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Abortion Incidence and Unintended Pregnancy in Nepal

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Abstract

CONTEXT—Although abortion has been legal under broad criteria in Nepal since 2002, a significant proportion of women continue to obtain illegal, unsafe abortions, and no national estimates exist of the incidence of safe and unsafe abortions.

METHODS—Data were collected in 2014 from a nationally representative sample of 386 facilities that provide legal abortions or postabortion care and a survey of 134 health professionals knowledgeable about abortion service provision. Facility caseloads and indirect estimation techniques were used to calculate the national and regional incidence of legal and illegal abortion. National and regional levels of abortion complications and unintended pregnancy were also estimated.

RESULTS—In 2014, women in Nepal had 323,100 abortions, of which 137,000 were legal, and 63,200 women were treated for abortion complications. The abortion rate was 42 per 1,000 women aged 15–49, and the abortion ratio was 56 per 100 live births. The abortion rate in the Central region (59 per 1,000) was substantially higher than the national average. Overall, 50% of pregnancies were unintended, and the unintended pregnancy rate was 68 per 1,000 women of reproductive age.

CONCLUSIONS—Despite legalization of abortion and expansion of services in Nepal, unsafe abortion is still common and exacts a heavy toll on women. Programs and policies to reduce rates

of unintended pregnancy and unsafe abortion, increase access to high-quality contraceptive care and expand safe abortion services are warranted.

Prior to its amendment in 2002, the abortion law in Nepal was highly restrictive: Abortion was permitted only to save a woman's life.¹ Moreover, unsafe abortion was common, and deaths from abortion-related complications accounted for more than half of maternal deaths that occurred in major hospitals.² In 2002, the Country Code of Nepal (*Muluki Ain*) was amended to grant all women the right to terminate a pregnancy at up to 12 weeks' gestation on demand, at up to 18 weeks' gestation if the pregnancy resulted from rape or incest, and at any gestational age with a doctor's recommendation if the pregnancy poses a danger to the woman's life or her physical or mental health or if there is a risk of fetal abnormality or impairment.¹ In addition, the revised law prohibits sex-selective abortions and abortions done without the consent of the woman.

During the past decade, the Ministry of Health has developed strategies for implementing the law and expanding access to safe and legal services. These strategies include training clinicians to perform abortions, providing them with necessary equipment, and certifying providers and health facilities³ (both of which need government approval to provide abortion services).^{4,5} All health facilities that have official approval to provide abortions are expected to perform first-trimester abortions. A few lower-level facilities, such as health posts, are approved only to provide medical abortion up to nine weeks' gestation. To provide abortions after the first trimester, facilities need separate approval and are required to have staff members trained and certified to provide such abortions. Abortion legalization has led to a decrease in the number of women presenting with severe abortion complications,^{6,7} and it has contributed to a decline in the country's maternal mortality ratio, which fell from 580 maternal deaths per 100,000 live births in 1995 to 190 deaths per 100,000 live births in 2013.⁸

Nonetheless, unsafe abortions—that is, procedures carried out by an unapproved provider in an unapproved facility, potentially under unsafe conditions and using unsafe methods—remain a concern in Nepal. According to the 2011 Nepal Demographic and Health Survey (DHS), a quarter of the women who reported having had an abortion in the past five years had had postabortion complications.⁹ Moreover, a 2009 survey of eight districts found that abortion was the third leading cause of maternal mortality, accounting for 7% of maternal deaths.¹⁰

Barriers to women's accessing safe, legal abortion include lack of awareness of the availability and location of services, lack of transport to approved facilities, and gender norms that hinder women's decision-making ability.^{11,12} Moreover, abortion is considered a sin in Nepali culture, and the need to keep it secret may cause many women to go to unqualified providers.^{3,13} In 2009, Nepal's Supreme Court ordered the government to ensure that all women, regardless of ability to pay, have access to safe abortion services; however, the government has not yet implemented an effective mechanism through which to provide cost-free abortion services for poor and marginalized women, and fees are often prohibitively high.^{3,13}

No national estimates of abortion incidence are available for Nepal. Data on abortion incidence are unavailable for years prior to the revision of the abortion law, and the only data available for years after 2002 are official statistics indicating the number of legal procedures reported by facilities. These statistics likely underestimate the number of abortions that occur in Nepal, given that they capture only legal abortions done in approved facilities and thus exclude illegal procedures; moreover, facility records in Nepal, as in many other countries, are often incomplete and therefore do not include even many legal abortions.¹⁴ Community-based surveys are not a good alternative to official statistics; because of the stigma associated with the procedure, women typically underreport their abortions in face-to-face interviews, a problem that may be exacerbated by women's not knowing abortion's legal status.^{9,11} As a result, we have used indirect methods for estimating abortion incidence.

In this study, we estimate the incidence of abortion in Nepal in 2014 using a modified version of the Abortion Incidence Complications Methodology (AICM). This approach, which has proven useful in settings where abortion is highly legally restricted, has been used to estimate the incidence of induced abortion in more than 20 countries,^{15–18} and can be modified for settings, such as Nepal, where abortion is legal and yet often done illegally by untrained or unapproved providers.

In addition, we present estimates of the abortion ratio and key indicators of unintended pregnancy. We also estimate the proportion of abortions that were illegal, the proportion that ended in complications requiring care in health facilities, the proportion that did not end in complications, and the treatment rate for abortion complications.

METHODS

As per the AICM, we calculated abortion incidence primarily using data from two sources: a survey of facilities potentially able to provide abortion-related care, called the Health Facilities Survey (HFS), and a survey of experts on abortion in Nepal, called the Health Professionals Survey (HPS). Both were conducted from August to November 2014 and were approved by the Nepal Health Research Council. Below we describe the two surveys, as well as the other data sources we drew upon and the method we used to compute abortion incidence.

Health Facilities Survey

The HFS was a multistage, stratified probability survey of 386 facilities that had the capacity to provide safe abortion services, postabortion care or both. The sample was drawn from 27 of Nepal's 75 districts, and was representative of facilities in the country as a whole as well as in its three geographic zones and five development regions. Public, private and nongovernmental organization (NGO) facilities were included.

We identified eligible facilities using a list obtained from the Health Management Information System of the Nepal Ministry of Health and Population. A total of 2,226 facilities were eligible for the HFS (Table 1). Seventy-three percent were public facilities: large tertiary hospitals (i.e., national, regional, subregional and zonal hospitals), district hospitals, public medical colleges, primary health care centers, health posts and sub-health

posts with birthing centers. From the private sector, which accounted for 23% of eligible facilities, we included hospitals, medical colleges and clinics. Last, we selected NGO facilities providing abortion, postabortion care or both, which accounted for 4% of eligible facilities.

We sampled a fraction of each type of facility; the proportion sampled varied according to the likelihood that facilities of that type provided abortion services and to the number of such facilities (Table 1). Because district hospitals and public and private medical colleges were few in number and had some of the largest caseloads of both legal abortions and postabortion care, we included in the HFS sample 100% of these facilities in the sampled districts. The sampling fractions were smaller for primary health care centers (63%), health posts (43%), sub-health posts with birth centers (50%), private hospitals (32%), private clinics (37%) and NGO facilities (34%). Of the 927 facilities in the sample districts, 430 were selected for the HFS and 386 participated, for a response rate of 90%.

For each participating facility, a senior staff member knowledgeable about the facility's provision of abortions and postabortion care was interviewed in person. A key purpose of the HFS was to determine the number of women who obtain care for postabortion complications at each facility (i.e., caseloads). In the survey, postabortion complications referred not only to extremely serious conditions, such as sepsis or a perforated uterus, but also to less severe conditions, such as incomplete abortion with heavy bleeding, that require facility-based treatment.

The survey asked for caseloads for all instances of post-abortion care, regardless of whether the complication was from a miscarriage or an induced abortion, both because symptoms of one are often difficult to distinguish from those of the other and because providers may be reluctant to identify cases of illegal abortion. The AICM adjusts for this in the abortion incidence calculations by subtracting the number of cases resulting from miscarriage. We collected the caseload information for postabortion care separately for inpatients and for outpatients, and for two reference periods: the average or typical month, and the month prior to the interview. Obtaining estimates for these two periods increased the likelihood of accurate recall and allowed us to capture variation in caseloads over the course of a year.

Given that abortion is legal in Nepal, a second key goal of the HFS was to collect data on the number of women who obtain legal abortions in approved facilities. As we did for postabortion services, we collected this caseload data for both the past month and the average month. Because most of these procedures are done on an outpatient basis during the first trimester, we did not collect data separately for inpatients and outpatients.

Health Professionals Survey

The HPS was administered to a purposive sample of health professionals with broad knowledge about the conditions under which women in Nepal obtain abortions—whether the procedures are legal or illegal; safe or unsafe; and performed by trained providers, by untrained providers or by the women themselves (self-induced). Because no list of potential key informants existed, the study team compiled one using a snowball sample approach. First, we identified individuals and organizations known to focus on abortion issues in each

sampled district. We then contacted these organizations and individuals and added suitable persons to the list; we also asked them to provide names of other potential key informants in their district. Finally, we selected informants from the list and contacted them for an interview. In selecting potential participants, we intentionally avoided including anyone who had participated in the HFS.

The list included both people with medical training and those without it, and it spanned a wide range of professions, including public health experts, managers of reproductive health programs, obstetrician-gynecologists, public health nurses, other clinicians (e.g., medical officers, senior nurses), policymakers, advocates and researchers (Table 2). The diversity of experience was important, because some AICM studies have found that estimates from professionals with medical backgrounds may differ substantially from those of experts with other backgrounds. We expected that including a range of perspectives would improve the reliability and representativeness of our estimates.¹⁵ Almost all key informants selected for the HPS (95%) participated in the study.

All HPS interviews were conducted in person by trained interviewers using a structured questionnaire. Altogether, 134 health professionals, representing all five development regions, were interviewed. More than three-quarters of participants had worked in rural areas in the past five years; about half currently worked in the government sector, and the remainder in the private sector or for NGOs.

The key purpose of the HPS was to obtain information that would allow us to calculate the proportion of illegal abortions that resulted in complications that were treated in health facilities, a key measure for estimating abortion incidence. From the literature, the study team created a list of categories of approved and unapproved providers,^{*} and HPS respondents were asked to estimate the proportion of abortions in their district performed by each type of provider. They were also asked to estimate the proportion of women who would likely experience complications requiring care at a health facility after obtaining an abortion from each type of provider, as well as the proportion of those with complications who would obtain care at a facility.

Because the conditions under which abortions are performed vary by women's socioeconomic status and place of residence, the above information was obtained for each of four socioeconomic subgroups of women: poor urban, nonpoor urban, poor rural and nonpoor rural.

Other Data Sources

We used the data from the HFS and the HPS in conjunction with information from several other sources. Data on population size and number of births, nationally and by development region, were obtained from the Ministry of Health and Population and the Central Bureau of Statistics.^{19,20} The 2011 Nepal DHS⁹ was our source of data on the distribution of women by wealth and place of residence. Finally, the two largest NGO service providers, Marie

*Unapproved providers include medical practitioners (e.g., doctors, staff nurses, auxiliary nurse midwives) who have not been approved by the government; paramedics; pharmacists; traditional providers (e.g., trained and untrained traditional birth attendants, quacks, homeopathic doctors, and Ayurvedic and traditional healers); and women themselves (i.e., those who self-induce abortions).

Stopes International and the Family Planning Association of Nepal, supplied statistics on the number of legal abortions and postabortion services that their affiliated clinics provided in 2014. Although service provision records from public- and private-sector facilities are generally of poor quality, we considered the data from these two NGOs to be of high quality, because the relevant clinics are part of large international organizations that have a uniform and well-established system for documenting services provided and clients served. Thus, we used the caseload data from these NGOs in our estimates. Caseload data for other NGOs were obtained using the HFS.

Steps in Estimating Abortion Incidence

- *Estimating the number of legal abortions.** To estimate the number of legal abortions, we first estimated the annual caseload at each facility by taking the mean of the number of abortions in the two reference periods—the average month and the past month—and multiplying by 12 to yield annual values. The caseload numbers were summed and then weighted at the regional level using sample weights.† Adding the regional estimates to the caseload numbers from the two large NGO networks yielded the total number of legal abortions in Nepal.
- *Estimating the number of postabortion care patients.* Estimating the number of illegal abortions is a complex task that requires a range of information and assumptions. The first step is to determine the number of women receiving postabortion care. For each facility, we estimated the annual postabortion care caseload to be the mean of the caseloads for the two reference periods—the average month and the past month—multiplied by 12. Because we collected data separately for inpatient and outpatient care, we performed these calculations for each and added the results to obtain the total number of cases. As we did in the legal abortion calculations, we then weighted the caseloads to the regional level. The results were added to the number of cases treated by the two large NGO networks to yield the total number of postabortion care patients treated in each region and in Nepal as a whole.
- *Estimating the number of women treated for complications of illegal abortion.* The postabortion care caseloads computed above include not only women treated for complications of illegal abortion, but also those treated for complications from miscarriage and legal abortion. Therefore, we made adjustments to subtract the number of women in the last two groups.

First, we estimated the number of women treated for complications of miscarriage. Clinical research has identified a biological pattern of spontaneous pregnancy loss,^{21,22} and the proportion of pregnancies ending in miscarriage and the distribution of these miscarriages by gestational age are thought to be fairly constant across populations. We assumed that only late miscarriages (those occurring at 13–21 completed weeks' gestation) were likely to be

*The mathematical equations used in each of these steps are outlined in Appendix A.

†To compute sample weights, we first divided the number of facilities of each type in the sample by the number of facilities of that type in the sampling frame. The inverse of this number is the sample weight.

accompanied by complications requiring care in health facilities, and that women did not obtain care for first-trimester miscarriages. In accordance with these assumptions, and with evidence from clinical studies, we estimated that the number of miscarriages requiring care was equivalent to 3.4% of the number of live births (577,718),²⁰ which yields an estimate of 19,700 late miscarriages.

However, because it is likely that not all of these women received care, we made a further simplifying assumption: that the proportion of women with late miscarriages who obtained care at a facility was equal to the proportion of women whose most recent delivery took place at a facility or who did not have their delivery at a facility for reasons other than poor access (e.g., because they did not consider it necessary). By applying this proportion (88%)⁹ to the 19,700 cases of miscarriage complications requiring care, we estimated that 17,300 women received care for complications from late miscarriage. We performed this calculation for each development region and subtracted the number of patients treated for late miscarriage from the total post-abortion care caseload in the region.

One final adjustment was needed to account for women whose complications resulted from legal abortions. HPS data provided estimates of the proportion of women having legal abortions who had complications, and the proportion of women with complications from legal abortions who received care in a health facility; these estimates were available for each of the four socioeconomic subgroups (poor rural, nonpoor rural, poor urban and nonpoor urban women). By weighting these proportions according to the relative size of the four subgroups (obtained from the 2011 DHS), we estimated that 6% of women who had legal abortions were treated in a facility for complications. We applied this proportion to the total number of legal abortions, and subtracted the result from the number of women treated for complications of any abortion to arrive at an estimate of the number of women treated in facilities for complications from illegal abortions.

- *Estimating the number of illegal abortions.* The number of women who had illegal abortions includes not only the number treated for complications of such abortions, but also the number who did not receive treatment or did not have complications. To account for the last two groups, we calculated a multiplier—an adjustment factor that is applied to the number of women treated at a facility for complications of illegal abortion—to yield an estimate of the total number of illegal abortions.

To compute the multiplier, we used estimates from the HPS of the proportion of women who obtained abortions from each of the various types of illegal providers, the proportion of abortions performed by each type of provider that would be expected to result in complications, and the proportion of women with complications who obtained treatment. HPS respondents were asked to estimate each of these proportions separately for the four socioeconomic subgroups.

The product of the three proportions yields the estimated proportion of women in each subgroup who obtained treatment for complications of an illegal abortion performed by each provider type. These calculations were done for each region of Nepal. Using data obtained from the 2011 DHS, we then weighted the estimates by the size of the four population

subgroups within each region and summed the results to obtain the proportion of all illegal abortions that resulted in women receiving treatment for complications.

The multiplier for each region is the inverse of this overall proportion.* To obtain the total number of illegal abortions in each region, we multiplied the estimated number of women treated in health facilities for complications from illegal abortions in the region (estimated as described above) by the region's multiplier. The resulting estimate includes not only women who obtained treatment for complications of illegal abortion, but also those who had such an abortion but either did not have complications or did not receive needed care (and may even have died).

The regional multipliers ranged from 2.72 in the Western region to 3.83 in the Central region.† In general, a lower multiplier implies a higher probability of complications from illegal abortions, greater access to medical care or a combination of the two factors, whereas a higher multiplier implies a lower probability of complications, less access to care or both.

- *Estimating the total number of abortions.* We summed the number of legal abortions and illegal abortions for each region to obtain the total number of abortions in that region in 2014. The regional results were summed to produce national estimates.

For each region and for Nepal as a whole, we calculated the abortion rate (the number of abortions per 1,000 women aged 15–49) and the abortion ratio (the number of abortions per 100 live births). Since these rates and ratios are derived from data from a sample of health facilities, they are subject to sampling error. To account for the resulting uncertainty, we provide not only main or “medium” estimates, but also “low” and “high” estimates derived using estimates of the number of legal abortions and the number of postabortion care cases that are two standard deviations below and above our main estimates.

Estimating Unintended and Intended Pregnancies

We calculated the number of unintended pregnancies, for each region and for Nepal as a whole, by summing the numbers of induced abortions, unplanned births, and miscarriages resulting from unintended pregnancies. To compute the number of unintended pregnancies ending in miscarriage, we used a model-based approach, derived from clinical studies on pregnancy loss, that estimates the number to be 20% of the number of live births resulting from unintended pregnancies plus 10% of the number of induced abortions.^{21,22} We estimated the number of unplanned births by multiplying the number of births by the proportion of all births that were unplanned (mistimed or unwanted at the time of conception), using data from the 2011 DHS on the planning status of births in the previous three years. The number of planned pregnancies was calculated by summing the number of planned births and the number of miscarriages from intended pregnancies (estimated to be 20% of the number of planned births). The sum of all live births, abortions and miscarriages (from intended and unintended pregnancies) yielded the total number of pregnancies.

*See Appendix B for an example of how the multiplier is calculated.

†The HPS sample size was adequate (i.e., the number of respondents was greater than 15) to compute the multiplier for three regions; however, we calculated a combined multiplier for the Far-Western and Mid-Western regions, which together had 28 respondents.

RESULTS

Abortion Service Provision in Nepal

Of the 386 surveyed facilities, 63% offered legal abortion, postabortion care or both (Table 3). Provision of one or both services was nearly universal (88–100%) among large facilities, such as tertiary, district and private hospitals. In contrast, the proportion that provided either service was lower among small facilities, such as health posts (46%), sub-health posts (27%) and private clinics (56%). Nationally, a weighted total of 1,112 facilities provided one or both services.

About 137,000 legal abortions were provided in Nepal in 2014. Thirty-seven percent were performed by public facilities, 29% by private facilities and 34% by NGO facilities.

Overall, an estimated 80,500 women were treated in health facilities for complications of miscarriage or induced abortion in 2014. Private facilities provided the largest share of postabortion care, accounting for 44% of the national caseload. Forty-one percent of cases were treated at public facilities and 15% at NGO facilities.

Service Provision by Region and Sector

Forty percent of legal abortions in Nepal were provided in the Central region, which includes the capital city of Kathmandu (Table 4). Twenty-two percent were provided in the Western region, 19% in the Eastern region and 10% each in the Mid-Western and Far-Western regions.

The Central region also provided the largest share of postabortion care (46%). About 24% was provided in the Eastern region, 16% in the Western region and smaller proportions in the Mid-Western (10%) and Far-Western (4%) regions.

The contribution of each sector to provision of abortion and postabortion care varied by region. Close to or slightly more than half (47–57%) of legal abortions in the Eastern, Mid-Western and Far-Western regions were provided by the public sector, whereas this sector provided a smaller proportion in the Western (38%) and Central (22%) regions. The private sector accounted for more than half of legal abortions in the Central region (57%), a much larger share than in other regions (7–16%). In the Eastern, Western and Mid-Western regions, a large proportion of abortions were provided by the NGO sector (40–49%).

More than 80% of women who received postabortion care in the Mid-Western and Far-Western regions were treated in public facilities, while in the Central region the private sector dominated, accounting for 67% of the caseload. The domination of a single sector was less extreme in the Western and Eastern regions; in the former, the public sector accounted for the largest share of cases (51%), while in the latter NGOs were the most common providers (44%).

Incidence and Rates of Postabortion Care and Abortion

Of the 80,500 women who received postabortion care in Nepal in 2014, 68% were treated for complications of illegal abortion, 11% for complications of legal abortion and 21% for complications of miscarriage (not shown).

We estimate that 8.2 per 1,000 Nepali women of reproductive age obtained facility-based treatment for complications of illegal or legal abortion (Table 5). The rate varied substantially by region, from a low of 1.8 per 1,000 in the Far-Western region to a high of 11.3 per 1,000 in the Central region.

Overall, about 323,100 induced abortions occurred in Nepal in 2014 (Table 6). The estimated annual abortion rate was 42 per 1,000 women aged 15–49; our low and high estimates were 24 and 59 per 1,000, respectively. The abortion rate varied by region. In the Central region, the rate was 59 per 1,000 (range, 26–92), substantially higher than the national value. The abortion rate was lower than the national rate in the other regions, ranging from 21 per 1,000 (half of the national rate) in the Far-Western region to 39 per 1,000 in the Eastern region.

The abortion ratio is an indicator of the likelihood that women who have a pregnancy will have an abortion rather than give birth. We estimate that the national abortion ratio was 56 abortions per 100 live births in 2014 (range of estimates, 33–80). Regionally, the ratio varied from 21 per 100 live births in the Far-Western region to 89 per 100 in the Central region.

Fifty-eight percent of abortions in 2014 were illegal. About three-fifths of these illegal terminations (representing 36% of all abortions) did not result in complications, while the remaining two-fifths (22% of all abortions) resulted in complications that required care at a health facility (not shown). The remaining 42% of abortions were legal; 6% of these abortions (accounting for 3% of all abortions) resulted in complications.

Unintended Pregnancies

Nepali women had an estimated 1,048,700 pregnancies in 2014 (Table 7). The pregnancy rate was 135 per 1,000 women of reproductive age, and it ranged from 121 per 1,000 in the Western region to 144 per 1,000 in the Central region. The national unintended pregnancy rate was 68 per 1,000 women of reproductive age; it was lowest (47 per 1,000) in the Far-Western region and highest (85 per 1,000) in the Central region. Nationally, 50% of all pregnancies in 2014 were unintended. The proportion of pregnancies that were unintended was lowest (34%) in the Far-Western region and highest (59%) in the Central region.

About 42% of pregnancies led to planned births in 2014; the proportion ranged from 34% in the Central region to 55% in the Far-Western region. Nationally, 31% of pregnancies ended in an abortion. This proportion was lowest in the Far-Western (15%) and Mid-Western (20%) regions, and highest in the Central region (41%). Sixty-two percent of unintended pregnancies in Nepal ended in abortion (not shown).

DISCUSSION

Since Nepal legalized abortion in 2002, women's ability to obtain safe abortions performed by trained providers in approved facilities has greatly improved.^{3,23} Nevertheless, women continue to face barriers to obtaining such services, and illegal abortions continue to be performed by unapproved providers in potentially unsafe conditions.⁶ In this study, our aim was to estimate total abortion incidence in Nepal as well as the number of illegal and potentially unsafe abortions that are performed.

We estimate that more than 300,000 abortions were performed in Nepal in 2014, and that nearly 60% of them were illegal. Out of every 1,000 women of reproductive age, eight were treated for complications of legal and illegal abortions. The overall abortion rate was 42 per 1,000 women aged 15–49, a rate comparable to the rates estimated using a similar methodology for two other South Asian countries—Pakistan, which had a rate of 50 per 1,000 women aged 15–49 in 2012, and Bangladesh, which had a rate of 37 per 1,000 women aged 15–44 in 2010.^{24,25}

The abortion rate varied across regions; it was highest in the Central region and lowest in the Far-Western region. The higher-than-average rate in the Central region was likely the result of many factors. For example, compared with their counterparts in other regions, couples in the Central region are probably more motivated to have small families and are more likely to live in urban areas (where abortion tends to be more easily accessible), and women marry at an older age, which may increase the likelihood of premarital sex and, in turn, rates of unintended pregnancy and abortion.^{20,26} In contrast, in the Far-Western region, educational attainment and women's mean age at marriage are lower than in the Central region, and residents are more likely to live in rural areas.

Another reason for the relatively high abortion rate in the Central region may be the greater availability of health care services, particularly from private facilities. Given its relative urbanity and greater density of providers (especially higher-quality and private providers), it is likely that the Central region is serving women from neighboring areas. If such an influx of women from other areas is occurring, the abortion rate for this region may be an overestimate, and the rates for the neighboring regions underestimate.

We calculated the incidence of unintended pregnancy in Nepal because such pregnancies are the root cause of women's seeking abortions. We estimated the rate of unintended pregnancy to be 68 per 1,000 women of reproductive age. This is much lower than the rates in such South Asian countries as Pakistan and Bangladesh (93 and 74, respectively).^{24,25} Nonetheless, about half of pregnancies in Nepal were unintended, and well over half of unintended pregnancies ended in an abortion.

The high proportion of pregnancies that were unintended is consistent with the substantial level of unmet need for contraception (about 27% among married women).⁹ Moreover, the

*In 2011, the mean age at marriage among Nepali women who married before age 50 was 20.9, up from 19.5 in 2001; it was 20.9 in the Central and Eastern regions, 20.4 in the Western region, 20.1 in the Far-Western region and 19.6 in the Mid-Western region. The proportion of the population that lived in urban areas was 24% in the Central region and 13% in the Far-Western region in 2011.

proportion of married women using modern contraceptive methods changed only slightly between 2006 and 2011 (from 44% to 43%), while use of less-reliable traditional methods increased from 3.7% to 6.5%.⁹ The level of unintended pregnancy is also consistent with the country's high rate of contraceptive discontinuation—more than half of users stop use of pills, injectables and condoms within a year⁹—and, given the high proportion of women who want small families, with the moderately high abortion rate.

The methodological approach and data used in this study have some important limitations. In the absence of other evidence, we assumed that the likelihood of miscarriage was stable over time and across countries; however, more research is needed to confirm this assumption. A second limitation is that our estimation of the multiplier relied on the opinions and perceptions of health professionals, because alternative sources of data on the likelihood that women will have and receive treatment for abortion complications are unavailable; however, we acknowledge that direct, good-quality data from women themselves would be better. Given the number of assumptions that underlie the methodology, the resulting estimates should be viewed as approximations rather than as exact measures of abortion incidence. We provided high and low estimates to account for sampling, and recommend that readers keep these ranges in mind when interpreting the results. Finally, the measure of unintended pregnancy used retrospective survey data on the planning status of births; because women may revise their characterization of intended-ness after giving birth (typically shifting from considering the pregnancy mistimed or unwanted to considering it wanted), we may be underestimating the incidence of unintended pregnancy.

Despite these limitations, our study helps fill an important evidence gap regarding sexual and reproductive behavior and needs, and provides information that should help inform programs and policies both in Nepal as a whole and in disadvantaged regions of the country. Though significant progress has been made in expanding abortion services, ensuring that all women seeking to terminate a pregnancy receive legal and safe abortion care remains an important challenge. The recently announced policy of providing legal abortions free of cost in public facilities is an important step in this direction. However, action needs to be taken to ensure that the policy is implemented, especially in rural areas.

Inadequate knowledge of the abortion law and of the availability of services continues to be an important barrier to accessing safe abortion care. A nationally representative survey found that 62% of Nepali women aged 15–49 did not know that abortion was legal, and a lower but still substantial proportion (41%) did not know of a place where they could get a safe abortion.⁹ Programs to educate women about the abortion law and where to obtain legal and safe abortion services are urgently needed. Furthermore, because the safety, efficacy and acceptability of medical abortion provided by trained auxiliary nurse-midwives (even at the sub-health post level) is now well established in Nepal, accrediting sub-health posts and staffing them with an auxiliary nurse-midwife trained in the provision of medical abortion could be an important step toward improving access to safe and legal abortion.^{23,27}

Given the high level of unmet need for contraception and the large proportion of pregnancies that are unintended, improvements in access to and quality of contraceptive services are

urgently needed in all regions. The terrain in Nepal makes the delivery of contraceptive services challenging. However, policymakers and other relevant parties need to devise programs to improve services in remote areas.

Finally, programs are needed to improve contraceptive access and care for the subgroups of men and women who may need it the most. This includes unmarried, sexually active adolescents, who may have an elevated risk of unintended pregnancy, as well as seasonal migrants and newly married couples.

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Appendix A

The following equations correspond to the different steps for calculating abortion incidence:

Total number of legal induced abortions:

$$\text{Total legal abortions}_{\text{region}} = \left(\sum_{j=1}^n \text{HFS annual caseload}_j * \text{HFS weight}_j \right)_{\text{region}} + \text{MSI caseload}_{\text{region}} + \text{FPAN caseload}_{\text{region}}$$

$\text{HFS annual caseload}_j = \frac{(\text{avg. month caseload}_j * 12) + (\text{past month caseload}_j * 12)}{2}$

Where j = index facility

Total number of PAC patients:

Avg. month caseload_j = avg. month inpatient caseload_j + avg. month outpatient caseload_j

Past month caseload_j = past month inpatient caseload_j + past month outpatient caseload_j

$$\text{Total PAC}_{\text{region}} = \left(\sum_{j=1}^n \text{HFS PAC}_j * \text{HFS weight}_j \right)_{\text{region}} + \text{MSI PAC}_{\text{region}} + \text{FPAN PAC}_{\text{region}}$$

Adjustment for complications from legal abortions:

$$\text{Complications} = \sum_{i=1}^4 \left(P_j^{\text{complications}} * P_j^{\text{complications getting care}} * \frac{\text{Pop}_i}{\text{Pop}_{\text{total}}} \right)$$

Where i=socioeconomic subgroups by rural/urban residence, j=legal provider, P = proportions

$$\text{Treated PAC}^{\text{illegal abortions}} = \text{Total PAC}_{\text{HFS+NGOs}} - \text{Treated PAC}_{\text{model based}}^{\text{miscarriages}} - \text{Treated PAC}_{\text{HPS+HFS}}^{\text{legal abortions}}$$

Multiplier:

$$\text{multiplier} = \left(\sum_{i=1}^4 \left(\sum_j \left(P_{ij}^{\text{illegal providers}} * P_{ij}^{\text{complications}} \right) * P_i^{\text{treatment in HF}} \right) * \frac{\text{Pop}_i}{\text{Pop}_{\text{total}}} \right)^{-1}$$

Where i=socioeconomic subgroups by rural or urban residence, j=provider, P = proportions/probability

Total illegal abortions:

$$\text{Total illegal abortions} = \# \text{illegal abortions treated in HF}_{\text{HFS+NGOs}} * \text{multiplier}$$

Appendix B. EXAMPLE OF CALCULATION OF A MULTIPLIER

Below we present two tables to illustrate how the multiplier is calculated. The tables show the calculations for the Eastern region of Nepal. We do these calculations for the four socioeconomic subgroups: poor urban, nonpoor urban, poor rural and nonpoor rural women. Appendix Table B1 shows the calculation of the proportion of abortions resulting in complications among poor urban women who go to unapproved providers, and Appendix Table B2 shows how these estimates from each of the four subgroups are used to calculate the multiplier (3.05) for the Eastern region as a whole.

APPENDIX TABLE B1

Calculation of the percentage of illegal abortions resulting in complications among poor urban women in the Eastern development region who use unapproved providers

Provider type	% of illegal abortions that were done by this provider type	% of these abortions that resulted in complications	% of illegal abortions that were done by this provider type and resulted in complications
	A	B	C = A × B/100
Unapproved medical provider	28.1	24.8	6.98
Paramedic	26.5	34.3	9.08

Provider type	% of illegal abortions that were done by this provider type	% of these abortions that resulted in complications	% of illegal abortions that were done by this provider type and resulted in complications
	A	B	C = A × B/100
Pharmacist	32.8	40.7	13.33
Traditional provider	5.2	60.4	3.12
Woman self-induced	7.5	61.5	4.59
Total	100.0	na	37.11

Note: na=not applicable.

APPENDIX TABLE B2

Calculation of multipliers for the Eastern development region

Subgroup	% of women obtaining illegal abortions who have complications	% of women with complications of illegal abortion who receive treatment	% of women obtaining illegal abortions who receive treatment for complications of illegal abortion	% of women in region who belong to subgroup	% of women in region obtaining illegal abortions who belong to subgroup and received treatment for complications	Regional multiplier
	A	B	C=A×B/100	D	E=C×D/100	F=D/E
Poor urban	37.11	88.62	32.89	8.2	2.69	3.04
Poor rural	39.94	81.72	32.64	46.4	15.15	3.06
Nonpoor urban	34.18	91.38	31.23	4.1	1.27	3.20
Nonpoor rural	38.82	85.17	33.06	41.3	13.67	3.02
All	na	na	na	100.0	32.78	3.05

Note: na=not applicable.

Source for population data on subgroups: Ministry of Health and Population, New ERA and ICF International, *Nepal Demographic and Health Survey 2011*, Kathmandu, Nepal: Ministry of Health and Population and New ERA; and Calverton, MD, USA: ICF International, 2012.

Number of eligible facilities, percentage and number of facilities sampled, and response rate, Health Facilities Survey, Nepal, 2014

TABLE 1

Sector/facility type	No. of facilities		% of facilities sampled	No. of facilities sampled	No. of participating facilities	Response rate
	All districts	Sample districts				
All	2,226	929	46	430	386	90
Public	1,628	528	54	285	283	99
Tertiary hospital	20	12	100	20*	20	100
District hospital	68	26	100	26	26	100
Medical college	3	2	100	2	2	100
Primary health care center	194	83	63	52	52	100
Health post	819	256	43	110	108	98
Sub-health post	524	149	50	75	75	100
Private	504	357	36	130	88	68
Hospital	222	147	32	47	43	91
Medical college	15	10	100	10	9	90
Clinic	267	200	37	73	36	49
NGO[†]	94	44	34	15	15	100
MSI	43	19	37	7	7	100
FPAN	37	16	25	4	4	100
Other	14	9	44	4	4	100

* All tertiary facilities (national, regional, subregional and zonal hospitals) in Nepal's 75 districts were included in the sample.

[†] MSI and FPAN facilities were included in the sample, but data on the number of postabortion cases treated and the number of abortions provided were from service provision statistics from all MSI and FPAN facilities nationwide.

Notes: NGO=nongovernmental organization. MSI=Marie Stopes International. FPAN=Family Planning Association of Nepal.

Number of health professionals interviewed, by primary profession, according to development region, Health Professionals Survey, Nepal, 2014

TABLE 2

Profession	Eastern	Central	Western	Mid-Western	Far-Western	Total
All	29	58	19	10	18	134
Manager of reproductive health program	10	17	4	3	5	39
Obstetrician-gynecologist	3	13	3	1	2	22
Public health nurse	5	4	3	2	1	15
Policymaker/advocate	1	10	1	0	0	12
Other clinician	10	9	8	4	9	40
Researcher	0	5	0	0	1	6

TABLE 3
Measures of facility survey participation and service provision, by type of facility, Health Facilities Survey, Nepal, 2014

Sector/facility type	No. of participating facilities	No. of facilities providing abortion or PAC	% of facilities providing abortion or PAC	Weighted no. of facilities providing abortion or PAC	No. of abortions	% of abortions provided	No. of PAC cases	% of PAC provided
All	386	242	63	1,112	136,951	100.0	80,469	100.0
Public	283	160	57	774	50,509	36.9	33,089	41.1
Tertiary hospital	20	18	90	18	7,904	5.8	8,754	10.9
District hospital	26	26	100	68	13,441	9.8	11,960	14.9
Public medical college	2	2	100	3	4,380	3.2	2,940	3.7
Primary health care center	52	44	85	168	11,930	8.7	4,630	5.8
Health post	108	50	46	372	10,329	7.5	3,086	3.8
Sub-health post	75	20	27	145	2,525	1.8	1,718	2.1
Private	88	67	76	268	40,281	29.4	35,698	44.4
Hospital	43	38	88	181	32,496	23.7	28,128	35.0
Medical college	9	9	100	14	2,460	1.8	5,106	6.3
Clinic	36	20	56	73	5,325	3.9	2,464	3.1
NGO *	15	15	100	70	46,161	33.7	11,683	14.5
MSI	7	7	100	43	31,563	23.0	2,083	2.6
FPAN	4	4	100	15	13,128	9.6	594	0.7
Other	4	4	100	12	1,470	1.1	9,006	11.2

* Data for MSI and FPAN were obtained from the organizations themselves; data for other NGOs were obtained from the HFS.

Notes: Numbers may not sum to totals because of rounding. NGO=nongovernmental organization. MSI=Marie Stopes International. FPAN=Family Planning Association of Nepal.

Number and percentage distribution of legal abortions and postabortion care cases, by type of facility, according to development region

TABLE 4

Development region	Postabortion care cases*																	
	Legal abortions					No.												
	% distribution by region		% distribution by facility type			% distribution by region		% distribution by facility type										
No.	All	Public	Private	NGO	All	Public	Private	NGO	All	Public	Private	NGO	Total					
All	136,951	50,509	40,281	46,161	100	37	29	34	100	80,469	33,089	35,699	11,683	100	41	44	15	100
Eastern	25,755	12,041	2,358	11,356	19	47	9	44	100	19,012	5,243	5,321	8,449	24	28	28	44	100
Central	54,274	12,168	31,122	10,984	40	22	57	20	100	36,867	11,351	24,715	801	46	31	67	2	100
Western	29,838	11,475	3,749	14,614	22	38	13	49	100	13,206	6,772	4,405	2,029	16	51	33	15	100
Mid-Western	13,768	7,257	957	5,554	10	53	7	40	100	8,062	6,931	891	241	10	86	11	3	100
Far-Western	13,316	7,568	2,095	3,653	10	57	16	27	100	3,322	2,792	367	163	4	84	11	5	100

* Includes complications of miscarriages and abortions treated in facilities.

Note: NGO=Nongovernmental organization.

Selected demographic and abortion-related measures, by development region, Nepal, 2014

TABLE 5

Development region	No. of women aged 15–49	No. of live births	No. of legal abortions	No. of women treated for complications			Treatment rate for complications of induced abortion *	
				Total	Miscarriages	Legal induced abortions		Illegal induced abortions
All	7,754,148	577,718	136,951	80,469	17,263	8,747	54,459	8.2
Eastern	1,711,590	122,277	25,755	19,012	3,733	1,664	13,615	8.9
Central	2,772,219	183,241	54,272	36,867	5,524	2,718	28,625	11.3
Western	1,508,839	107,022	29,839	13,206	3,367	2,813	7,026	6.5
Mid-Western	1,028,475	93,167	13,768	8,062	2,669	789	4,604	5.2
Far-Western	733,025	72,011	13,316	3,322	1,969	763	589	1.8

* Rate indicates number of cases per 1,000 women and includes complications of both legal and illegal abortions.

Estimated numbers of legal and illegal abortions, percentage of abortions that were illegal, and abortion rates and abortion ratios—all by development region, Nepal, 2014

TABLE 6

Development region	No. of illegal abortions resulting in treated complications	Multiplier	Total no. of illegal abortions	No. of legal abortions [†]	Total no. of abortions	% of abortions that were illegal	Abortion rate			Abortion ratio					
							Legal [‡]	Illegal*	All	Low	Medium	High	Low	Medium	High
All	54,459	3.30	186,144	136,951	323,094	58	17.7	24.0	24.2	41.7	59.2	33	56	80	
Eastern	13,615	3.05	41,535	25,755	67,291	62	15.0	24.3	29.4	39.3	49.2	41	55	69	
Central	28,625	3.83	109,638	54,272	163,910	67	19.6	39.5	26.0	59.1	92.2	39	89	140	
Western	7,026	2.72	19,109	29,839	48,948	39	19.8	12.7	23.8	32.4	41.1	34	46	58	
Mid-Western	4,604	3.05	14,062	13,768	27,830	51	13.4	13.7	16.2	27.1	37.9	18	30	42	
Far-Western	589	3.05	1,799	13,316	15,115	12	18.2	2.5	17.2	20.6	25.1	18	21	26	

* Provided by untrained or unapproved providers, or self-induced.

[†] Provided in government-approved facilities.

Notes: Abortion rate is the number of abortions per 1,000 women aged 15–49. Abortion ratio is the number of abortions per 100 live births.

TABLE 7

Measures of levels, intendedness and outcomes of pregnancy, by development region, Nepal, 2014

Development region	No. of pregnancies	Pregnancy rate	Unintended pregnancy rate	% of pregnancies that were unintended	% distribution of pregnancies by outcome					
					Planned births	Miscarriages of intended pregnancies	Unplanned births	Abortion	Miscarriages of unintended pregnancies	Total
All	1,048,665	135	67.7	50	42	8	13	31	6	100
Eastern	220,752	129	64.3	50	42	8	14	30	6	100
Central	400,191	144	85.0	59	34	7	12	41	6	100
Western	182,269	121	57.2	47	44	9	15	27	6	100
Mid-Western	142,414	138	56.9	41	49	10	16	20	5	100
Far-Western	103,040	141	47.3	34	55	11	15	15	4	100

Note: Rates are number of events per 1,000 women aged 15–49. Percentages may not total 100 because of rounding.