

Health System Costs of Menstrual Regulation and Care For Abortion Complications in Bangladesh

CONTEXT: Treatment of complications of unsafe abortion can be a significant financial drain on health system resources, particularly in developing countries. In Bangladesh, menstrual regulation is provided by the government as a backup to contraception. The comparison of economic costs of providing menstrual regulation care with those of providing treatment of abortion complications has implications for policy in Bangladesh and internationally.

METHODS: Data on incremental costs of providing menstrual regulation and care for abortion complications were collected through surveys of providers at 21 public-sector facilities in Bangladesh. These data were entered into an abortion-oriented costing spreadsheet to estimate the health system costs of providing such services.

RESULTS: The incremental costs per case of providing menstrual regulation care in 2008 were 8–13% of those associated with treating severe abortion complications, depending on the level of care. An estimated 263,688 menstrual regulation procedures were provided at public-sector facilities in 2008, with incremental costs estimated at US\$2.2 million, and 70,098 women were treated for abortion-related complications in such facilities, with incremental costs estimated at US\$1.6 million.

CONCLUSION: The provision of menstrual regulation averts unsafe abortion and associated maternal morbidity and mortality, and on a per case basis, saves scarce health system resources. Increasing access to menstrual regulation would enable more women to obtain much-needed care and health system resources to be utilized more efficiently.

International Perspectives on Sexual and Reproductive Health, 2010, 36(4):197–204

By Heidi Bart Johnston,
Elizabeth Oliveras,
Shamima Akhter
and Damian G.
Walker

Heidi Bart Johnston is an independent consultant, previously with the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Dhaka, Bangladesh. Elizabeth Oliveras is senior M & E advisor, Pathfinder International, Watertown, MA, USA. Shamima Akhter is research investigator, ICDDR,B. Damian G Walker is senior program officer, Global Health Program, Vaccine Delivery, Bill & Melinda Gates Foundation, Seattle, WA, USA.

Abortion-related mortality and morbidity result in significant health system costs. Approximately 42 million induced abortions occur around the world each year,¹ of which an estimated 22 million are conducted under unsafe conditions—that is, by an unqualified provider, in unsanitary conditions or both.² At least 65,000 women die annually from complications of unsafe abortion, and close to five million suffer temporary or permanent disability.³ A recent analysis suggests that in Africa and Latin America, the annual cost of caring for women with complications of unsafe abortion ranges from US\$159 million to US\$333 million.⁴ According to studies from a number of countries where the incidence of unsafe abortion is high, treatment of abortion complications can account for as much as 50% of hospital budgets for obstetrics and gynecology.⁵

Abortion-related mortality and morbidity—and their associated health system costs—can largely be avoided through the prevention of unwanted pregnancy and through the provision of safe abortion services and menstrual regulation.⁶ The technical and clinical interventions needed to provide safe, accessible and high quality abortion and menstrual regulation services are well known and include using vacuum aspiration or medication abortion instead of dilation and curettage for uterine evacuation; providing services in outpatient facilities, rather than in operating theaters; having midlevel providers instead of specialists provide care; and providing contraceptive coun-

seling and services.^{7–21} Each of these interventions has been shown to reduce the cost of care at the individual, facility or health system levels.^{9,12,15,17–21} Despite the advantages of these interventions in terms of safety and cost, they are often not implemented or are used inconsistently, preventing measurement of costs of services at facility or health system levels.

Savings—an abortion-oriented costing spreadsheet—was developed by Ipas to generate estimates of the costs of different strategies of providing abortion care. The initial application of the Savings model used published data primarily from Uganda;²² however, because the abortion law in Uganda is restrictive, some data from other African countries were used to project costs of providing safe and legal abortion-related care. Results suggest that use of recommended technical interventions would substantially reduce costs of providing abortion care.

In Bangladesh, the abortion law is also restrictive; however, menstrual regulation—defined as the evacuation of the uterus of a woman at risk of being pregnant to ensure a state of nonpregnancy—is provided by the government as a backup to contraception for women up to 10 weeks from the beginning of their last menstrual period. The procedure is sanctioned by the government and available at all levels of the public health care system.

The Bangladesh menstrual regulation program has had many of the recommended best practices for abortion-

TABLE 1. Distribution of study facilities, by type, according to location, Bangladesh

Division	Tertiary/ division	Secondary/district		Primary		All
	Hospital	Hospital	Maternal and child welfare center	Upazila health complex	Union health center	
Dhaka	1	2	1	2	1	7
Barisal	1	2	1	1	2	7
Sylhet	1	2	1	2	1	7
Total	3	6	3	5	4	21
National total	14	60	96	427	1,362	1,959

Source: **National total**—Bangladesh Bureau of Statistics, 2007 *Statistical Yearbook of Bangladesh*, 27th ed., Dhaka, Bangladesh: Ministry of Planning, 2008.

related care in place since the 1970s: For example, paramedics use manual vacuum aspiration for menstrual regulation in outpatient service delivery settings at the primary care level, and contraceptive counseling and services are integral to the program. Thus, the Bangladesh setting provides an opportunity to assess the financial impact of their implementation in the context of a single health system.

For this study, we collected health system expenditure data and used the Savings model to estimate comparative costs to the health system of providing menstrual regulation and care for abortion complications. We report estimates of the incremental costs to the Bangladesh health system of providing menstrual regulation and treatment for complications of unsafe abortion.

METHODS

The Savings Model

The Savings model employs a “bottom-up” approach in which system costs are generated by multiplying estimated resource use by the respective unit prices of those resources. Treatment costs are calculated separately as the sums of the incremental costs of elective abortion services and treatment of abortion complications for each health system level. Costed services include physical examinations; restoration of fluids; administration of antibiotics; uterine evacuation; repair of vaginal, cervical and uterine laceration; hysterectomy; lab-

TABLE 2. Average monthly salaries and benefits for select Ministry of Health and Family Welfare clinic staff

Staff designation	Salary and benefits range*	Median level of salary and benefits†
Gynecologist	21,700–32,900	396
General practitioner‡	16,100–26,842	302
Anesthetist	16,100–26,842	302
Nurse	12,300–21,700	238
Paramedic family welfare visitor	8,675–16,357	175
Counselor	8,675–16,357	175
Lab technician	9,980–19,142	159
Ayah/cleaner	6,850–10,884	125
Ward boy	6,850–10,884	125

*In Bangladesh Taka; US\$1=BDT69. †In U.S. dollars. ‡Individuals with a bachelor’s degree in medicine and surgery. Source: Government of Bangladesh, *Bangladesh Gazette*, Dec. 2, 2009, Dhaka, Bangladesh: Government Press of Bangladesh, 2009, pp. 7535–7538.

oratory tests; counseling; and contraceptive and recovery supplies. Costs account for provider time (based on salary, benefits and length of time needed for each procedure) and medical supplies (e.g., gloves, antibiotics, medication for pain relief and cleaning materials). Thus, the model includes incremental or recurrent costs, but not overhead and capital costs such as buildings, large equipment and essential durable equipment (i.e., specula, forceps and autoclaves). Not including such infrastructure costs underestimates the total cost of each service; however, it allowed us to capture the costs most affected by changes in clinical practice, and made it feasible for us to conduct our study despite limited time and financial resources.

We adapted the Savings model to capture the specifics of the Bangladesh health system. For example, we included the particular types of facilities that offer menstrual regulation and care for abortion complications: Tertiary-level teaching hospitals, district hospitals, maternal and child welfare centers, *upazila* (subdistrict) health complexes, and union health and family welfare clinics. We also included the range of clinicians who provide menstrual regulation and abortion care, and staff who support those clinicians: obstetrician-gynecologists, general practitioners, interns, anesthetists, family welfare visitors, counselors, nurses, lab technicians, cleaners and female and male clinic assistants (i.e., ayahs and ward boys). By applying data to the model, we generated the per case incremental costs to the public sector of providing menstrual regulation and care for abortion complications in Bangladesh in 2008.

Data Collection

We collected current treatment practice data from government health facilities that provide menstrual regulation or care for abortion complications. Selection of facilities was purposive and systematic, by location (urban or rural), facility level (primary, secondary or tertiary) and division or district performance (high, median or low rate of procedures performed). We included Dhaka division, because it is an important outlier (for example, 40% of all reported menstrual regulations performed nationally take place in Dhaka division), and then selected the remaining highest (Barisal) and lowest (Sylhet) performing divisions according to the menstrual regulation data. Within Dhaka, Barisal and Sylhet divisions, we selected the districts with the highest, median and lowest contraceptive acceptance rates. In Dhaka division, the highest, median and lowest performing districts (respectively) were Manikganj, Dhaka* and Madaripur; in Barisal division, they were Pirojpur, Barguna and Bhola; and in Sylhet division, Moulvi Bazar, Habiganj and Sunamganj.

Within each selected division, we included the tertiary-level hospital, which provides menstrual regulation in spe-

*Dhaka district was not the true median, but was within the range of median. It was included because of its high recorded rates of menstrual regulation and comparatively low fertility.

TABLE 3. Number and monthly average number of women who presented at study facilities between March and May 2008 for menstrual regulation or care for abortion complications, by type of facility

Health service	Tertiary hospital (N=3)		District hospital (N=6)		Maternal and child welfare center* (N=3)		Upazila health complex (N=5)		Union health center (N=4)	
	No.	Monthly average	No.	Monthly average	No.	Monthly average	No.	Monthly average	No.	Monthly average
Menstrual regulation	2,626	292	na	na	561	62	181	12	60	5
Treatment of abortion-related complications										
Moderate	1,094	122	339	19	43	5	67	4	na	na
Severe	41	5	21	1	na	na	na	na	na	na

*Includes one Dhaka-based women's health facility that is similar to but not a maternal and child welfare center. †Includes one Dhaka-based urban primary health care clinic that is similar to but not an upazila health complex. Note: na=not applicable.

cial wards managed by the Reproductive Health Services and Training Education Project (RHSTEP) and care for abortion complications in gynecology wards. Within each district, we purposively selected one district-level facility (a district hospital or maternal and child welfare center) and one upazila- or union-level facility that provides menstrual regulation or care for abortion complications. Government counterparts assisted us in selecting high- and low-performing facilities. In total, we included 21 facilities in the study (Table 1).

We developed survey instruments to collect the clinical information necessary to populate the Savings model: specifically, information on staff time dedicated to and supplies used for patient counseling, infection prevention, pain management and postabortion contraception, as well as uterine evacuation and other medical procedures. A detailed four-section interview tool was implemented with key clinicians at each facility. The first section focused on basic information about the facility, including a record review of numbers of women presenting for menstrual regulation and abortion-related care between March and May 2008. The subsequent three sections collected information specific to the management of menstrual regulation care, treatment of moderate abortion complications and severe abortion complications, respectively.* Clinicians were asked about the types of uterine evacuation and pain management used in the ward or facility, then about the designations of staff who provided different elements of menstrual regulation or abortion-related care and next about the types and amounts of supplies and equipment used for each. In addition, a brief interview tool was used to assess the time spent by staff members who provided abortion-related care, and to give each provider an opportunity to review the supply list.

Our survey instruments were developed using the comprehensive abortion care model.²³ Ipas's comprehensive abortion care facility checklists proved helpful, particularly in the initial development of the supply and equipment list.²⁴ The tools were pretested and fine-tuned four times prior to implementation; the initial pretest was conducted at a tertiary facility by the investigators, and three additional pretests were conducted by the interviewers with the investigators at two clinics and a tertiary facility.

Between June and August 2008, interviews were conducted with practicing clinicians (those with a bachelor's degree in medicine and surgery, and paramedic family welfare visitors), counselors, support staff and clinic administrators, in facility wards providing uterine evacuation for menstrual regulation, treatment of abortion complications and other indications. In each relevant ward, one key clinician was interviewed; in addition, brief interviews were conducted with up to five support staff members listed by the principal respondent as also participating in the provision of menstrual regulation or abortion-related care. A total of 165 respondents were interviewed: Thirty-nine key clinicians completed the detailed interview, and 126 support staff completed the brief interview.

Three female interviewers each underwent seven days of intensive training on the study objectives and administration of the data collection instruments. A female Bangladeshi medical doctor and senior investigator for this project supervised data collection. Written consent was obtained from each respondent prior to interview. The study was approved by the ethical review committee of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B).

In addition to survey data, we used price data for drugs and supplies from the *International Drug Price Indicator Guide*—an Internet resource containing drug prices from pharmaceutical suppliers, international development organizations and government agencies (Web appendix).²⁵ The prices of supplies not included in the *International Drug Price Indicator Guide* were collected from a leading Dhaka-based public-sector maternal care facility. The Bangladesh Ministry of Health and Family Welfare provided compensation (salary plus benefits) and annual increment data (Table 2). We calculated median compensation assuming retirement after 18 years of service. To calculate an hourly

*Moderate complications were defined as those requiring uterine evacuation, but no other surgical care; severe complications were defined as those requiring treatment of sepsis or requiring reconstructive surgery. Patients with moderate abortion complications were managed at all facilities, except the community-level union health and family welfare centers; management usually included uterine evacuation, restoration of fluid volume and management of sepsis. Patients with severe complications were managed only at district- and tertiary-level facilities; management included reconstructive surgery and hysterectomy for extremely severe cases.

TABLE 4. Costs (in US\$) per case of menstrual regulation and of care for moderate and severe abortion complications, by type of facility

Health service	Tertiary hospital	District hospital	Maternal and child welfare center	Upazila health complex	Union health center
Menstrual regulation					
Salary					
Periuterine evacuation	2.76	na	2.39	3.91	2.70
Uterine evacuation	0.36	na	0.62	0.54	0.51
Supplies	7.88	na	5.83	3.77	3.36
Total	11.00	na	8.84	8.22	6.57
Salary as % of total	28	na	34	54	49
Moderate complications					
Salary					
Perisurgical care	3.67	5.31	4.08	5.15	na
Surgical care	3.00	1.57	3.36	3.63	na
Supplies	20.61	34.12	13.80	0.82	na
Total	27.28	40.99	21.24	9.60	na
Salary as % of total	24	17	35	91	na
Severe complications					
Salary					
Perisurgical care	11.87	6.10	na	na	na
Surgical care	6.31	3.06	na	na	na
Supplies	68.28	76.93	na	na	na
Total	86.46	86.09	na	na	na
Salary as % of total	21	11	na	na	na

Note: na=not applicable.

wage for each type of provider, we assumed that individuals within provider types worked 22 days per month, eight hours per day and received the same compensation regardless of the level of care at which they were posted.

Analysis

We used our data on menstrual regulation and postabortion care to generate national annual estimates and compared those with previously generated estimates.^{26,27} To generate national annual estimates of the number of services provided, we multiplied the average annualized number of each type of service conducted at each type of facility by the number of each facility type in the country. We summed the estimates from the different types of facilities, which should be similar to the numbers of menstrual regulation and complications of unsafe abortion recorded at public-sector facilities in 2008.

To generate illustrative estimates of how much Bangladesh spends per year on menstrual regulation and care for moderate and severe abortion-related complications, we annualized the average monthly recurrent costs associated with providing the three categories of service for each type of facility, and multiplied the annual costs by the number of that type of facility in the country.

Results

As one would expect, the more decentralized the level of care, the fewer patients presented (Table 3, page 199). During the study period, the average number of women who sought menstrual regulation per month per facility was 292 at tertiary hospitals, 62 at maternal and child welfare centers, 12 at upazila health complexes and five at union health cen-

ters; menstrual regulation is not offered at district hospitals. Menstrual regulation was generally provided using manual vacuum aspiration, although some procedures were performed using electric vacuum aspiration (not shown). All facilities that provided menstrual regulation reported providing contraceptive services to menstrual regulation clients.

A monthly average of 127 women per facility presented at tertiary hospitals with abortion-related complications (122 for moderate complications and five for severe complications), and 20 women per month per facility sought postabortion care from district hospitals (19 for moderate complications and one for severe complications). Maternal and child welfare centers and upazila health complexes only treat moderate postabortion complications—a monthly average of five and four per facility, respectively, over the study period; union facilities do not provide any postabortion care services. Uterine evacuation for abortion complications was generally performed using dilation and curettage (not shown). Typically, abortion care patients were referred for contraceptive services; these were not provided on the wards where abortion complication patients received care.

Overall, the majority of menstrual regulation and abortion-related services at all facilities were for menstrual regulation. The vast majority of abortion-related services were to treat moderate complications; fewer than 3% of presentations were for treatment of severe complications. Still, 127 women per month, or an average of four women per day, were treated at each tertiary hospital for moderate or severe abortion-related complications; an average of one woman per day presented to each district hospital with abortion complications.

Incremental Per-Case Costs

On a per-case basis, menstrual regulation is much less expensive to provide than care for moderate or severe abortion complications, and care for moderate complications is much less expensive than care for severe complications (Table 4). At the tertiary care level, the total incremental cost per case of menstrual regulation was 40% of the cost of care for moderate abortion complications (US\$11 vs. US\$27) and 13% of the cost of care for severe complications (US\$86). The cost of menstrual regulation at the maternal and child welfare- and upazila-level facilities was \$9 and \$8 per case, respectively. The cost of menstrual regulation at the union level was \$7 per case, which was the lowest by facility type and only 8% of the cost of tertiary-level care for severe abortion complications. At district hospitals, care for moderate complications cost about half as much as care for severe complications (US\$41 vs. US\$86); the cost of moderate complications at the maternal and child welfare- and upazila-level facilities was \$21 and \$10 per case, respectively.

When we separated the costs of menstrual regulation care into provider salary for periuterine evacuation,*

*Includes salary costs attributed to preparation of the procedure room, physical examinations and lab tests, preservice counseling, administration of pain medication, postprocedure monitoring, reproductive health and contraceptive counseling, and follow-up care.

provider salary for uterine evacuation, and supply costs, supply costs exceeded salary costs at tertiary hospitals and maternal and child welfare centers. Specifically, salary costs were 28% of the total incremental costs at tertiary hospitals and 34% of the total costs at maternal and child welfare centers. At upazila- and union-level facilities, supply costs and salary costs each represented approximately half of the total costs (54% and 49%, respectively). Supplies for recovery of menstrual regulation clients—such as antibiotics, iron supplements, vitamins and sanitary pads—and contraceptive supplies made up the majority of the supply costs at most facilities (not shown).

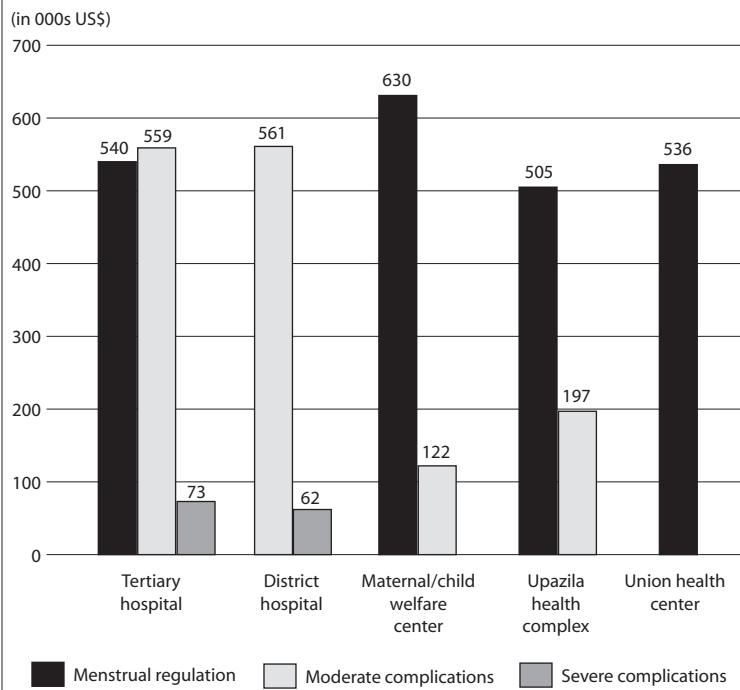
In a similar examination of the costs associated with care of abortion complications, the proportion of the total cost of care for moderate abortion-related complications attributed to provider salary was 24% for tertiary hospitals, 17% for district hospitals, 35% for maternal and child welfare centers and 91% for upazila health facilities. Provider salary was 21% of the total cost of severe complication care at tertiary hospitals and 11% of such care at district hospitals. Significant supply costs—particularly at district hospitals—included blood and oxygen. An additional expense was Rh(d) immune globulin, a medicine recommended after an abortion for women with negative blood types; however, as fewer than 5% of women in Bangladesh have a negative blood type, administration of Rh(d) immune globulin to 100% of patients represents an unnecessary expense that substantially increases the cost of care.

National Annual Estimates

We estimate that 263,688 menstrual regulation procedures were provided at public-sector facilities and RHSTEP centers based in public-sector facilities in 2008. According to the Directorate General of Family Planning, approximately 124,045 menstrual regulations were conducted in ministry of health and family welfare facilities in 2006,²⁷ and RHSTEP reports that an additional 59,783 were performed in their public sector–based facilities from July 2005 to June 2006²⁸—for an annual total estimate of 183,828. Thus, our estimate is higher than the official records, but within the same order of magnitude. Menstrual regulation services are severely underreported in the public sector.^{29,30} Thus, as both the estimates presented in this article and the official estimates are based primarily on public-sector records, they are likely to be stark underestimates of the actual number of menstrual regulations provided in public-sector facilities. The numbers in the official records are less than half of the most recent national estimate—468,000 menstrual regulations in 1995.²⁶

Additionally, we estimate that in 2008, 68,413 women presented at public-sector facilities with moderate abortion complications, and an additional 1,685 presented with severe abortion complications. Our combined total of 70,098 hospitalizations for abortion-related complications is of the same order of magnitude as a previous estimate of 71,700 annual abortion-related complications, derived from a random sample survey of 110 Bangladesh

FIGURE 1. Average annual incremental costs (in US\$) to the Bangladesh national health system for menstrual regulation and care for abortion complications, by type of facility



hospitals conducted in 1996.²⁶

On the basis of our results, we estimate that the national incremental health system cost of menstrual regulation and treatment of abortion-related complications for 2008 totaled US\$3.8 million—US\$2.2 million for menstrual regulation and US\$1.6 million for care of abortion-related complications. That year, tertiary facilities spent an estimated \$539,648 on menstrual regulation (Figure 1); however, such facilities spent even more money treating abortion-related complications (\$559,182 for moderate complications and \$72,624 for severe complications), although more than twice as many women received menstrual regulation as care for abortion complications. At maternal and child welfare clinics, costs for menstrual regulation were five times those for moderate abortion complications (\$630,457 vs. \$122,350), although 12 times as many women received menstrual regulation as treatment for abortion complications. Likewise, at upazila facilities, costs for menstrual regulation were 2.5 times those for treating moderate abortion complications (\$505,332 vs. \$196,817), although three times as many women received menstrual regulation.

DISCUSSION

Our analysis confirms that on a per-case basis, the incremental costs of providing menstrual regulation and related care following recommended practices—including use of manual vacuum aspiration for uterine evacuation, providing services in outpatient facilities, having midlevel providers offer uterine evacuation and other care, and pro-

viding contraceptive counseling and services—are much lower than those associated with providing care for abortion complications using conventional practices. The application of Bangladesh data to the Savings model demonstrates that on a per-case basis, provision of menstrual regulation care cost 8–13% of the cost of treatment for severe abortion complications, depending on the level of care at which menstrual regulation and postabortion care were offered.

By providing menstrual regulation care as a basic service, the Bangladesh government is providing women with much-needed care, and preventing unnecessary and expensive complications. Data from several demographic surveillance systems indicate that as menstrual regulation has increased over the more than 30 years of the program's existence, abortion-related mortality has decreased substantially.^{31–33} We can assume that the menstrual regulation program is averting a substantial number of abortion complications. Additionally, it should be noted that according to our findings, fewer than 3% of patients with complications had severe complications; thus, it is possible that the menstrual regulation program is having the unintended impact of making illegal abortions safer. Regardless, the overall implication is that the menstrual regulation program has played an important role in reducing abortion-related morbidity and mortality, and thereby has also played an important role in reducing health system costs associated with treating abortion-related complications.

However, despite the menstrual regulation program's provision of services at the primary-care level, many women in Bangladesh still resort to unsafe abortion. Previous research suggests that only about one in five women who have abortion-related complications obtain hospital care.²⁶ Multiple social, cultural, economic and political barriers can prevent women from accessing safe reproductive health care. If all women experiencing abortion-related complications were able to access the care they needed (and that Bangladesh has committed to providing in international agreements),^{34,35} the total annual health system costs of providing care for abortion-related complications would be much higher.

The Bangladesh health system could better meet the reproductive health needs of women by making menstrual regulation more accessible, further reducing recourse to unsafe abortion. For example, the health system could ensure that each facility that is meant to provide menstrual regulation services has a provider trained and equipped to offer menstrual regulation care, increase the allowed limit for menstrual regulation from 10 to 12 weeks since last menstrual period and address the socioeconomic barriers to safe menstrual regulation services. On a national level, the incremental costs of providing essential care to women with abortion-related complications amounted to roughly US\$1.6 million in 2008. It is possible that these costs of treating abortion complications could be reduced and quality of care maintained or improved through shifting of

care strategies, for example, by more judicious administration of expensive supplies such as blood, oxygen and Rh(d) immune globulin, and by moving away from dilation and curettage to vacuum aspiration for uterine evacuation. However, rather than cutting costs of providing treatment, the primary aim should be to prevent these complications from occurring, by the promotion and use of contraceptive and menstrual regulation services.

Limitations

The national estimates generated in this analysis are intended to be illustrative. Our sample of 21 facilities was purposively selected to be representative of public-sector facilities that provide menstrual regulation and abortion-related care nationally; a larger, random sample may have yielded different results.

For several reasons, the current costs and potential savings associated with averting complications of unsafe abortion by having a decentralized menstrual regulation program are likely underestimates. First, we expect the menstrual regulation program to have a much greater impact than is demonstrated in this article. As mentioned, in our modeling, we included only the menstrual regulations that had been recorded in facility registers. It is widely recognized that public-sector facilities undercount—sometimes severely—the total number of menstrual regulations that occur. Thus, the numbers of unsafe abortions averted with menstrual regulation are underrepresented, and the costs of supplies and provider time calculated in this analysis are undercounts. Second, a much larger number of women require care for abortion-related complications than are noted in public sector facility records. This is because a majority of women who require care do not obtain care,²⁶ and of those who do obtain care, there is a preference for care at private-sector facilities. Averting abortion-related morbidities with safe menstrual regulation and contraception would represent a substantial savings—if not to the public health system, then to the population it serves. Third, the costs for supplies come from an international source and may not reflect local costs; however, use of such data may increase the comparability of our cost estimates to those from other countries. In addition, the costs reflected in this analysis are incremental costs only. The total costs to the health system of providing both menstrual regulation care and care for abortion complications would include the costs associated with general organizational infrastructure and would be substantially higher.

We recognize that estimating time use through interviews is less reliable than other methods, such as time-motion studies and record reviews.³⁶ The self-reporting of provider time spent on menstrual regulation and postabortion care may be inaccurate. Finally, we recognize that some of the costs of menstrual regulation and unsafe abortion are borne by the woman and her family rather than the health system.⁴ Such costs are outside the scope of this study.

Conclusion

By providing menstrual regulation care at primary-, secondary- and tertiary-level public facilities; training and posting paramedics to provide uterine evacuation; using manual vacuum aspiration; and including contraceptive counseling and services as integral components of menstrual regulation services, the Bangladesh menstrual regulation program has demonstrated over more than 30 years that even in the context of a restrictive abortion law, safe uterine evacuation services can be provided that not only avert unsafe abortion and associated maternal morbidity and mortality, but also make efficient use of health system resources. At a time when many countries are struggling to meet the fifth Millennium Development Goal by reducing maternal mortality by 75% between 1990 and 2015, policymakers in countries with high rates of unsafe abortion and related morbidity and mortality might be encouraged by the Bangladesh menstrual regulation program's efficient use of scarce resources to avert abortion-related morbidity and mortality.

REFERENCES

1. Sedgh G et al., Induced abortion: estimated rates and trends worldwide, *Lancet*, 2007, 370(9595):1338–1345.
2. World Health Organization (WHO), *Unsafe Abortion in 2008—Global and Regional Levels and Trends*, Geneva: WHO, 2010.
3. WHO, *Unsafe Abortion—Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality in 2003*, fifth ed., Geneva: WHO, 2007.
4. Vlassoff M et al., Estimates of health care system costs of unsafe abortion in Africa and Latin America, *International Perspectives on Sexual and Reproductive Health*, 2009, 35(3):114–121.
5. Alan Guttmacher Institute (AGI), *Sharing Responsibility: Women, Society and Abortion Worldwide*, 1999, New York: AGI.
6. Grimes DA et al., Unsafe abortion: the preventable pandemic, *Lancet*, 2006, 368(9550):1908–1919.
7. WHO, *Safe Abortion: Technical and Policy Guidance for Health Care Systems*, Geneva: WHO, 2003.
8. Billings DL and Benson J, Postabortion care in Latin America: policy and service recommendations from a decade of operations research, *Health Policy and Planning*, 2005, 20(3):158–166.
9. Koontz SL et al., Treating incomplete abortion in El Salvador: cost savings with manual vacuum aspiration, *Contraception*, 2003, 68(5):345–351.
10. Dickson-Tetteh K and Billings DL, Abortion care services provided by registered midwives in South Africa, *International Family Planning Perspectives*, 2002, 28(3):144–150.
11. Ipas and IHCAR, *Deciding Women's Lives Are Worth Saving: Expanding the Role of Midlevel Providers in Safe Abortion Care*, Chapel Hill, NC, USA: Ipas, 2002.
12. Dayaratna V et al., *Reproductive Health Interventions: Which Ones Work and What Do They Cost?* Washington, DC: Futures Group International, 2000.
13. Jowett M, Safe motherhood interventions in low-income countries: an economic justification and evidence of cost effectiveness, *Health Policy*, 2000, 53(3):201–228.
14. Huntington D et al., The postabortion caseload in Egyptian hospitals: a descriptive study, *International Family Planning Perspectives*, 1998, 24(1):25–31.
15. de Pinho H and McIntyre D, *Cost Analysis of Abortions Performed in the Public Sector*, Cape Town, South Africa: University of Cape Town, 1997.
16. King T, Benson J and Stein K, *Comparing the Cost of Postabortion Care in Africa and Latin America: The DataPAC Project*, New York: Population Council, 1997.
17. Blumenthal PD and Remsburg RE, A time and cost analysis of the management of incomplete abortion with manual vacuum aspiration, *International Journal of Gynecology & Obstetrics*, 1994, 45(3):261–267.
18. Bradley J et al., A comparison of the costs of manual vacuum aspiration (MVA) and evacuation and curettage (E and C) in the treatment of early incomplete abortions in Kenya, *Journal of Obstetrics & Gynaecology of Eastern and Central Africa*, 1993, 11(1):12–19.
19. Johnson BR et al., Costs and resource utilization for the treatment of incomplete abortion in Kenya and Mexico, *Social Science & Medicine*, 1993, 36(11):1443–1453.
20. Bankole A et al., Meeting the contraceptive needs of Ugandan women: A beneficial investment, paper presented at the 26th International Union for the Scientific Study of Population's International Population Conference, Marrakech, Morocco, Sept. 27–Oct. 2, 2009.
21. Shearer JC, Walker DG and Vlassoff M, Costs of post-abortion care in low- and middle-income countries, *International Journal of Gynecology & Obstetrics*, 2010, 108(2):165–169.
22. Johnston HB, Benson J and Gallo M, Reducing the costs to health systems of unsafe abortion: a comparison of four strategies, *Journal of Family Planning and Reproductive Health Care*, 2007, 33(4):250–257.
23. Hyman A and Kumar A, *What Is Women-Centered Comprehensive Abortion Care?* 2003, <http://www.ipas.org/Publications/asset_upload_file995_2423.pdf>, accessed Sept. 5, 2009.
24. Ipas, unpublished abortion facility care checklists, Ipas: Chapel Hill, NC, USA, 2001.
25. *International Drug Price Indicator Guide*, <<http://erc.msh.org/mainpage.cfm?file=1.0.htm&module=DMP&language=english>>, accessed Sept. 5, 2009.
26. Singh S et al., Estimating the level of abortion in the Philippines and Bangladesh, *International Family Planning Perspectives*, 1997, 23(3):100–107 & 144.
27. Directorate General of Family Planning Management Information System, *Annual Report 2006*, Dhaka, Bangladesh: Directorate General of Family Planning Management Information System, 2007.
28. Reproductive Health Services Training and Education Programme (RHSTEP), *RHSTEP Annual Report: July 2005–June 2006*, Dhaka, Bangladesh: RHSTEP, 2007.
29. Begum SF, Kamal H and Kamal GM, *Evaluation of MR Services in Bangladesh*, Dhaka, Bangladesh: Bangladesh Association for Prevention of Septic Abortion, 1987.
30. Huda FA et al., *Strengthening Health System Capacity to Monitor and Evaluate Programs Targeted at Reducing Abortion-Related Maternal Mortality: Final Report of the Safe Menstrual Regulation Care (SMRC) Project, January–December 2009*, Dhaka, Bangladesh: ICDDR,B, 2010.
31. Oliveras E et al., *Situation Analysis of Unsafe Abortion and Menstrual Regulation in Bangladesh*, Dhaka, Bangladesh: International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), 2008.
32. Chowdhury ME et al., Determinants of reduction in maternal mortality in Matlab, Bangladesh: a 30-year cohort study, *Lancet*, 2007, 370(9595):1320–1328.
33. Oliveras E and Johnston HB, Increasing levels of abortion and decreasing abortion-related mortality, *Health Sciences Bulletin*, 2007, 5(2):1–6.
34. United Nations (UN), *Population and Development, Programme of Action Adopted at the International Conference on Population and Development*, Cairo, Sept. 5–13, 1994, New York: Department for Economic and Social Information and Policy Analysis, UN, 1995.
35. UN, *Declaration of the Fourth World Conference on Women, Beijing, September 4–15, 1995*, New York: UN, 1995.
36. Bratt JH et al., A comparison of four approaches for measuring clinician time use, *Health Policy and Planning*, 1999, 14(4):374–381.

RESUMEN

Contexto: El tratamiento de las complicaciones de aborto inseguro puede ser un sumidero de los recursos financieros de los sistemas de salud, especialmente en los países en desarrollo. En Bangladesh, el gobierno presta servicios de regulación menstrual como un respaldo para la anticoncepción. Los resultados de una comparación de los costos económicos de los servicios de regulación menstrual con respecto a los del tratamiento de las complicaciones de aborto inducido, tienen implicaciones para las políticas tanto en Bangladesh como a nivel internacional.

Métodos: Los datos sobre costos incrementales de prestar servicios de regulación menstrual y de atención a complicaciones de aborto fueron recolectados a través de encuestas aplicadas a prestadores de servicios en 21 instituciones del sector público en Bangladesh. Se ingresaron estos datos en una hoja de cálculo para servicios de aborto, con el objeto de estimar los costos para el sistema de salud.

Resultados: Los costos incrementales de prestar servicios de regulación menstrual por caso en 2008 fueron un 8–13% de los costos asociados con el tratamiento de complicaciones graves de aborto, dependiendo del nivel de atención. Se proporcionaron unos 263,688 procedimientos de regulación menstrual en instituciones del sector público en 2008, con costos incrementales estimados en US\$2.2 millones de dólares; y 70,098 mujeres fueron tratadas en dichas instituciones por complicaciones relacionadas con el aborto, con costos incrementales estimados en US\$1.6 millones.

Conclusión: La prestación de servicios de regulación menstrual evita abortos inseguros, así como la morbilidad y mortalidad maternas asociadas; y, caso por caso, ahorra recursos limitados de los sistemas de salud. Aumentar el acceso a la regulación menstrual posibilitaría que una mayor cantidad de mujeres obtuvieran los servicios de salud tan necesarios, y que los recursos del sistema de salud se utilizaran de manera más eficiente.

RÉSUMÉ

Contexte: Le traitement des complications de l'avortement non médicalisé peut ponctionner significativement les ressources des systèmes de santé, surtout dans les pays en développement. Au Bangladesh, la régulation menstruelle est assurée par l'État, à l'appui de la contraception. La comparaison des coûts économiques de la prestation de soins de régulation

menstruelle par rapport à ceux du traitement des complications de l'avortement a des implications de politique au Bangladesh comme à l'échelle internationale.

Méthodes: Les données de coûts différentiels de la prestation de la régulation menstruelle et des soins des complications de l'avortement ont été collectées dans le cadre d'enquêtes auprès des prestataires de 21 établissements du secteur public bangladais. Ces données ont été chargées dans un tableur de coûts de l'avortement en vue d'estimer les coûts de ces services au système de santé.

Résultats: Les coûts différentiels par cas de la prestation de soins de régulation menstruelle en 2008 représentaient 8% à 13% de ceux associés au traitement des complications graves de l'avortement, suivant le niveau de soins. Quelque 263.688 procédures de régulation menstruelle ont été pratiquées dans les établissements de l'État en 2008, à coûts différentiels estimés à 2,2 millions de dollars américains, tandis que 70.098 femmes étaient traitées dans ces établissements pour cause de complications d'avortement, à coûts différentiels estimés à 1,6 million de dollars.

Conclusion: La prestation de la régulation menstruelle évite l'avortement non médicalisé et la morbidité et mortalité maternelle qui s'ensuit et, par cas, économise les faibles ressources du système de santé. Un accès accru à la régulation menstruelle permettrait à plus de femmes d'obtenir des soins dont elles ont grand besoin, tandis que les ressources du système de santé seraient utilisées plus efficacement.

Acknowledgments

This work was made possible through funding provided by the U.K. Department for International Development (DFID) to the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The authors thank the Directorate General of Family Planning and the Directorate General of Health of the Bangladesh Ministry of Health and Family Welfare for providing insightful advice, support and approval for this study; Reproductive Health Services, Training and Education Project (RHSTEP) for their advice and logistic support; Abbas Bhuiya and K. Zaman of ICDDR,B, Sabina Faiz Rashid at BRAC University and Mashud Alam at the Bangladesh Bureau of Statistics, for their assistance in obtaining provider salary data; and DFID/Bangladesh for financial and technical support.

Author contact: heidibartjohnston@gmail.com