
First Trimester Abortion Care in Low and Middle-income Countries

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Abstract: Access to first trimester abortions has increased significantly in the past few decades in low and middle-income countries. Manual vacuum aspiration is now standard of care for procedural abortion and postabortion care. Medication abortion has shifted abortions to being performed earlier in pregnancy and is becoming more widely available with new service delivery strategies to broaden access. Widespread availability of misoprostol has made abortions induced outside of the formal medical sector overall safer. In both legally restrictive and supportive environments, there is increased interest in self-managed abortions as part of a shift towards demedicalizing abortion through task-sharing.

Key words: abortion, first-trimester, manual vacuum aspirator, misoprostol, mifepristone, self-managed

Introduction

Globally, an estimated 56.3 million abortions occur each year; those occurring in low-to-middle-income countries (LMICs)

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account for ~86% of all abortions.¹ The vast majority, nearly 90% of abortions, take place in the first trimester. Increased access to technology enabling earlier detection of pregnancy and the rising access to and use of medication abortion have shifted abortions to being performed earlier in pregnancy.

In many LMICs, girls are attending school longer, more women are working outside of the home, and the age at first marriage has increased. Consequently, more women desire to delay childbearing and seek greater control over birth-spacing. In addition, desired family size has fallen dramatically; the increased desire for smaller families being most appreciable in Asia, Europe, and Central America.²

Rates of unintended and mistimed pregnancies have decreased with increasing access to and use of contraception, resulting in a decline in global abortion rates.³ However, where access to contraception lags behind women's changing fertility preferences, women may turn to abortion

as a way of controlling their fertility. Therefore, the incidence of abortions may be most reflective of the level of unmet need for contraception and contraceptive effectiveness in a given geographic area.

International Abortion Policy

In the last 20 years, > 30 countries have amended their laws to expand access to safe and legal abortion services.⁴ However, that still leaves over 40% of women of reproductive-age living in a country where abortion remains highly restricted. Nearly all countries with the most highly restrictive laws are LMICs. While there has been progress in legislatively liberalizing abortion access in many LMICs, El Salvador and Nicaragua are the notable exceptions and have taken steps to additionally restrict abortion.

The legislative environment in a country directly impacts the safety of abortion in that country. When legal access to abortion is restricted, women look to alternatives outside of the formal health care sector. Consequently, the prevalence of unsafe abortions increases when abortion restrictions increase, from 1% of all abortions being unsafe in countries with the least-restrictive laws to 31% in those in the most-restrictive laws.⁵ As restrictive abortion laws tend to coincide with restricting access to modern contraception, the number of unintended pregnancies has increased in LMICs with the most restrictive abortion laws.⁶ As a result, abortion rates are paradoxically highest in the most legislatively restrictive countries.

The impact of liberalizing abortion laws on decreasing maternal mortality has been well characterized in the literature. Six years after liberalizing its abortion laws, South Africa saw a 50% decrease in maternal mortality as rates of unsafe abortion fell; the number of hospitalizations and severity of postabortion complications fell markedly as well.⁷

Similarly, after abortion was legalized in 2004 in Nepal, the number of women admitted for complications of unsafe abortion and the severity of those complications significantly declined; the total number of maternal deaths in Nepal also declined.⁸

Access may depend on what is practically available beyond what is legally available. The United States remains the single largest donor to family planning and reproductive health programs overseas.⁹ However, 2 long standing US policies significantly limit access to abortion: the 1973 Helms amendment, which prohibits the use of US foreign assistance funds to pay for the provision of abortion services, followed by the 1984 Mexico City Policy, requiring foreign nongovernmental organizations to certify that they will not perform or promote abortion as a method of family planning as a condition of receiving US funding. Both policies have been rescinded and reinstated by alternating administrations along partisan lines and has now been in effect for 19 of the past 34 years.

Many organizations affected by this policy also provide contraception. In an analysis of countries in sub-Saharan Africa, the use of contraception declined by 14% in countries with high-exposure to the Mexico City Policy compared with those with low-exposure during periods when the policy was in place.¹⁰ Consequently, abortion rates increased by 40% in countries with high-exposure compared with those countries with low-exposure. By reducing these organizations' ability to supply modern contraceptives, the Mexico City Policy, ironically, increases abortion rates.

Unsafe Abortion and Postabortion Care (PAC)

Unsafe abortion remains a top 5 causes of maternal mortality with an estimated

47,000 deaths annually attributed to unsafe abortion; nearly all occurring in LMIC countries.¹¹ A recent systematic analysis estimates that 8% of all maternal deaths are due to unsafe abortion.¹² This finding is lower than the previous assessments, either suggesting that maternal mortality due to unsafe abortion is decreasing or misclassification and under-reporting are artificially lowering reports. There is significant geographic variation in proportion of maternal deaths attributed unsafe abortions: 0.8% in eastern Asia, 9.9% in Latin America and the Caribbean, and 9.6% in sub-Saharan Africa.

The World Health Organization (WHO) defines unsafe abortion as a procedure for terminating a pregnancy performed by persons lacking the necessary skills or in an environment not in conformity with minimal medical standards, or both.¹³ With recent changes in abortion provision and methods, a broader, more nuanced conceptual framework has been proposed to update the WHO definition in 2017.⁵ According to this framework, abortions would fall into 1 of 3 categories: safe, less safe, and least safe (with the latter 2 categories together comprising unsafe abortions). An abortion is classified as safe if it takes place using a safe method and is done by an appropriately trained provider (per WHO guidelines above); less-safe abortions are those that meet only one of the 2 criteria, and least-safe abortions are those that meet neither standard (Table 1). Using this definition, about 45% of abortions

globally are unsafe—31% are less safe and 14% are least safe.⁵ Of the estimated 25 million unsafe abortions each year, 97% take place in LMICs.

Women and untrained providers use many types of traditional and nonmedical methods to end unintended pregnancies. Past reports were rife with women inserting foreign objects into the vagina or cervix, liquids into the vagina, consuming alcohol, detergent, bleach, acid, turpentine, teas or pharmaceuticals, or inducing trauma to the abdomen. Fortunately, women seeking to terminate a pregnancy are increasingly able to obtain misoprostol to self-induce an abortion in response to the WHO's listing of misoprostol on the Essential Medication List in 2009.¹⁴

As a result, unsafe abortions are now less unsafe because fewer occur by invasive or toxic methods. However, women using misoprostol remain at risk of complications if they cannot get the necessary information to use the method correctly. PAC treatment rates have not declined despite the increase in access to misoprostol-only abortions.¹⁵ This may reflect a combination of a relatively high first-trimester failure rate associated with a misoprostol-only regimen, many women are inadequately informed about what to expect and seek care for what is an otherwise anticipated clinical course of bleeding or cramping, and some providers specifically instruct women to go to facilities for surgical aspiration soon after bleeding starts.¹⁶

In 2012, almost 7 million women were treated for complications of unsafe

TABLE 1. World Health Organization Updated Definitions of Abortion Safety (2017)

Traditional	Updated	Definition
Safe	Safe	Appropriately trained health care provider with methods recommended by World Health Organization
Unsafe	Less safe	Trained providers using nonrecommended (eg, sharp curettage) methods or using a safe method (eg, misoprostol) but without adequate information or support from a trained individual
	Least safe	Untrained people using dangerous, invasive methods

abortion in the LMICs.¹⁷ The current estimated annual PAC treatment rates in LMICs range from a relative low of 2.4 in Brazil to a high of 14.6 per 1000 women of reproductive age in Pakistan. In Africa, Kenya has the highest rate, with 13.4 per 1000 women seeking PAC. Countries reporting low rates could either represent low levels of morbidity or low levels of access to care. Notably, this study was unable to capture the severity of complications. Even though the number of women treated remains high, the proportion with severe complications may have declined with increased access to misoprostol-only regimens. Thus, the overall unchanged rates of women seeking out PAC is likely more reflective of increased access to PAC which should be viewed as progress in safety.

The WHO's new guideline *Health worker roles in providing safe abortion care and postabortion contraception* highlights the importance of enabling a wide range of health care workers to provide safe abortion and PAC.¹⁸ Through task-sharing in health systems and task-specific competency-based training, these guidelines broaden the scope of practice of many providers in LMICs. For example, manual vacuum aspiration (MVA) can be safely provided by associate (mid-level) clinicians, midwives, nurses, and, in specific circumstances, other workers such as auxiliary nurse midwives. This general trend towards reorganizing scopes of practice (often referred to as task-shifting or task-sharing) can improve access to PAC as this care is time-sensitive and delays in transfers could increase morbidity.

Trends in Those Seeking Abortions in LMICs

Official statistics are often incomplete or poor quality in many LMICs; the increased availability of mifepristone and

misoprostol outside of formal health systems poses additional challenges for measuring abortion incidence in many of these countries. A recent study created a Bayesian model to estimate the incidence of unintended pregnancy and abortion in 166 developing and developed countries using country-based surveys and aggregated data from studies found through a literature search.⁶ As data surrounding abortion and unintended pregnancy is ubiquitously plagued by underreporting and missing data, their model sought to account for the presumed missing data. They estimate in 2015 to 2019, there were 120 million unintended pregnancies annually, corresponding to a global rate of 64 unintended pregnancies per 1000 women of reproductive age. This model predicts 61% of these unintended pregnancies ended in abortion, for an estimated 73 million abortions annually.

This same model shows a decreasing trend in unintended pregnancies in the last 30 years. In 1990 to 1994, the global annual unintended pregnancy rate was 79 pregnancies per 1000 reproductive-aged women. The estimated decline in unintended pregnancy rate was steepest leading into 2000 and has continued to decline. Due to global population growth, the absolute number of unintended pregnancies annually continues to increase even as the relative rate is declining over the analysis period. While the rate of unintended pregnancies decreased, modeling predicted that most regions saw an increase in the percent of unintended pregnancies ending in abortion during this 30-year analysis period.

A recent study collated nationally representative data from 28 LMICs from 4 regions (Africa, Asia, Europe, Latin America and the Caribbean), collected between 2002 and 2014 offers emerging trends in demographic characteristics of those obtaining abortions by region.¹⁹ In all 4 regions sampled, most women seeking abortions were in their 20s. Nigeria

was the one exception where over one third of abortions took place among adolescents.

Among the African countries included in this analysis (Congo, Gabon, Ghana, Nigeria), significant variation existed in the distribution of abortions by parity. While only a quarter of abortions occurred among primiparous women in Congo Republic and Gabon, primiparous women in Ghana and Nigeria had the highest abortion rates. In the Central and South America region (Haiti, Mexico), abortions were relatively evenly distributed across parity, with slightly higher proportions reported among multiparous women. In 11 of the 12 Asian countries included (Armenia, Azerbaijan, Bangladesh, Cambodia, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Philippines, Uzbekistan, Vietnam), the majority of abortions (73% to 85%) occurred among multiparous women. Nepal was the outlier in this region where less than one third of abortions occurred among multiparous women. The disproportionate number of abortions occurring among multiparous married women in Asia suggests that these women may obtain abortions to space births or limit family size.

This study also found that a disproportionate proportion of abortions occurred among women of higher socioeconomic status in all 4 regions; with notable exceptions of Armenia and Azerbaijan where a higher proportion of abortions occurred among women in the poorest wealth quintile. As it is unlikely that women in higher socioeconomic classes have less access to contraception to prevent unintended pregnancy, the disproportionate share of abortions among these women is likely a reflection of better access to information on how to obtain abortion services and more empowerment to act on fertility preferences.

This theory is supported when looking at educational attainment among those that seek abortions. In 4 of the 5 African

countries with education data, women with at least 2 year of secondary education accounted for the majority of abortions, similarly ranging from 61% in Nigeria to 82% in Gabon. There was wide variation in Asian countries consistent with underlying distribution of educational opportunities by country; the percentage of abortions occurring among women with some secondary education ranged from 22% in Cambodia to 100% in Kyrgyzstan. In Pakistan, Nepal, and Bangladesh, women with secondary education were disproportionately represented among those having abortions.

In a separate analysis from this same group, data on the main reason women give for having an abortion was available for 13 countries.²⁰ More than 1 reason for having an abortion was reported in the majority of cases. Financial concern was the most commonly cited reason, followed by wanting to postpone or space a birth. Other main reasons were partner-related and health-related issues.

Procedural Abortion

The shift towards vacuum aspiration over sharp curettage for surgical management of first trimester abortion was adapted globally within the last 2 decades. Vacuum aspiration is associated with decreased blood loss, less pain, shorter duration of procedure, and fewer complications than sharp curettage.²¹ In 2003, the WHO recommended vacuum aspiration as the preferred surgical technique for first-trimester abortion and strongly recommends against sharp curettage as a standalone abortion procedure.²² In addition, no data suggest that use of curettage following vacuum aspiration decreases the risk of retained products although “sharp check,” or 1 pass with a sharp curette at the end of vacuum aspiration, remains prevalent as a relic of prior practice patterns.

MVA was designed for use in low-resource settings and is associated with lower costs compared with electric vacuum aspiration (EVA). MVA is more portable, less expensive, and does not require electricity, making its use favorable in resource-limited settings compared with EVA. A systematic review comparing MVA with EVA found no difference in complete abortion rates or participant satisfaction in early first trimester abortions occurring < 7 weeks gestation.²³ In addition, MVA was associated with less blood loss and less pain in this early first trimester study.

In much of the Indian sub-continent, abortion, despite being legal, remains highly restricted while menstrual regulation (MR) is widely available.²⁴ MR disrupts an early pregnancy—typically within 14 days of a missed menstrual period—before it is clinically recognized. A small-bore suction is used to “regulate” the endometrial lining ensuring that a woman either is not pregnant or does not remain pregnant by disrupting the early embryo. Essentially, this is an early first trimester procedural abortion without prior pregnancy confirmation. In 2010, an estimated 653,000 women in Bangladesh obtained MRs, a rate of 18 per 1000 women of reproductive age, similar to abortion rates in surrounding LMIC Asian counties.²⁵

Medication Abortion

Combination mifepristone and misoprostol is the preferred medication abortion regimen endorsed by the WHO.²⁶ Where mifepristone is unavailable, a misoprostol-only regimen is acceptable though less effective. Given robust evidence showing no difference in safety or efficacy by type of trained provider in the first trimester, new WHO guidelines recommend that medication abortions be provided by trained mid-level providers instead of doctors.¹⁸ This is overall consistent with

the ongoing shift towards task-sharing to expand abortion access and reduce costs.

There is recent evidence that medication abortion can be successfully managed late in the first trimester, specifically for pregnancies through 11 weeks gestation. The efficacy of mifepristone and a single dose of misoprostol decreases with advancing gestational age. A systematic review reported average efficacy rates of 96.7% in the eighth week, 95.2% in the ninth week, and 93.1% in the 10th week.²⁷ In a noninferiority trial comparing efficacy of mifepristone and misoprostol in among pregnancies 64 to 70 days and 71 to 77 days of gestation found successful expulsion without surgical intervention was achieved in 92.3% of the earlier gestational age group and 86.7% of the later group.²⁸ The WHO now supports outpatient medication abortion through 84 days gestation.²⁶ Beyond 12 weeks gestation, repetitive doses of misoprostol are recommended (Table 2).

Impact of Increased Access To Medication Abortion

Population-level access to misoprostol has had a direct impact on safety of abortion. This was first noted in the 1980s in Brazil where the incidence of infection was 12 times lower in women using misoprostol compared with women stating that they had used other methods to self-induce abortion.²⁹ Following government restrictions limiting the availability of misoprostol in 1991, 1 Brazilian city experienced a tripling of maternal mortality.³⁰ With the introduction of misoprostol to the Dominican Republic, abortion complications decreased from 11.7% of abortions in 1986 to 1.7% in 2001.³¹ This natural before and after experiment has been repeated in multiple settings and strongly supports access to misoprostol and the inclusion of misoprostol on the WHO essential medication list.

TABLE 2. Updated Medication Abortion Regimens Per World Health Organization Guidelines (2018)

	Combination Regimen (Preferred)		Misoprostol-only (Alternative)
	Mifepristone	1-2 Days Misoprostol	Misoprostol
< 12 wk	200 mg PO once	800 µg buccal, PV, or SL once	800 µg buccal, PV, or SL once
Over 12 wk	200 mg PO once	400 µg buccal, PV, or SL every 3 h	400 µg buccal, PV, or SL every 3 h

PO indicates oral; PV, vaginal; SL, sublingual.

In a region of some of the most highly restrictive abortion laws, the use of misoprostol is now common in much of Latin America and the Caribbean. In 2007, misoprostol-only was used in an estimated 30% of abortions in Mexico and in over 50% of abortions in Colombia.³² This trend towards access to and use of self-managed misoprostol is similar in Africa where nearly 60% of those presenting for PAC in the second-largest hospital in Ghana reported using misoprostol.³³

Expanding Access To Medication Abortion Through Novel Delivery Methods

The ease of inducing first trimester abortion with medication has led to innovative service delivery models.

Similar to MR described in procedural abortions, there is growing interest and availability of Missed Period Pills in the Indian subcontinent.²⁴ This is provision of low-dose mifepristone (100 to 150 mg) and misoprostol through the medical sector for treatment of delayed menses to allow women to ensure they are not pregnant by inducing bleeding without requiring knowledge of one's initial pregnancy status. This early medication abortion could also be considered a form of postfertilization contraceptive. As Missed Period Pills decreases logistical challenges of initiating contraception before sexual intercourse and may only be needed a few times a year

when one's menstrual period is late, this is an area of growing international interest.³⁴

In the early 1990s, the NGO Women on Waves started providing abortions outside the territorial waters of countries where abortion was otherwise illegal.³⁵ By ferrying women into international waters, women could access abortion care where it was otherwise highly restricted in their home country. Medication abortion was initiated on the boat and PAC including MVA was available by a gynecologist, if needed.

Increased access to misoprostol without a prescription coincided with the worldwide expansion of the internet. The unmet need for access to abortion care within the formal health sector prompted the development of several types of online services that facilitate access to self-managed abortion. The most established websites are Women on Web (www.womenonweb.org), Aid Access (www.aidaccess.org), safe2choose (www.safe2choose.org), and Women Help Women (www.womenhelp.org). The internet provided an important platform to disseminate evidence-based information about timing, dosing schedules, side effects, complications necessitating additional medical intervention, and expected outcomes. Frequency of utilization and demand for services on the internet as a means to access medication abortion has increased dramatically in the last 2 decades.³⁶

Multiple platforms now offer mail delivery of misoprostol and sometimes mifepristone. In a study of the efficacy and safety of the Women on Web

platform, after online consultation, mifepristone and misoprostol were delivered to the homes of 484 women from 33 different countries.³⁷ Complications were rare and were similar to those undergoing a medication abortion supervised by a physician: 13.6% reported undergoing a vacuum aspiration for an incomplete abortion or for excessive bleeding, 0.8% of women used antibiotics for an infection, and 1.6% reported a continuing pregnancy.

To address the quality of these medications obtained online, a study purchased medications from 18 different websites delivering mifepristone and misoprostol to the United States and evaluated the drugs they received.³⁸ None of the websites required a prescription or medical consultation. The pills varied in cost between \$110 and \$360 USD including shipping. Chemical assays determined that the tablets labeled mifepristone 200 mg were fairly accurate, containing 184.3 to 204.1 mg of active mifepristone. However, the tablets labeled misoprostol 200 mg were less consistent in quality, containing between 34.1 and 201.4 mg of active misoprostol. Although this model provides increased access, the variation in dosing could lead women to underdose the needed misoprostol for complete abortion.

The Future of Self-managed Abortion

The interest in self-managed abortion extends beyond areas where abortion is highly restricted and emerging evidence suggests this may be the preferred method of abortion for many women.³⁹ Nearly all service delivery models for medical abortion services remains highly medicalized. Many medically unnecessary restrictions exist on where the medications can be dispensed and administered, and the tests required before and after the treatment

can be obtained. As such, the current focus within the Family Planning community is on addressing these limitations to make self-managed care even safer and more accessible.

In many settings, women are required to make a minimum of 2 clinic visits, during which they receive pretreatment and posttreatment sonography. The first ultrasound is to confirm gestational age and candidacy for medication abortion. A recent systematic review suggests that routine use of ultrasound to determine gestational age before medical abortion may not always be necessary.⁴⁰ In 4257 patients presenting for a medical abortion reporting a last menstrual period < 70 days, only 4% were in fact greater than 70 days gestation. Of the 2681 who were certain that their last menstrual periods began no > 56 days prior, only 0.6% were greater than 70 days gestational age by ultrasound. This is overall reassuring that women can accurately assess their candidacy for medication abortion, particularly in low-resource settings where access to sonography may be limited.

The need for preabortion blood work to test Rh-status adds an additional touch point in the health care system that can be burdensome for women or delay care. A recent flow cytometry study found that fetal red blood cell exposure up to 12 weeks gestation was well below the calculated threshold for maternal Rh sensitization.⁴¹ This conclusion is supported on a population-level when comparing Canada and the Netherlands level of clinically significant perinatal antibodies.⁴² Despite different anti-D IgG treatment policies, alloimmunization rates did not differ. The WHO now suggests, but does not require, blood group typing when feasible.²⁶ For women obtaining abortions outside of the traditional health care system using medication and not receiving Rh testing, there appears to be little risk of Rh sensitization early in the first trimester.

Verifying completion of the abortion often also required an additional touch point with the health care system. The WHO recommends verifying successful abortion by pelvic examination, pelvic ultrasound, or a repeat human chorionic gonadotropin measurement.²⁶ There has been recent interest in verifying completion of abortion without another health care visit. In a meta-analysis of efficacy of multilevel pregnancy tests (MLPTs) to assess completion of abortion, of the 1482 participants, only 21 (1.3%) had an ongoing pregnancy, none of whom had a decline in human chorionic gonadotropin bracket on the MLPT.⁴³ MLPT are increasingly available in LMICs and may become a more wide-spread alternative for verifying completion of abortion, especially for self-managed abortions.

There are large regional differences in the rates of surgical interventions after medical abortion provided by telemedicine or self-managed abortion.⁴⁴ High rates were found in Eastern Europe (14.8%), Latin America (14.4%), and Asia/Oceania (11.0%) and low rates in Western Europe (5.8%), the Middle East (4.7%), and Africa (6.1%). These differences likely reflect different clinical practice and local guidelines on management of incomplete abortion rather than complications that genuinely needed surgical intervention. As health care providers become increasingly familiar with women self-managing abortions, these rates should standardize.

Conclusions

Access to first trimester abortions has increased significantly in the few decades in LMICs. MVA is standard of care for induced procedural abortion and PAC and is widely available in many LMICs, replacing sharp curettage. Medication abortion is now more effective with the addition of mifepristone and is becoming more widely available with new service

delivery strategies to broaden access. Despite these advances coinciding with the evolving fertility preferences in modernizing economies, the legal setting in most LMICs remains restrictive and thus limiting to further progress. Until contraception and abortion are widely accessible to women in LMICs, unsafe abortions will remain a prevalent, yet avoidable, cause of maternal mortality.

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