

# The Incidence of Menstrual Regulation Procedures and Abortion in Bangladesh, 2014

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**CONTEXT:** Menstrual regulation (MR) has been part of the Bangladesh family planning program since 1979. However, clandestine abortion remains a serious health problem in Bangladesh, and anecdotal reports indicate that clandestine use of misoprostol has increased since the most recent estimates (for 2010). Because of this, it is important to assess changes in the use of MR services and the incidence of clandestine abortion since 2010.

**METHODS:** A survey of a nationally representative sample of 829 health facilities that provide MR or postabortion care services and a survey of 322 professionals knowledgeable about these services were conducted in 2014. Direct and indirect methods were applied to calculate the incidence of MR and induced abortion.

**RESULTS:** In 2014, an estimated 1,194,000 induced abortions were performed in Bangladesh (29 per 1,000 women aged 15–49), and 257,000 women were treated for complications of such abortions (a rate of 6 per 1,000 women aged 15–49). Among women with complications, the proportion presenting with hemorrhage increased significantly, from 27% to 48%. An estimated 430,000 MR procedures (using MVA or medication) were performed in health facilities nationwide, a decline of about 40% in the MR rate—from 17 to 10 per 1,000 women aged 15–49—from 2010 to 2014.

**CONCLUSIONS:** Given declines in MR provision, more attention needs to be paid to building capacity, including hiring and training more providers of MR. Harm-reduction approaches should be pursued to increase the safety of clandestine use of misoprostol in Bangladesh.

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Recent studies have documented the important benefits of the menstrual regulation (MR)\* program in Bangladesh. An estimated 653,000 MR procedures were performed in health facilities nationwide in 2010,<sup>1,2</sup> and other recent studies have provided evidence that the MR program has contributed to the sharp decline in maternal mortality in Bangladesh over the past two decades.<sup>3–6</sup> Despite the successes of the MR program, clandestine abortion remains a serious health problem in Bangladesh. Abortion is illegal in Bangladesh except to save a woman's life; however, in 2010, an estimated 647,000 induced abortions were performed, and 231,000 women were treated at health facilities in Bangladesh for complications resulting from unsafe abortion.<sup>1</sup>

In the years since 2010, when the most recent estimates were obtained, a number of significant changes have occurred that may affect both access to MR services

and the level of induced abortion. In 2010, the only approved methods for MR were manual vacuum aspiration (MVA) and dilation and curettage (D&C), which was used less frequently. In 2014, however, the Ministry of Family Health and Welfare formally approved the provision of MR using a dual regimen of mifepristone and misoprostol up to nine weeks after a woman's last menstrual period (LMP),<sup>7</sup> after several successful pilots of this method in selected facilities starting in 2009.<sup>8</sup> Doctors (though not community-level providers) are now approved to provide MR using the two-drug regimen, which is commonly referred to within Bangladesh as MRM (MR with medication). The approval of this method, which is less invasive and typically less expensive, has the potential to increase access to MR and improve quality of care. The immediate impacts of this shift in MR provision, however, are as yet unknown.

In contrast, a longer-term development is likely having a detrimental effect on access to MR.<sup>1</sup> Recruitment of new cohorts of family welfare visitors (FWVs), needed to replace those who have retired and to meet growing demand, was discontinued in 1994. Although recruitment and training of FWVs was resumed in 2011, it will take time and continued governmental support to train adequate numbers of FWVs over the coming years.<sup>9</sup> The cumulative impact of this hiatus is likely to be a shortage of trained FWVs, which may in turn reduce access to MR services.<sup>2</sup> Because the majority of MR services in the country are provided by

\*Menstrual regulation (MR) is officially recognized as the "procedure of regulating the menstrual cycle when menstruation is absent for a short duration" and has been available free of charge in the government's family planning program since 1979 (Government of the People's Republic of Bangladesh, Memo No. 5–14/MCH-FP/Trg. 79, Dhaka, Bangladesh: Population Control and Family Planning Division, 1979; Directorate General of Family Planning, Bangladesh National Menstrual Regulation Service Guidelines, 2014). MR procedures are typically performed using manual vacuum aspiration. They are allowed up to 12 weeks after a woman's last menstrual period if provided by a physician, and up to 10 weeks if provided by a family welfare visitor, a type of community-level provider (Directorate General of Family Planning, Proceedings of the 62nd Meeting of the National Technical Committee held on June 30, 2014. Dhaka, Bangladesh: Directorate General of Family Planning, 2014).

FWVs, who are typically stationed in rural health facilities, this shortage particularly affects rural areas.<sup>10</sup>

Recent studies have also found numerous barriers to obtaining access to MR. More than half (55%) of ever-married women do not know about the MR program,<sup>11</sup> and about one-quarter (26%) of women who seek MR are turned down by providers, often for reasons not sanctioned by government guidelines.<sup>2</sup> Finally, several studies have documented cost as a barrier to care. Although MR services are supposed to be offered to women free of charge, reports of unauthorized charging for services are common.<sup>2,12-14</sup>

A third trend is the increase in over-the-counter availability of misoprostol at pharmacies and among drug sellers in Bangladesh. Although this drug has long been used for treatment of postpartum hemorrhage and other conditions, anecdotal evidence suggests that women may be using it more than in the past to illegally self-induce abortion.<sup>14-16</sup> Use of misoprostol alone as an abortion method is attractive to women because it is inexpensive. Moreover, because it is relatively safe and effective when used correctly,\* it is less likely than other methods of clandestine abortion to lead to negative health consequences. It is less effective, however, than the dual regimen of mifepristone and misoprostol used in MRM,<sup>17,18</sup> and incorrect use or dosages of misoprostol may lead to complications requiring care at a health facility. A recent study of pharmacy workers in Bangladesh found that only 7% provided correct information concerning dosage, and the majority did not counsel regarding the possibility of complications requiring additional care.<sup>16</sup> To date, the extent of use of these methods has not been measured. Monitoring these trends is important, however, because the use of misoprostol alone, in particular, will likely reduce women's use of more effective and safer facility-based MR and MRM services, even though it may also reduce the use of more dangerous methods of clandestine abortion.

Over the past two decades, fertility has declined substantially in Bangladesh, from a TFR of 3.4 in 1993-1994 to 2.3 in 2014.<sup>19,20</sup> Much of this decline is likely due to increased use of contraceptives. Use of modern methods of contraception among married women increased from 36% in 1993-1994 to 54% in 2014. However, the pace of increase in contraceptive use has slowed in recent years. From 1993 to 2004, the contraceptive prevalence rate increased by more than one percentage point per year, on average, whereas from 2004 to 2014 the annual rate of increase decreased to around 0.7 percentage points.<sup>20</sup> This slowing of the pace of contraceptive uptake in a context where preferences for small families and for controlling the timing of births are increasing may lead to higher demand for menstrual regulation and induced abortion services.

\*WHO estimates that misoprostol, when used alone, has a clinical effectiveness rate of 75-90% in inducing abortion at gestational ages of up to 12 weeks (World Health Organization (WHO), *Safe Abortion: Technical and Policy Guidance for Health Systems*, second ed., Geneva:WHO, 2012).

Given the trends noted above and the significance of these services for women's health and survival, new research is needed to assess current levels of MR and abortion services in Bangladesh. To that end, this article presents results from a 2014 study documenting changes in the incidence and provision of MR since 2010. In addition, we present updated estimates of the incidence of postabortion complications treated in health facilities and of clandestine abortion throughout Bangladesh, as well as current estimates of the incidence of unintended pregnancy.

The current study uses a design and methodology similar to those used in an earlier study that produced estimates for 2010,<sup>1</sup> both are based on a national survey of health facilities and a survey of health professionals. Original data collection and the application of indirect estimation methods are necessary; there are no complete national statistics on menstrual regulation services, and because Bangladesh's current penal code permits abortion only to save the life of a woman,<sup>21</sup> there are almost no data regarding clandestine abortions.

A second objective of the current study is to measure changes in the incidence of abortion and unintended pregnancy, while also placing priority on obtaining the best possible estimates of each for 2014. Improvements in our methodology for the current study's estimate of induced abortion incidence, however, ultimately meant that the 2014 estimate of the incidence of abortion is not comparable to the 2010 estimate. Nevertheless, the study provides estimates of changes in a number of indicators and presents updated, more comprehensive estimates of MR, induced abortion and unintended pregnancy that will be valuable for informing health policy and planning decisions.

## METHODS

### Data Sources

This study uses the Abortion Incidence Complications Methodology,<sup>22</sup> an approach developed to estimate the incidence of abortion in countries where it is illegal or highly restricted, and which has been adapted for use in various settings.<sup>23-26</sup> It is based on three key sources of data: a nationally representative survey of health facilities providing MR services or postabortion care; a survey of key informants, selected for their in-depth knowledge about the provision of MR, abortion and postabortion care in Bangladesh; and data compiled from major NGOs on the number of MR procedures conducted and postabortion care cases treated at their facilities. The two surveys were pretested in August of 2014 and conducted from September through December of that year. Data from NGO facilities for 2014 were compiled in January and February of 2015.

• *Health Facilities Survey (HFS)*. The sampling universe for the HFS included all public-sector and private-sector facilities that are potential providers of postabortion care (PAC) or MR services in the seven divisions of Bangladesh. The public sector has five main types

of facilities (listed here in order of descending size): medical college hospitals, district hospitals, maternal and child welfare centers (MCWCs), upazila health complexes (UHCs), and union health and family welfare centers (UH&FWCs). The first four types are authorized to provide both PAC and MR; UH&FWCs are staffed by paramedics who are trained to provide selected reproductive health services, including MR services, but not postabortion care. The private sector in Bangladesh includes health clinics of varying size; for sampling purposes, we divided these into three categories based on bed count (0–19 beds, 20–49 beds and ≥50 beds). NGOs were not included in the HFS; data on services provided by NGOs are described below.

Using the most recent Ministry of Health and Family Welfare lists of health facilities in Bangladesh, along with information obtained from the Directorate General of Health Services and the Directorate General of Family Planning, we identified a total of 5,424 public- and private-sector facilities that were eligible for the survey (Table 1). A stratified multistage sample design was used. Due to their important role in the provision of MR and PAC services, all medical college hospitals in Bangladesh were included in the sample. The sample of all other categories of facilities was drawn from 16 of the 64 districts in the country. These districts were randomly sampled for the 2010 study and represent all seven divisions of the country. We chose to use the same districts as those selected in 2010 to aid with comparability of our estimates over time.

Sampling fractions varied by facility type and division and were determined by the importance of facility types in providing PAC and MR services and the absolute number of facilities of each type. Because district hospitals, UHCs and MCWCs are critical sources of treatment for abortion complications, and because the numbers of these facilities are relatively small, 100% of each of these types in the 16 sample districts were included in the sample. We randomly selected 353 (31%) of the 1,147

UH&FWCs in the sampled districts; however, we used different sampling fractions by division to ensure that a sufficiently large number of these facilities were selected in all divisions. For example, 40% of all UH&FWCs in the sampled districts in Sylhet division were selected, whereas 20% of all UH&FWCs in Dhaka division were selected. We used a similar approach to sample 270 private clinics, varying the proportion sampled by division and facility size. Overall, 837 facilities were selected for the HFS. Interviews were successfully completed for 829 facilities, a response rate of 99%.

HFS respondents were senior staff members who were knowledgeable about the facility's provision of MR and PAC services. In hospitals, the respondent was generally the chief of the obstetrics and gynecology department; in smaller facilities, the respondent was typically the director of the facility or another senior staff member. Respondents were asked to estimate the number of PAC and MR cases treated at their facility in an average month and in the past month; these numbers were then averaged and multiplied by 12 to produce an annual estimate. Respondents were also asked to estimate the number of PAC cases that were a result of complications from MR procedures. Because paramedics at UH&FWCs often provide additional MR services outside of a facility setting (at their own homes or at women's homes, for example),<sup>14</sup> these respondents were also asked to estimate the number of MR procedures they provided outside of the facility at which they were based. Finally, respondents at public-sector and private-sector facilities (excluding UHCs and UH&FWCs) were asked to estimate the distribution of MR procedures by method. Providers at UHCs and UH&FWCs were not asked this question because, at the time of data collection, community-level providers had not been trained to provide MRM and were not legally permitted to provide this procedure.

In the analysis, all survey data were weighted to produce national estimates, taking into account the

**TABLE 1. Characteristics of facilities sample, by sector and type, Health Facilities Survey, Bangladesh, 2014**

Sector and type of facility	No. of facilities in Bangladesh	No. of facilities in 16 sample districts	Sampling fraction within 16 sample districts (%)	No. of facilities selected into sample	No. of facilities interviewed	Response rate (%)
<b>Total</b>	<b>5,424</b>	<b>1,915</b>	<b>44</b>	<b>837</b>	<b>829</b>	<b>99</b>
<b>Public-sector facilities</b>						
Public medical college hospitals	24	na*	na*	24	24	100
Private medical college hospitals†	53	na*	na*	53	52	98
District hospitals	57	13	100	13	13	100
Upazila health complexes	456	98	100	98	98	100
Maternal and child welfare centers	94	26	100	26	26	100
Union health and family welfare centers	3,049	1,147	31	353	353	100
<b>Private-sector clinics</b>						
Small (0–19 beds)	1,188	373	44	164	161	98
Medium (20–49 beds)	390	135	53	72	71	99
Large (≥50 beds)	113	46	74	34	31	91

\*Not applicable because all public and private medical colleges in the country's 64 districts were included. †Private medical college hospitals were grouped with public-sector facilities because they are similar to public medical college hospitals in terms of service provision.

probability of selection into the sample and nonresponse, by division and facility type.

- **NGO caseloads.** Aggregate data on the number of MR procedures performed and the number of women treated for abortion complications in 2014, for each of the country's seven divisions, were collected from the head offices of all major NGOs providing MR or PAC in Bangladesh.

- **Health Professionals Survey (HPS).** The HPS was designed to obtain the opinions and perceptions of a sample of experts who are highly knowledgeable about provision of MR, abortion and postabortion care in Bangladesh. The survey was administered to a purposive sample of 322 health care providers, policymakers and researchers selected from all seven divisions and 36 of the 64 districts of Bangladesh. Prospective respondents were identified by the Association for Prevention of Septic Abortion, Bangladesh, which conducted fieldwork for this study. The overwhelming majority of the sample (84%) were health care providers; the remaining 16% were program managers, clinic directors or policymakers with experience in the area of abortion and MR service provision in Bangladesh. On average, respondents had more than 19 years of experience in the field and were working at the time of the survey in a variety of settings: Sixty percent were working in the public sector, 34% in the private sector and 6% at NGOs. Though a majority of respondents worked in urban areas, 67% had prior experience working in rural areas (for an average of 7 years), and 23% had at least six months' experience working in rural areas in the five years prior to being interviewed.

The HPS provided information used to calculate, among all women who had induced abortions, the proportion treated in facilities for abortion complications. The calculations used to derive this factor, referred to as a "multiplier," are described below.

### Estimating the Incidence of Treatment for Induced Abortion Complications

According to calculations based on the HFS and NGO reports, an estimated 485,200 women were provided with postabortion care in health facilities in 2014 (not shown). HFS providers estimated that 152,500 of these women

were treated for complications from MR procedures (provided with either MVA or MRM). Because information on the incidence of MR services was collected separately, complications from MR procedures were subtracted from the total number of complications treated. After the removal of these cases, we estimate that approximately 332,700 women were treated in health facilities for complications of either induced or spontaneous abortions in 2014 (Table 2).

Because complications of induced and spontaneous abortion are often similar, and because restrictive abortion laws may lead to unwillingness to report complications of induced abortion, HFS respondents were not asked to provide separate estimates for each type of pregnancy loss. Instead, we employed an indirect approach to estimate the number of patients with complications arising from spontaneous abortion. We drew on available estimates, established by clinical studies,<sup>27,28</sup> of the gestational distribution of spontaneous abortions to indirectly estimate the number of women who have spontaneous abortions at 13–22 weeks' gestation. These women were assumed to require care at a health facility. These spontaneous abortions are estimated to be 3.4% of all live births.

The number of births—in Bangladesh and in each of its seven regions—was estimated by applying age-specific fertility rates from 2014 Bangladesh Demographic and Health Survey (DHS) results<sup>11</sup> to the number of women in each age-group. Age- and division-specific population estimates of women were not available for 2014. Estimates were made in two steps. First, the population of women aged 15–49 by division in 2014 was estimated on the basis of changes between the 2001 and 2011 censuses.<sup>29,30</sup> Second, the number in each five-year age-group for each division was estimated on the basis of percentage distributions from the 2011 Bangladesh DHS.<sup>11</sup> According to these calculations, an estimated 3,363,300 live births and 114,700 late spontaneous abortions occurred in 2014 in Bangladesh.

A further adjustment was needed because only a certain proportion of women who need treatment for complications of late spontaneous abortion have access to a health facility.

**TABLE 2. Measures related to estimating the number of women treated in health facilities for complications of abortion, by type of abortion, all according to division, Bangladesh, 2014**

Division	No. of women aged 15–49	No. of live births	No. of women treated for complications of			Treatment rate for induced abortion complication† (95% CI)	
			All types of abortions	Spontaneous abortions	Induced abortions		
<b>Bangladesh</b>	<b>41,749,501</b>	<b>3,363,286</b>	<b>332,736</b>	<b>76,227</b>	<b>256,509</b>	<b>6.1</b>	<b>(5.0–7.3)</b>
Barisal	2,279,180	173,870	16,633	3,826	12,807	5.6	(3.2–8.0)
Chittagong	8,049,638	750,202	49,421	16,441	32,979	4.1	(2.1–6.1)
Dhaka	13,859,088	1,130,187	116,983	26,881	90,102	6.5	(4.0–9.0)
Khulna	4,651,917	312,713	44,947	7,214	37,733	8.1	(5.4–10.9)
Rajshahi	5,436,415	403,039	47,145	8,833	38,312	7.0	(3.4–10.7)
Rangpur	4,665,039	306,755	32,199	6,765	25,434	5.5	(3.1–7.8)
Sylhet	2,808,224	286,520	25,409	6,267	19,142	6.8	(2.3–11.3)

†Number of women treated for complications of induced abortion per 1,000 women aged 15–49.

We assumed that this proportion was equivalent to the HPS-based estimate of the proportion obtaining care in facilities for complications of induced abortion—66% nationally. We therefore estimated that 76,200 women were treated in health facilities each year for complications of spontaneous abortion. Subtracting this number from the total post-abortion care caseload yields an estimated 256,500 women treated for complications of unsafe induced abortion each year in all public-sector, private-sector and NGO facilities.

### **Estimating the Incidence of Induced Abortion**

The incidence of induced abortion was estimated using an adapted version of the Abortion Incidence Complications Methodology. According to this approach, the incidence of induced abortion in settings where it is illegal can be split into three groups: women who are treated for induced abortion complications, women who have complications requiring care but who do not receive treatment, and women who do not experience any complications requiring care at a health facility. We estimated the latter two groups based on the HPS. Key informants provided estimates of the proportion of women who use each of three major categories of methods of induced abortion (surgical, medical and all other methods), by type of provider; the relative safety of these methods (also by type of provider); and the likelihood that women who do experience complications will receive care in a health facility. Respondents were asked to estimate each of these proportions for four subgroups of women (poor urban, nonpoor urban, poor rural and nonpoor rural) to account for differing access to care across socioeconomic status and place of residence. Analysis of these data yielded an overall proportion of all women who obtained induced abortions who were treated for complications in health facilities, for each of the four socioeconomic subgroups, within each division.

These estimates were then weighted by the relative size of each socioeconomic subgroup, by division, to calculate multipliers for each division and Bangladesh. The national multiplier was 4.7, whereas divisionally the multipliers ranged from 4.2 in Rangpur to 4.9 in Dhaka and Sylhet. These figures convey that, nationally, approximately one of every five women who obtained an induced abortion were treated for complications in health facilities; the remaining four either did not experience complications or had complications but were not able to obtain care in a facility.

We calculated 95% confidence intervals around the total number of women treated for abortion complications in health facilities. We then applied the multipliers both to the point estimate of the number of women treated for complications of induced abortion and to its lower and upper bounds to produce a range of estimates (denoted low, medium and high) of the total number of women who had illegal induced abortions in Bangladesh in 2014, by division.

### **Estimating the Incidence of MR**

Previous research has found that providers underreport MR procedures that do not fully comply with government regulations,<sup>31,32</sup> such as procedures that are performed outside of health care facilities (at a woman's home, for example) and those for which providers collect a fee. UH&FWCs may be particularly prone to underreporting, given the limited supervision at these lower-level facilities. Underreporting is likely also occurring at private clinics, given anecdotal evidence that an important motivation for underreporting is to avoid reporting the income from these services. We followed the approach used by Singh and colleagues in 2012<sup>1</sup> and corrected for underreporting using the following estimates of the proportion of MRs that are not reported by providers in our survey: 40% for UH&FWCs, 25% for private-sector facilities and 15% for all other public-sector facilities. Although these numbers are not precise, they have the advantage of maintaining comparability between the estimates from 2010 and those from 2014—an important goal. In total, these underreporting adjustments account for 19% of our final MR estimates.

### **Estimating Unintended and Intended Pregnancies**

To calculate pregnancies by intention status nationally and by division, we first derived the numbers of planned and unplanned births by multiplying the proportion of births that are planned (wanted at the time of conception or earlier) and the proportion that are unplanned (mistimed by two or more years or unwanted at the time of conception) according to the 2014 DHS by the number of live births. To estimate the number of pregnancies (intended and unintended) that end in outcomes other than birth and abortion (i.e., spontaneous abortion and stillbirth), we used a model-based approach from clinical studies of pregnancy loss by gestational age.<sup>27,28</sup> We applied the parameters from that model—estimating pregnancy losses as 20% of live births plus 10% of induced abortions—to estimate the number of spontaneous pregnancy losses resulting from unintended and intended pregnancies. The total number of unintended pregnancies is the sum of induced abortions, MRs, unplanned births and spontaneous pregnancy losses attributable to unintended pregnancies; the number of intended pregnancies is the sum of planned births and spontaneous pregnancy losses from intended pregnancies. The sum of all live births, abortions, MRs and spontaneous pregnancy losses (from both intended and unintended pregnancies) yields the total number of pregnancies.

## **RESULTS**

### **Provision of Menstrual Regulation and Postabortion Services**

Nationally, 57% of MR procedures were performed at public-sector facilities, with UH&FWCs accounting for around 56% of all procedures performed in the public sector and 32% of procedures overall (Table 3). Of all facility

**TABLE 3. Percentage distribution of menstrual regulation and postabortion care services provided, by type of facility, Bangladesh, 2010 and 2014**

Facility type	Menstrual regulation		Postabortion care	
	2010	2014	2010	2014
UH&FWCs	46	32	na	na
Other public facilities†	17	25	54	53
Private clinics	9	8	43	43
NGOs	28	35	2	3
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

†Medical colleges, district hospitals, maternal and child welfare centers and upazila health complexes. Private medical colleges are included in this group because they are similar to public medical colleges in terms of service provision and access. *Notes:* Percentages may not sum to 100 because of rounding. UH&FWC=Union health and family welfare center.

types, NGOs performed the largest share of MRs (35%), while private clinics performed the smallest share (8%).

In contrast, NGO facilities treated a relatively small share of women with complications from induced or spontaneous abortion in 2014 (3%), with private clinics playing a much larger role in the provision of PAC services (treating 43% of such cases). The public sector (excluding UH&FWCs, which do not provide PAC) treated the largest share of women with postabortion complications, at 53%.

The distribution of the type of complications treated in health facilities shifted sharply between 2010 and 2014 (Table 4). In 2010, respondents to the HFS estimated that only 27% of PAC patients were treated for hemorrhage; in 2014, that proportion was 48%. (Note that these proportions include complications from both spontaneous and induced abortions, as well as complications resulting from MR, in order to maintain comparability with 2010 estimates.) The estimated proportion of patients with incomplete abortion declined from 66% to 56%, and the estimated proportion with sepsis increased from 2% to 6%. The proportion of patients with cervical or vaginal lacerations or bladder injury increased slightly, by around one percentage point each, though the overall proportion of patients with these complications remained small, at 2% and 1%, respectively.

The number of women treated at health facilities for complications of induced abortion remained largely

**TABLE 4. Percentage of postabortion patients estimated to have experienced specific complications, Health Facilities Survey, Bangladesh 2010 and 2014**

Type of complication	2010	2014
Incomplete abortion	66	56*
Hemorrhage	27	48*
Shock	3	4
Sepsis	2	6*
Uterine perforation	2	2
Lacerations	1	2*
Bladder/intestinal injury	0	1*

\*Differs from 2010 at  $p < .05$ . *Notes:* Postabortion patients are those treated for complications of menstrual regulation procedures or of spontaneous or induced abortions. Percentages do not add to 100 because patients could have more than one complication.

stable, increasing slightly from 231,400 in 2010<sup>1</sup> to 256,500 in 2014 (see Table 2). Treatment rates, which take into account population growth over this time period, remained essentially constant: 6.1 per 1,000 women aged 15–49 in 2014, compared with 6.0 in 2010.\*

### Trends in MR provision

The 430,200 MR procedures performed in 2014 represent a sharp decline from the estimated 653,100 procedures performed just four years earlier (Table 5). When population growth over this period is accounted for, these numbers indicate a decline of approximately 40% in the rate per 1,000 women aged 15–49 (from 17 to 10, not shown).

MR provision by almost every type of facility declined significantly. The number of MR procedures provided by NGOs declined by 16% (from 180,200 to 150,700), while the number provided by private clinics declined by 42% (from 59,800 to 34,600). UH&FWCs had the sharpest decline, at 54% (from 301,600 to 138,300), and accounted for close to three-quarters of the decline nationwide (not shown).

It is helpful to decompose the decline in MRs provided at UH&FWCs into its two components: a decline in the proportion of UH&FWCs providing MR services, and a decline in average caseload at facilities that provide MR. The proportion of UH&FWCs providing MR services decreased by 25% between 2010 and 2014 (from 63% to 48%); the average caseload also declined sharply, from 152 to 95 cases per year (Table 5). The contributions to the decline in total MR services and average caseload provided by UH&FWCs are 40% and 60%, respectively (not shown).

As of 2014, the vast majority of MR procedures were still performed using manual vacuum aspiration. On average, respondents at facilities providing MR (excluding UHCs and UH&FWCs, see Methods section) estimated that 88% of procedures at their facility were performed using this method (not shown). In contrast, the use of MRM was still relatively limited at the time of the study, at an average of 11% of MR procedures performed.

### Incidence of Induced Abortion

An estimated 1,194,100 induced abortions occurred in Bangladesh in 2014, for an annual national abortion rate of 29 per 1,000 women aged 15–49 (Table 6). The low estimate of this rate is 23 and the high estimate is 34. The abortion rate was highest in Khulna, at 39, and lowest in Chittagong, at 18. Rangpur and Barisal had rates below the national average, at 23 and 26, respectively. The rates in Dhaka, Rajshahi and Sylhet, at 32–33, were slightly higher than the national average.

The ratio of induced abortions to live births was 36 per 100 live births nationally. This measure represents

\*Published rates for 2010 were per 1,000 women aged 15–44. To maintain comparability with 2014, these and all other rates for 2010 cited in the results have been recalculated using the population of women aged 15–49.

**TABLE 5. Menstrual regulation service provision and caseload, and percentage change between 2010 and 2014, by type of facility, Bangladesh**

Facility	Total number of procedures			% of facilities providing services			Mean annual caseload		
	2010	2014	% change	2010	2014	% change	2010	2014	% change
<b>All</b>	<b>653,078</b>	<b>430,183*</b>	<b>-34</b>	<b>57</b>	<b>42*</b>	<b>-26</b>	<b>158</b>	<b>121*</b>	<b>-23</b>
<b>Public-sector</b>									
UH&FWCs	301,631	138,341*	-54	63	48*	-25	152	95*	-37
Other public facilities†	111,456	106,501	-4	77	74	-4	238	210	-12
<b>Private clinics</b>	59,755	34,649*	-42	36	20*	-43	110	101	-9
<b>NGO clinics‡</b>	180,236	150,692§	-16	u	u	u	u	u	u

\*Differs from 2010 at  $p < .05$ . †Medical colleges, district hospitals, maternal and child welfare centers and upazila health complexes. Private medical colleges are included in this group because they are similar to public medical colleges in terms of service provision and access. ‡Percentage of facilities providing menstrual regulation services and mean caseloads are not available from NGO facilities because data regarding number of procedures were collected in aggregate from NGO head offices. §The number of procedures provided for NGO clinics is based on comprehensive aggregate data and therefore has no associated sampling error. Notes: UH&FWC=Union health and family welfare center. u=unavailable.

**TABLE 6. Low, medium and high estimates of total number of induced abortions, abortion rate and abortion ratio, all according to division, Bangladesh, 2014**

Division	Total number of induced abortions*			Abortion rate†			Abortion ratio‡		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
<b>Bangladesh</b>	<b>974,913</b>	<b>1,194,137</b>	<b>1,413,361</b>	<b>23.4</b>	<b>28.6</b>	<b>33.9</b>	<b>29.0</b>	<b>35.5</b>	<b>42.0</b>
Barisal	34,611	60,020	85,429	15.2	26.3	37.5	19.9	34.5	49.1
Chittagong	70,748	141,343	211,938	8.8	17.6	26.3	9.4	18.8	28.3
Dhaka	271,999	437,014	602,029	19.6	31.5	43.4	24.1	38.7	53.3
Khulna	121,069	182,893	244,717	26.0	39.3	52.6	38.7	58.5	78.3
Rajshahi	82,404	173,211	264,019	15.2	31.9	48.6	20.4	43.0	65.5
Rangpur	61,358	106,796	152,234	13.2	22.9	32.6	20.0	34.8	49.6
Sylhet	31,556	92,860	154,164	11.2	33.1	54.9	11.0	32.4	53.8

\*The total number of induced abortions is the product of the multiplier estimate and the total number of induced abortion complication cases treated in health facilities. †The abortion rate is the number of abortions per 1,000 women aged 15–49. ‡The abortion ratio is the number of abortions per 100 live births.

the likelihood that a woman will have an abortion if she becomes pregnant; the ratio of 36 translates to approximately one woman having had an induced abortion for every three who gave birth in 2014.

It is important to note that the abortion rates calculated for 2010 and 2014 are not comparable because of changes in the estimation approach. In particular, for the 2010 study, we were unable to use the standard approach to calculating the multiplier because of apparent misinterpretation of a key question in the HPS. Instead, we used a proxy estimate that likely underestimated the number of women who had induced abortions without experiencing complications that needed care in a facility. Our current study used the standard approach to calculating the multiplier, based on the HPS survey. We feel this is a substantial improvement over the 2010 estimates; as a consequence, however, we are unable to track changes in the abortion rate over this four-year period. Thus, although the rate appears to have increased from 17 in 2010 to 29 in 2014, the increase is likely to be largely a result of the improvement in our estimation approach.

### Estimates of Intended and Unintended Pregnancy

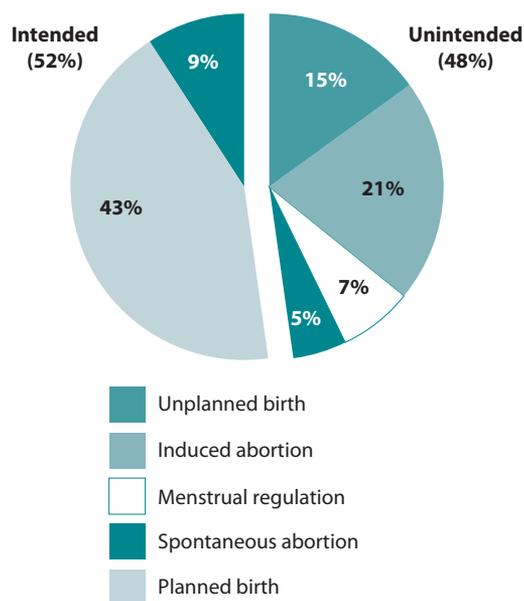
An estimated 5.8 million pregnancies occurred in Bangladesh in 2014; we estimate that 48% of these were unintended (Figure 1). In total, there were an estimated

2.8 million unintended pregnancies in 2014, for a rate of 67 per 1,000 women aged 15–49. Induced abortions and MR procedures accounted for 28% of all pregnancies and 58% of unplanned pregnancies. Fifteen percent of all pregnancies—and 31% of unintended pregnancies—resulted in unplanned births.

We are unable to compare the rate of unintended pregnancy and the distribution by outcome between 2010 and 2014 because of the previously discussed changes in the methodology used to estimate illegal induced abortion, a major component of these estimates. However, since the abortion rate in 2010 was underestimated, the unintended pregnancy rate estimated for that year (69 per 1,000 women) would likely be substantially higher. Comparison with the current rate of 67 per 1,000 suggests that the unintended pregnancy rate likely declined between 2010 and 2014.

### LIMITATIONS

The Abortion Incidence Complications Methodology has some limitations, many of which have been documented elsewhere.<sup>1,22,25</sup> In particular, data regarding the types of methods women use to procure induced abortions, the likelihood that these methods lead to complications and the proportion who will receive care—the key components of the multiplier—are based

**FIGURE 1. Percentage distribution of pregnancies, by outcome and intention, Bangladesh 2014**

on key informants' perceptions. Although this is necessary in the absence of empirical data, estimates of the incidence of induced abortion should be interpreted with caution. In particular, experts' estimates of the proportion of women with complications who will receive care at health facilities was relatively high (66%), especially in comparison with low levels of facility-based delivery of live births in Bangladesh (37% in 2014).<sup>33</sup> We suspect that women are more likely to seek and receive care for a complication than for a birth. If this proportion is an overestimate, however, our estimates of induced abortion will be too conservative.

In addition, the HFS results show that the proportion of women experiencing hemorrhage as a post-abortion complication increased substantially between 2010 and 2014. This is consistent with a pattern of increased use of misoprostol to induce abortion. Because heavy and prolonged bleeding is a common side effect of misoprostol-induced abortion, it is possible that this symptom would have resolved without further treatment for some women who presented at facilities. Because our multiplier is based on estimates of the proportion of women who will have complications that require treatment at a health facility,

\*Because women can have multiple concurrent complications from an induced abortion, the distribution of complications at the facility level adds up to more than 100%. To address this issue, we prorated the distribution to 100% before applying the appropriate percentage reduction.

†These percentage reductions were based on the percentage-point increase in hemorrhage cases from 2010 to 2014 (21 percentage points). A reduction of 25% in total hemorrhage cases accounts for slightly more than half of this increase; a reduction of 40% removes almost all of the increase in hemorrhage from the total, and so is a reasonable ceiling for these effects.

applying it to hemorrhage cases that potentially did not require treatment could lead to an overestimate of abortion incidence in the country. To account for this possibility, we carried out a sensitivity analysis, calculating abortion incidence estimates under two alternate scenarios: with hemorrhage cases reduced at the facility level by 25%\* and with hemorrhage cases reduced by 40%.† Under the former assumption, the abortion rate would be reduced to 25 per 1,000 women aged 15–49, and under the latter assumption to 22.

## DISCUSSION

The findings from this study have implications for both policy and service provision. The rate of facility-based MR procedures declined substantially between 2010 and 2014. A variety of supply-side factors likely contributed to this decline, including the retirement of a large cohort of FWVs who had provided MR in smaller public-sector facilities. The decline in the proportion of smaller facilities offering MR is particularly worrisome given their disproportionately large role in providing MR as recently as 2010, and their ability to reach women in rural or otherwise remote areas.

Declines in MR services were not limited to UH&FWCs, however, and there may also be demand-side factors contributing to the decline in facility-based MR services. In particular, women may prefer to obtain misoprostol or other abortifacient drugs from unauthorized sources such as drug sellers because these sources provide greater privacy and confidentiality and the cost may be lower. In addition, studies have documented problems at many public-sector health facilities, including judgmental treatment by providers, low quality of care and lack of privacy, particularly in smaller facilities.<sup>9,14,31</sup>

Possible programmatic solutions include: rapid expansion in training of FWVs in provision of quality MR services; scaling up the provision of MRM services and expanding the range of facilities permitted to offer MRM; ensuring that accurate counseling regarding the use of MRM is provided at facilities; and ensuring that instructions on medication drug packages are accurate and understandable. It is also possible that improving the quality of care at public-sector facilities that already provide MR, as well as educating women about the accessibility of MR services, could reduce the proportion of women who resort to unauthorized providers.

Recent positive developments regarding recruitment and training of FWVs are encouraging. For example, from 2011 to 2014 about 1,000 FWVs were recruited by the family planning division of the Ministry of Health and Family Welfare. However, many of these new FWVs had not been trained in provision of MR services at the time of fieldwork. More attention needs to be given to building this capacity in MR and MRM service provision. Other positive policy changes include the guidelines on MR care recently published by the Directorate General of Family Planning (which should improve quality of

care),<sup>34</sup> and expansion of LMP limits for FWVs and doctors (to 10 and 12 weeks, respectively).<sup>35</sup>

Between 2010 and 2014, the proportion of postabortion patients diagnosed with hemorrhage increased. The reasons behind this change are unclear; it is possible, however, that the increase could be due to an increase in the clandestine use of misoprostol. This hypothesis is supported by anecdotal reports of more widespread availability and clandestine use of the method. It is also possible that the increase reflects complications from legal MRM. This is unlikely, however, given the relatively small proportion of MR procedures provided with medication, the greater clinical effectiveness of MRM and the higher quality of care from providers trained in MRM provision, compared with misoprostol, which is usually obtained from untrained providers.

In addition, the proportion of postabortion patients who were diagnosed with sepsis, though still very small, tripled between 2010 and 2014. Informal discussions with MR providers suggest that this may be an indirect effect of the clandestine use of misoprostol—for example, because of infections resulting from unhygienic self-care combined with hemorrhage over a period of weeks. It is also possible that increased access to misoprostol—and to the dual regimen of misoprostol and mifepristone—from untrained providers may result in a decline in safe but illegal surgical abortion services and an increase in complications among women having medication abortions.

On the other hand, as women learn the correct protocol for using misoprostol or the combined drug regimen to induce abortion, the proportion of women experiencing abortion-related complications from these methods will presumably decline over time. In addition, women who do experience complications from the use of misoprostol or mifepristone will experience less severe symptoms, compared with those who use more invasive methods to terminate pregnancies. When supported by the government and other stakeholders, harm-reduction approaches—such as training drug sellers and paramedics, and accurate labeling in accessible language on drug packaging—can increase the safety of use of these methods, as shown in other settings.<sup>36–38</sup>

Given improvements in estimating abortion incidence in 2014, we cannot draw conclusions about changes since 2010. Nevertheless, the rate of clandestine abortion in 2014 was quite high, indicating that the consequences of clandestine abortion continue to be a substantial burden on women and the health system. The rate of treatment for complications of clandestine abortion at health facilities was six per 1,000 women in 2014 (unchanged since 2010). This rate of treatment for complications is much lower than the 14.6 per 1,000 women estimated in Pakistan in 2012.<sup>23</sup> This suggests that access to MR services (despite the supply-side issues mentioned above), increased access to approved MRM services, and clandestine availability of misoprostol from a number of sources are all contributing

to the level of morbidity from pregnancy termination in Bangladesh being lower than that in Pakistan. In addition to the 256,000 women treated in facilities for complications from unsafe abortion, an estimated 128,000 women needed facility-based care for complications but did not obtain treatment. This figure accounts for roughly 10% of all women having clandestine abortions and indicates a large service gap, which has adverse consequences for women's health and negative social and economic consequences for the women and their families.<sup>39–41</sup>

The unintended pregnancy rate in Bangladesh in 2014 was an estimated 67 per 1,000 women of reproductive age. This rate is relatively high in comparison with the most recent estimates for 2012 for South-Central Asia, the subregion that includes Bangladesh; the unintended pregnancy rate for this subregion was estimated at 48 per 1,000 women.<sup>42</sup> However, the unintended pregnancy rate in Bangladesh in 2014 (67) was much lower than that in Pakistan in 2012 (93).<sup>23</sup>

Although we are unable to assess changes in the unintended pregnancy rate, the proportion of married women using modern contraceptives increased from 48% in 2007 to 52% in 2011,<sup>11</sup> and has continued at a similar pace, rising to 54% by 2014, with unmet need falling by 2% between 2011 and 2014.<sup>20</sup> This steady, moderate increase in use of modern contraceptives could have led to small improvements in prevention of unintended pregnancies. Greater efforts should be made, however, to improve access to a wide variety of contraceptive methods and information in order to further these gains. Improvements in contraceptive care are needed if women are to prevent unintended pregnancies and achieve their preferences regarding the timing and number of births.

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## RESUMEN

**Contexto:** La regulación menstrual (RM) ha sido parte del programa de planificación familiar de Bangladesh desde 1979. Sin embargo, el aborto clandestino sigue siendo un serio problema de salud en ese país, e informes anecdóticos indican que el uso clandestino de misoprostol ha aumentado según las estimaciones más recientes (de 2010). Por esta razón es importante analizar los cambios en el uso de los servicios de RM y la incidencia del aborto clandestino desde 2010.

**Métodos:** En 2014 se condujeron dos encuestas, una a partir de una muestra representativa a nivel nacional de 829 instituciones de salud que proveen servicios de RM o de atención postaborto, y otra realizada a 322 profesionales conocedores de esos servicios. Se aplicaron métodos directos e indirectos para calcular la incidencia de la RM y del aborto inducido.

**Resultados:** Se estima que en 2014 se realizaron 1,194,000 abortos inducidos en Bangladesh (29 por 1,000 mujeres en edades de 15–49 años) y que 257,000 mujeres recibieron tratamiento por complicaciones de esos abortos (una tasa de 6 por 1,000 mujeres en edades de 15–49 años). Entre las mujeres con complicaciones, la proporción que presentó hemorragia aumentó significativamente de 27% a 48%. Se estima que en instituciones de salud a nivel nacional se realizaron 430,000 procedimientos de RM (usando AMEU o medicación), lo que representa una disminución de alrededor del 40% en la tasa de RM—de 17 a 10 por 1,000 mujeres en edades de 15–49 años—entre 2010 y 2014.

**Conclusiones:** Dadas las disminuciones en la provisión de RM, es necesario prestar más atención al fortalecimiento de capacidades, incluidos el reclutamiento y la capacitación de más proveedores de RM. Debe proseguirse con enfoques de reducción de daños para aumentar la seguridad del uso clandestino de misoprostol en Bangladesh.

## RÉSUMÉ

**Contexte:** La régulation menstruelle (RM) fait partie du programme de planification familiale du Bangladesh depuis 1979. L'avortement clandestin continue cependant de poser un grave problème de santé dans le pays, où des rapports anecdotiques font état d'un usage clandestin du misoprostol en hausse depuis les dernières estimations en date (pour l'année 2010). Aussi est-il important d'évaluer les changements d'usage des services de RM et d'incidence de l'avortement clandestin depuis 2010.

**Méthodes:** Deux enquêtes ont été menées en 2014, l'une auprès d'un échantillon nationalement représentatif de 829 structures de santé prestataires de services de RM ou de soins après avortement, et l'autre auprès de 322 professionnels informés au sujet de ces services. L'incidence de la RM et de l'avortement provoqué a été calculée par méthodes directes et indirectes.

**Résultats:** En 2014, on estime à 1 194 000 le nombre d'avortements pratiqués au Bangladesh (29 pour 1 000 femmes âgées de 15 à 49 ans), tandis que 257 000 femmes étaient traitées pour cause de complications de ces avortements (soit un taux de 6 pour 1 000 femmes âgées de 15 à 49 ans). Parmi les femmes atteintes de complications, la proportion présentant une hémorragie est en hausse nette, de 27% à 48%. On estime à 430 000 le nombre de procédures de RM (par AMIU ou médicamenteuse) pratiquées dans les structures de santé à l'échelle du pays, soit une baisse d'environ 40% du taux de RM – de 17 à 10 pour 1000 femmes âgées de 15 à 49 ans – de 2010 à 2014.

**Conclusions:** Étant donné la baisse de la prestation de la RM, il convient de prêter davantage attention au renforcement de capacité, y compris l'engagement et la formation d'un plus grand nombre de prestataires de la RM. Les approches axées sur l'amointrissement des préjugés doivent être poursuivies pour accroître la sécurité de l'usage clandestin du misoprostol au Bangladesh.

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