy. This manuscript also demonstrated that IPV is associated with potentially poor reproductive health outcomes such as PAC treatment for abortion compared to legal MR. However, IPV experience was also associated with outcomes such as selection of MA as the UE procedure method, which may be a strategy used by women to covertly induce abortion to regain control of their fertility in the context of IPV experience.

7.2. STRENGTHS AND LIMITATIONS

7.2.1. Strengths

This dissertation expands our understanding of post-abortion contraceptive use, extending past research into the domains of family relationships and UE service delivery. Past research has focused primarily on individual socio-demographic correlates of post-abortion contraceptive use (Zavier and Padmadas, 2012; Tavrow et al., 2012; Akhter, 1987). Though some studies have

considered UE care characteristics such as quality of post-abortion contraceptive counseling (Sultana et al., 2013) and UE procedure type (Kalyanwala et al., 2012), few have considered the role of family characteristics and the multiple levels of influence on women's ability to effectively use post-abortion contraception. This dissertation also provides insights into the overlap between experience of IPV and other potential constraints to women's reproductive autonomy, including perceptions about access to family planning, discordance in fertility intentions within the family, and aspects of women's power within the family.

The data used for this dissertation are unique in that they include both MR and PAC clients, and assess the type of UE treatment received. In settings where abortion is legally restricted, studies of post-abortion contraception typically focus on PAC clients who include both women who have had a spontaneous abortion (miscarriage) and those who previously had an induced abortion (Solo et al., 1999; Johnson et al., 2002). In settings where abortion is legal, studies of post-abortion contraception often exclude PAC clients (Sultana et al., 2013; Kalyanwala et al., 2012; Puri et al., 2014), presumably because they assume that the majority of PAC clients are being seen for spontaneous abortion and have different post-abortion contraceptive needs. However, in developing country settings where abortion outside the health system is common, such as Bangladesh, PAC clients are likely to include women who have attempted induced abortion, possibly under illegal or unsafe conditions, in addition to women who have experienced a miscarriage. By including both MR and PAC clients who do not intend pregnancy, and delineating between PAC clients seen for abortion and miscarriage, this dissertation provides a more complete picture of post-abortion contraceptive use.

7.2.2. Limitations

Though the sample used for this study is unique in that it is one of the few samples of UE clients in Bangladesh and includes women from all levels of the public sector health system, it is a

limitation that women were only recruited from facilities receiving an intervention to improve UE service quality. In addition, youth and long-acting and permanent post-abortion contraceptive acceptors are not included in this sample as they were ineligible for participation in the parent study. As a result, women included in this study may not be representative of all UE clients in Bangladesh. In particular, the UE care characteristics may not be representative of the broader group of government facilities providing UE services in Bangladesh, especially DGHS facilities providing PAC services. It is likely that we underestimate the role of service delivery characteristics in post-abortion contraceptive acceptance, as UE care is expected to be more uniform and of higher quality in the study facilities. In addition, because the parent study used a facility-based sample and did not collect data on the woman's place of residence, we are not able to create community-level measures. Studies have demonstrated the influence of community-level factors on behaviors such as IPV and contraceptive use (Koenig et al., 2003; DeGraff et al., 1997), and these data would have provided another useful level in the social-ecological model guiding this study.

The study design attempted to minimize information bias, but this remains a potential limitation of the dissertation. Fertility intentions of woman's husband/partner and in-laws were reported by the respondent, rather than the husband/partner and in-laws directly. Women who experience IPV or other family problems may be more likely to report discordance in intentions due to family discord and violence rather than true discordance in fertility preferences. In addition, fertility intentions regarding the terminated pregnancy were assessed on the day of the UE procedure, asking women to recall the way that they felt just before they became pregnant. This measure is subject to recall bias, and may be differential based on pregnancy outcome, especially for women receiving treatment for miscarriage (Santelli et al., 2009).

Though we have measured variables at each level, unmeasured confounding may be another limitation of this study. For example, Sultana et al. (2013) used a quality of care score based on 21 items, and demonstrated that quality of post-abortion contraceptive counseling is associated with contraceptive use three months post-abortion in Bangladesh. The data used for this dissertation included only two measures of quality of post-abortion contraceptive counseling, and neither was associated with post-abortion contraceptive acceptance or use four months post-abortion. It is likely that more comprehensive measures of quality of post-abortion contraceptive counseling would have provided more insight into the role of UE service delivery in post-abortion contraceptive use. In addition, information on frequency of violence experience as well as broader measures of violence such as reproductive coercion would have provided a more complete picture of women's IPV experience.

For the second manuscript (Chapter 5), there are additional limitations associated with the prospective data. Due to the relatively short four-month follow-up period, the study was not powered to assess outcomes such as subsequent pregnancy or pregnancy termination. In addition, we did not have data on sexual activity or resumption of menses after the UE procedure, and as a result, we do not know whether women were at risk for pregnancy at the time of the four-month follow-up interview. Potential selection bias resulting from loss to follow-up is also a concern. Though loss to follow-up was non-differential by most socio-demographic characteristics, differential loss by parity was observed. Modern contraceptive use four months post-abortion is likely to be lowest among nulliparous women, and the differential loss of these respondents could lead to an overestimate of modern contraceptive use at the time of the four-month follow-up. Another limitation is that calendar data on contraceptive use over the four-month follow-up period would have provided a more detailed understanding of the timing of acceptance of modern contraception over time. Finally, self-reported contraceptive use is sensitive to social desirability bias, and may have led to higher reports of contraceptive use at the four-month follow-up.

However, study findings are consistent with a similar study in Bangladesh, which found higher rates of contraceptive use at the three-month follow-up compared to the day of the UE procedure (Sultana et al., 2013).

7.3. IMPLICATIONS

This dissertation identifies gaps in UE service provision and family level factors as key predictors of post-abortion contraceptive use. To improve the effectiveness of post-abortion contraceptive provision at scale, interventions should be considered at the clinic, health system and community levels.

To address gaps resulting from UE service delivery characteristics, findings suggest that contraceptive commodity supply and provider training are crucial areas for intervention. At the health system level, it is important to ensure that a range of methods is available in all facilities where MR and PAC services are provided. In Bangladesh, because contraceptive commodities are procured through DGFP, availability of contraceptive commodities is limited in DGHS facilities. In this setting, DGHS should consider directly procuring contraceptive commodities, or formalizing a procurement system through DGFP. At the clinic level, providers should be trained on WHO clinical practice guidelines (World Health Organization, 2012), especially for MA clients, to ensure that all women are offered a method on the day of their UE procedures, regardless of their UE procedure type. As MA becomes more widely available in the government health system due to its recent approval, it is imperative that providers receive adequate training on post-abortion contraceptive provision for these clients.

Disparities in post-abortion contraceptive use related to family level characteristics are more challenging to address, but interventions at multiple levels could lead to improvements. At the clinic level, UE service providers should be trained in respectful, confidential post-abortion

contraceptive counseling to provide an opportunity for disclosure of violence experience or reproductive coercion (Silverman & Raj, 2014). In addition, WHO recommends IPV assessment for specific clinical conditions, including multiple pregnancy terminations and if the husband/partner is intrusive in healthcare consultations (World Health Organization, 2013). This dissertation finds that women who experience IPV are more likely to have had multiple pregnancy terminations, and that spousal accompaniment impacts immediate post-abortion contraceptive acceptance for women who have experienced past year IPV, which suggests that WHO criteria are appropriate in this setting. Findings suggest that service delivery protocols should include IPV assessment for women who meet these criteria, and women who identify themselves as experiencing IPV or reproductive coercion should receive appropriate counseling, both on woman-controlled methods of contraception such as IUDs and injectables and on available IPV support services (Silverman & Raj, 2014; World Health Organization, 2013). At the health system level, findings from this study suggest that increasing access to woman-controlled contraceptive commodities and MA are promising strategies for improving women's ability to control their fertility covertly in the context of IPV (Silverman & Raj, 2014). At the community level, findings suggest that husbands/partners, in-laws, and religious communities impact women's reproductive autonomy, and should be key groups for community interventions seeking to improve women's empowerment and access to reproductive health services, including safe, legal UE care.

Overall, this dissertation demonstrates that there are multiple levels of influence on women's post-abortion contraceptive use. Policies and programs should be designed accordingly to better meet women's needs. This dissertation also draws attention to the issue of intimate partner violence among UE clients, and reveals the multiple vulnerabilities of women experiencing IPV. We identify potential areas for intervention, but more research is needed to develop a more

nuanced understanding of women's experiences and strategies for overcoming constraints to their reproductive autonomy.

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Master of Public Health, Department of Maternal and Child Health
- University of Pennsylvania** **2005**
College of Arts and Sciences, Philadelphia, PA
Bachelor of Arts
Major: Biological Basis of Behavior
Minor: Health Services Management

PROFESSIONAL EXPERIENCE

- Ipas, Chapel Hill, NC** **Sep 2009-Present**
Senior Advisor, Research and Evaluation Unit *Jul 2012-Present*
Consultant, Research and Evaluation Unit *Sep 2009-Jun 2012*
- Provide technical assistance for research and evaluation studies in Asia and globally, including development of study protocols, sampling strategies, indicators, and analysis plans. Studies have included:
 - Randomized controlled trial to assess the effectiveness of an mHealth intervention to promote contraceptive choice and continuation among post-abortion clients in Bangladesh.
 - Evaluation of the Values Clarification and Attitudes Transformation (VCAT) curriculum to improve abortion-related knowledge, attitudes and behaviors in Pakistan.
 - Effectiveness of a community-based behavior change communication program to increase knowledge and improve perceptions about abortion in Bihar and Jharkhand, India.
 - Evaluation of a peer education program to improve youth sexual and reproductive health in Nepal.

- Provide technical assistance in monitoring and evaluation for Pakistan, Nepal and Bangladesh country programs aiming to prevent unsafe abortion through government health systems.
 - Provide evidence-based strategic direction for country programs.
 - Conduct participatory capacity building workshops for local NGO partners, government stakeholders, Ipas in-country staff, and consultants.
 - Produce donor reports, project reports, and peer-reviewed publications in collaboration with Ipas global and in-country staff and partnering organizations.
- Supervise U.S.-based data analyst and provide technical oversight for in-country staff.
- Represent Ipas at international meetings and conferences.

Johns Hopkins Bloomberg School of Public Health, Baltimore, MD Aug 2010-Aug 2014

Graduate Research Assistant, STARH-B study

Jul 2011-Aug 2014

- Conducted in-depth interviews with female sex workers in Baltimore City for the Sex Trade: Abuse, Risk and Health in Baltimore (STARH-B) study.
- Analyzed qualitative data and co-authored conference abstracts and manuscripts.

Graduate Research Assistant, Couple Unmet Need in West Africa study Sep 2011-Aug 2014

- Assessed a novel method of measuring unmet need for family planning among couples in Benin, Burkina Faso, and Mali using Demographic and Health Survey (DHS) data.
- Wrote a manuscript for peer-reviewed publication in *Studies in Family Planning* arguing for the importance of considering men's fertility preferences to measure demand for family planning.

Teaching Assistant, HIV Infection in Women, Children and Adolescents Mar 2013-May 2014

- Led discussion sessions, graded student assignments, and responded to student questions.

Graduate Research Assistant, GLOBUS Evaluation

Sep 2011-May 2012

- Analyzed qualitative data for an evaluation of the Global Efforts Against AIDS in Russia (GLOBUS) Project's impact on HIV prevention and gender-based violence among sex workers in Russia.
- Contributed to the evaluation report.

University of North Carolina, Chapel Hill, NC

Aug 2008-Jun 2011

Graduate Research Assistant, Maternal and Child Health

Sep 2009-Jun 2011

- Employed causal inference methods to determine the effect of special education program characteristics on developmental and educational outcomes for adolescents with autism.
- Co-authored a manuscript for peer-reviewed publication in *Pediatrics*.

Graduate Research Assistant, MEASURE Evaluation

Aug 2008-May 2009

- Examined the relationship between early marriage and intimate partner violence among youth in India.
- Supported MEASURE's population, health and environment monitoring and evaluation workshops.

UNICEF India, Jharkhand, India

Jun 2009-Aug 2009

Analyst, Knowledge Community on Children in India (KCCI)

- Designed an evaluation of *Janani Suraksha Yojana (JSY)*, a Government of India program that promotes institutional childbirth through conditional cash transfers, in three villages in East Singhbhum district.
 - Developed research methodology and qualitative interview guides.
 - Conducted in-depth interviews with program beneficiaries and other stakeholders.
 - Analyzed qualitative data, participant observations, and costing data.
 - Co-authored a case study on JSY in East Singhbhum district for publication by UNICEF India.
- Presented findings and made recommendations to Government of India officials and UNICEF's Chief Country Officer at a final dissemination workshop in Delhi.

International Center for Research on Women, Washington, DC

Aug 2006-Aug 2008

Research Assistant, Population and Social Transitions Team

Jul 2007 – Aug 2008

- Supported gender and women's health intervention research projects in South Asia on topics including:
 - Child marriage prevention
 - Integrated programming in adolescent sexual and reproductive health
 - Women's property rights
 - Son preference
 - The effect of the value chain on access to transformative reproductive health commodities
- Analyzed quantitative and qualitative data.
- Co-authored project reports and manuscripts for peer-reviewed publication and conference presentations.
- Managed work plans and project budgets.

Program Assistant, Senior Vice President, Strategic Initiatives

Aug 2006-Jul 2007

- Maintained institutional budgets for core support grants.
- Prepared proposals, presentations, donor reports, and maintained institutional project database.

Students Partnership Worldwide, Tamil Nadu, India

Jan 2006-May 2006

Volunteer Project Coordinator

- Worked on an international team to design and implement an adolescent sexual and reproductive health and empowerment program in a rural community through the local government secondary school.

Asia Society, Shanghai, China

Jun 2005-Aug 2005

Intern, AIDS in Asia Initiative

- Assisted in organizing a symposium targeting Chinese government officials and business people on the potential role of media and the arts in combatting HIV/AIDS-related stigma and discrimination in China.
- Contributed to a report chronicling the China symposium proceedings for publication by the Asia Society.

PEER-REVIEWED PUBLICATIONS

Pearson, E., Becker, S. (2014). Couples' unmet need for family planning in three West African countries. *Studies in Family Planning*, 45(3): 339-359.

Sherman, S.G., Footer, K., Illangasekare, S., Clark, E., **Pearson, E.**, Decker, M.R. (2014). "What makes you think you have special privileges because you are a police officer?" A qualitative exploration of police's role in the risk environment of female sex workers. *AIDS Care*, 1-8 [Epub ahead of print]

Decker, M.R., **Pearson, E.**, Illangasekare, S.L., Clark, E., Sherman, S.G. (2013). Violence against women in sex work and HIV risk implications differ qualitatively by perpetrator. *BMC Public Health*, 13: 876.

Banerjee, S.K., Andersen, K., Warvadekar, J., **Pearson, E.** (2013). Effectiveness of a behavior change communication intervention to improve knowledge and perceptions about abortion in Bihar and Jharkhand, India. *International Perspectives on Sexual and Reproductive Health*, 39(3): 142-151.

Andersen, K., Singh, A., Shrestha, M.K., Shah, M., **Pearson, E.**, & Hessini, L. (2013). Early pregnancy detection by female community health volunteers in Nepal facilitated referral for appropriate reproductive health services. *Global Health: Science and Practice Journal*, 1(3): 372-381.

Abdella, A., Fetters, T., Benson, J., **Pearson, E.**, Gebrehiwot, Y., Andersen, K., Gebreselassie, H., & Tesfaye, S. (2013). Meeting the need for safe abortion care in Ethiopia: Results of a national assessment in 2008. *Global Public Health*, 8(4): 417-434.

Basnett, I., Shrestha, M.K., Shah, M., **Pearson, E.**, Thapa, K., & Andersen, K.L. (2012). Evaluation of nurse providers of comprehensive abortion care using manual vacuum aspiration in Nepal. *Journal of the Nepal Health Research Council*, 10(20): 193-196.

Foster, E.M. & **Pearson, E.** (2012). Is inclusivity an indicator of quality of care for children with autism in special education? *Pediatrics*, 130(S2): S179-S185.

Geary, C.W., Gebreselassie, H., Paschal, A., & **Pearson, E.** (2012). Attitudes toward abortion in Zambia. *International Journal of Gynecology and Obstetrics*, 118S: S84-S87.

Levandowski, B., **Pearson, E.**, Lunguzi, J., & Katengeza, H.R. (2012). Reproductive health characteristics of young Malawian women seeking postabortion care. *African Journal of Reproductive Health*, 16(2): 253-261.

Otsea, K., Benson, J., Alemayehu, T., **Pearson, E.**, & Healy, J. (2011). Testing the safe abortion care model in Ethiopia to monitor service availability, use and quality. *International Journal of Gynecology and Obstetrics*, 115(3): 316-321.

Speizer, I.S., & **Pearson, E.** (2011). Association between early marriage and intimate partner violence in India: A focus on youth from Bihar and Rajasthan. *Journal of Interpersonal Violence*, 26(10): 1963-1981.

Nyblade, L., Edmeades, J., & **Pearson, E.** (2010). Measuring self-reported abortion-related morbidity: A comparison of measures in Madhya Pradesh, India. *International Perspectives on Sexual and Reproductive Health*, 36(3): 140-148.

TECHNICAL REPORTS

Biswas, K., **Pearson, E.**, Chowdhury, R., Andersen, K., Shahidullah, S. & Sultana, S. (2014). *Patterns and determinants of postabortion contraceptive use in Bangladesh*. Dhaka, Bangladesh: Ipas.

Biswas, K., **Pearson, E.**, Shahidullah, S., Sultana, S., Islam, F., Musa, S.A.J., Sharif, M., Das, T.R., Chowdhury, R. & Andersen, K. (2013). *Lessons learned from integration of postabortion care, menstrual regulation, and family planning services in Bangladesh*. Dhaka, Bangladesh: Ipas.

Bart Johnston, H., Edmeades, J., Nyblade, L., **Pearson, E.**, Serbanescu, & F., Stupp, P. (2010). Three approaches to improving the use of face-to-face interviews to measure abortion. In S. Singh, L. Remez, & A. Tartaglione (Eds.), *Methodologies for estimating abortion incidence and abortion-related morbidity: A review* (pp. 35-48). New York, NY: Guttmacher Institute.

Nyblade, L., Edmeades, J., **Pearson, E.**, & McDougall, J. (2010). Quantitative measures of self-reported data on abortion morbidity: A case study in Madhya Pradesh, India. In S. Singh, L. Remez, & A. Tartaglione (Eds.), *Methodologies for estimating abortion incidence and abortion-related morbidity: A review* (pp. 165-174). New York, NY: Guttmacher Institute.

Baruah, L., **Pearson, E.**, Sirari, T., & Stranger-Johannessen, E. (2009). *Janani Suraksha Yojana (JSY): Problems and prospects in East Singhbhum, Jharkhand*. New Delhi, India: UNICEF India.

Kanesathasan, A., Cardinal, L. J., **Pearson, E.**, Das Gupta, S., Mukherjee, S., & Malhotra, A. (2008). *Catalyzing Change: Improving youth sexual and reproductive health through DISHA, an integrated program in India*. Washington, DC: International Center for Research on Women.

CONFERENCE PRESENTATIONS

Pearson, E., Andersen, K., Biswas, K., Chowdhury, R., Sultana, S., Shahidullah, S.M., & Decker, M.R. (2015). *The intersection of intimate partner violence and constraints to reproductive autonomy and reproductive health: A cross-sectional study of uterine evacuation clients in Bangladesh*. Poster presentation at: Population Association of America Annual Meeting; 2015 April 30 - May 2; San Diego, USA.

Pearson, E., Biswas, K., Chowdhury, R., Andersen, K., Sultana, S., Shahidullah, S.M., Decker, M.R., & Moreau, C. (2015). *Fertility intentions at the time of conception among women terminating pregnancy and association with post-abortion contraceptive behaviors in Bangladesh*. Poster presentation at: Population Association of America Annual Meeting; 2015 April 30 - May 2; San Diego, USA.

Pearson, E., Biswas, K., Chowdhury, R., Sultana, S., Shahidullah, S.M., & Andersen, K. (2015). *Using mHealth to support post-abortion contraceptive use: Results from a feasibility study in urban Bangladesh*. Oral presentation in international plenary session at: National Abortion Federation Annual Meeting; 2015 April 20-21; Baltimore, USA.

Pearson, E., Biswas, K., Chowdhury, R., Andersen, K., Sultana, S., Shahidullah, S.M., Decker, M.R. (2014). *Determinants of short-term post-abortion contraceptive acceptance and method selection in Bangladesh*. Oral presentation presented at: IUSSP Seminar on Postpartum and Post-abortion Family Planning; 2014 November 11-13; Kochi, India.

Pearson, E., Biswas, K., Chowdhury, R., Andersen, K., Sultana, S., & Shahidullah, S.M. (2014). *Individual, family, and provider encounter level determinants of short-term post-abortion contraceptive acceptance, method selection and discontinuation in Bangladesh*. Poster presentation at: Population Association of America Annual Meeting; 2014 May 1-3; Boston, USA.

Pearson, E., Banerjee, S., Andersen, K. Warvadekar, J. (2013). *Evaluating the effectiveness of two behavior change communication interventions for safe abortion services in Bihar and Jharkhand, India*. Poster presentation at: Population Association of America Annual Meeting; 2013 April 11-13; New Orleans, USA.

HONORS AND AWARDS

Johns Hopkins Bloomberg School of Public Health

Johns Hopkins Sommer Scholar

2012-2015

- Selected by the department as the cohort's Sommer Scholar, receiving a full scholarship for doctoral studies and access to an enrichment program for development of leadership skills.

Pre-Doctoral Traineeship on Preventing and Addressing Violence in Families 2010-2012

- Selected by the department to receive the violence National Institute of Child Health and Human Development (NICHD) T32 training grant, receiving a full scholarship for the first two years of doctoral studies and access to specialized curriculum on violence research.

University of North Carolina Gillings School of Global Public Health

Delta Omega Honor Society in Public Health, Theta Chapter

2010

- Nominated by the department and inducted into the Delta Omega Honorary Society in Public Health.

University of North Carolina Graduate Merit Assistantship

2008-2009

- Selected by the university to receive a Graduate Merit Assistantship, receiving a full scholarship for graduate studies.

PUBLIC HEALTH SERVICE AND PRACTICE

- Served as a reviewer for journal articles in *International Journal of Gynecology and Obstetrics*, *BMC Women's Health*, *Sage Open Medicine* and *Archives of Women's Mental Health*.
- Member of the Population Association of America (PAA) and American Public Health Association (APHA).