

Levels, Trends and Correlates of Abortion in Tehran, Iran: 2009–2014

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CONTEXT: Accurate, up-to-date information on abortion incidence is lacking for Iran, where abortion is illegal.

METHODS: Data from 2,934 currently married women aged 15–49 who completed the 2009 Tehran Survey of Fertility (TSF) and 3,012 such women who completed the 2014 TSF were used to estimate levels of and trends in abortion and related measures. Analyses also examined characteristics of abortions, abortion recipients and providers, as well as trends in women's reasons for having an abortion.

RESULTS: Between 2009 and 2014, the proportion of married women who reported having ever had an abortion decreased from 8.3% to 5.6%. Declines also occurred in the general abortion rate (from 6.6 to 5.4 abortions per 1,000 women), the total abortion rate (from 0.18 to 0.17 abortions per married woman) and the annual number of abortions (from 10,656 to 8,734); however, the proportion of pregnancies that were terminated was stable (8.7–8.8%). The proportion of terminations obtained for nonmedical reasons rose from 68% to 81%. In 2014, abortion rates were elevated among women who were more educated, wealthier, employed, urban migrants or not highly religious, and among those who had no more than one child. The most commonly used providers were midwives (40%) and obstetricians (32%). Half of abortions resulted from withdrawal failure, but only one-fourth of withdrawal users switched to a modern contraceptive method after an abortion.

CONCLUSIONS: Some subgroups of women had an elevated risk of abortion and may benefit from measures that increase couples' effective use of contraceptives.

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Abortion is currently illegal in Iran except if a woman's life is in danger or in cases of severe fetal abnormality. As in other settings where abortion is severely restricted or illegal, reliable data on the incidence of the procedure is limited in Iran because of stigma and political sensitivity. As a result, the only two national studies documenting the incidence of abortion in Iran have relied on indirect methods. Using the indirect residual method and data from the 2000 Iran Demographic and Health Survey, Erfani and McQuillan estimated that Iranian women undergo 73,000 abortions annually.¹ More recently, Rastegari and colleagues, applying a network scale-up approach, estimated that 129,000 nonmedical (i.e., not medically indicated) abortions take place each year.² However, these studies do not provide detailed information about abortion rates among subpopulations; about the characteristics, recipients and providers of abortions; or about the reasons for and complications of abortions. A direct survey can yield such valuable information, despite the limitations of the approach in estimating abortion incidence.³

The purpose of the current study was to estimate abortion rates among married women in Tehran, Iran, and to document abortion characteristics, women's pre- and postabortion contraceptive use, women's reasons for terminating pregnancies and the medical consequences of these abortions. In addition, the availability of data from

two representative fertility surveys made it possible for the first time to study trends in abortion incidence in Tehran.

METHODS

Data

This study used data from the 2009 Tehran Survey of Fertility (TSF) and the 2014 TSF, both of which were conducted by the author in Iran's capital city, home to one-seventh of the country's population.^{4,5} The surveys collected a wide range of data, including complete histories of women's live births, abortions and contraceptive use. Women were also asked how many miscarriages and (in the 2014 survey only) how many stillbirths they had had, although they were not asked when those events had occurred. The overall methodology and many of the questions were identical in the two surveys, permitting examination of trends in abortion incidence; in addition, questions were added to the 2014 survey to collect data on the characteristics, providers and complications of abortions.

Both surveys used a two-stage stratified cluster random sampling design. Face-to-face interviews were conducted with a total of 2,934 currently married (hereafter referred to simply as "married") women aged 15–49 in the summer of 2009 and 3,012 such women in the spring of 2014. Details of the sampling methods are available elsewhere.⁶

Measures and Analyses

• **Abortion levels.** The abortions that married women reported were used to calculate three types of abortion measures: age-specific abortion rates (number of abortions per 1,000 woman-years in a five-year age group), the total abortion rate (number of abortions a woman is expected to have during her lifetime if current age-specific rates persist) and the annual general abortion rate (number of abortions annually per 1,000 women aged 15–49). These rates were computed for both the one-year and six-year periods preceding each survey. Because premarital and nonmarital pregnancies are extremely rare in Iran and the study sample is limited to married women, these calculations excluded months in which women were not married, and the rates reported in this article apply only to married women. The total number of abortions in Tehran was estimated by applying the general abortion rates for 2009 and 2014 to the number of married women aged 15–49, as reported in the 2006 and 2011 censuses,^{7,8} while adjusting for changes in the number of women and in women's mortality over the three-year period before the relevant TSF.

The proportion of known pregnancies ending in abortion was also computed, again for both the one-year and six-year periods preceding each survey. Because information on the timing of any miscarriages and stillbirths that women had experienced was not collected, “known pregnancies” refers only to those that ended in a birth or an abortion during the relevant time frame.

• **Demographic and socioeconomic measures.** Abortion incidence varies by the level of regional development^{9,10} and by women's demographic and socioeconomic characteristics,¹¹ which may influence abortion rates through their associations with fertility preferences, contraceptive use and the probability that a woman will choose to terminate an unintended pregnancy.¹²

Thus, in this analysis, abortion levels were calculated according to 13 demographic and socioeconomic variables: age at abortion, number of live births, ideal number of children, desire for more children, years of schooling completed by respondents and their husbands, ethnicity of respondents and their husbands, women's employment status, importance of religion, income, residential district and migration status. Age was categorized as less than 20, 20–24, 25–29, 30–34 or 35 or older. Ethnicity was classified using four categories: Fars; Turk; Gilak and Mazanadarani; and Lur, Kurd or other. The religion measure indicated whether the respondent considered religion very important, somewhat important, or not very/not at all important in her life. Income, which was classified as low, medium or high, was measured indirectly according to the household's monthly expenditures. The variable indicating whether the respondent lived in a northern, central or southern district of Tehran was included because residents of northern districts are generally wealthier, have more years of education and have more liberal attitudes toward marriage, family formation and childbearing than do those of southern districts.^{4,5}

Finally, the migration variable indicated whether the respondent was a migrant and, if so, had come from an urban area or a rural one.

• **Abortion-related outcomes.** In both surveys, women who had had an abortion reported the most important reason they had terminated their pregnancy and the type of contraceptive method, if any, they had been using at the time they became pregnant. The reasons for abortion were grouped into three broad categories: fertility-related, health-related and socioeconomic; contraceptive methods were classified as modern (vasectomy, IUD, pill or condoms) or traditional (withdrawal or rhythm). Analyses assessed trends in both measures. The 2014 TSF added a question about the type of contraceptive method women used right after their abortion, which allowed examination of contraceptive switching after abortion. Finally, the 2014 survey also added a series of questions that asked women about various aspects of their abortions, including the gestational age at abortion, the method and site of the procedure, the type of provider and the types of any complications that occurred.

Analyses of abortion characteristics were restricted to procedures done in the past six years, both to minimize bias from retrospective reporting and to minimize the probability of changes in women's characteristics between the time of the abortion and the time of the survey (though it is likely that some changes occurred). Abortion underreporting was assumed to be independent of women's characteristics.

RESULTS

Abortion Levels and Trends

In the 2009 survey, 244 married women of reproductive age reported having had at least one abortion in their lifetime; overall, these women had had a total of 311 abortions (Table 1). In the 2014 survey, 169 women reported having had a total of 195 abortions. The proportion of women who said they had had at least one abortion declined from 8.3% in 2009 to 5.6% in 2014.

About a fifth of women in each survey (19–20%) reported having had a miscarriage during their lifetime, while 1% of respondents in 2014 had had at least one stillbirth. Relatively small proportions of women (<5%) had had more than one abortion, miscarriage or stillbirth.

The average age at abortion was nearly identical in 2009 and 2014 (about 33), and median ages were only slightly different from the means (Table 2). The estimated age-specific abortion rates for the year preceding the 2009 survey showed an inverted U-shaped pattern: The abortion rate was highest among women aged 30–34 (12 per 1,000) and lowest among teenagers and women aged 40 or older. In 2014, the rates showed a bimodal distribution, reaching peaks among women aged 20–24 (10.6 per 1,000) and 35–39 (11.7 per 1,000); fertility rates in these two age-groups were low relative to those of their counterparts aged 25–34 (Figure 1). Among women younger than 25, the rate of abortion increased sharply, from 3.8 to 10.6 per 1,000, between 2009 and 2014 (Table 2).

No abortions were reported among married women aged 45–49 in 2014 or among those younger than 20 in either survey.

The estimated total abortion rate in Tehran in 2014 was 0.17 abortions per married woman aged 15–49, a slight decline from the rate in 2009 (0.18); these rates are based on reported abortions in the year prior to the respective surveys. That is, on average, one in every six married women of reproductive age will have an abortion in her lifetime. Furthermore, the annual general abortion rate was 5.4 abortions per 1,000 married women aged 15–49, again a slight decline from 2009 (6.6 per 1,000). The product of the general abortion rate and number of married women of reproductive age is the annual number of abortions. After adjustment of census data⁷⁸ for population growth and mortality, the number of married women aged 15–49 living in Tehran was about 1,615,000 in 2006 and about 1,617,000 in 2011. These figures suggest that married women aged 15–49 had 8,734 abortions in Tehran in 2014, a decline from the 10,656 estimated for 2009. This trend is consistent with the decline observed in the proportion of women who had ever had an abortion (Table 1).

Overall, out of every 100 known pregnancies, 8.7 ended in abortion in the year prior to the 2009 survey and 8.8 ended in abortion in the year prior to the 2014 survey (Table 2). The corresponding proportions for abortions in the six-year period prior to the surveys are slightly lower (7.3 and 6.6 per 100 known pregnancies, respectively).

Abortion Variations by Women's Characteristics

The percentage of known pregnancies ending in abortion and the annual abortion rate often varied substantially according to women's demographic characteristics (Table 3). The relationship between women's age at abortion and the percentage of pregnancies ending in abortion was U-shaped, such that the proportion was high among married teenagers (10%), declined to its lowest level among women aged 20–24 (4%), and then rose to its highest level among women aged 35 and older (12%). The pattern for abortion rates was somewhat similar; it was highest among the youngest respondents (16.1 per 1,000) and, after a sharp decline, had a secondary peak (6.7 per 1,000) among women aged 30–34 before declining again.

Abortion levels generally were inversely related to actual and ideal number of children. For example, the abortion rate declined as the number of previous live births rose, from 13 per 1,000 among women without such births to 1.1 per 1,000 among women with three or more births. However, the abortion rate among women who wanted no more children was slightly lower than that among women who wanted more children (4.4 vs. 5.9 per 1,000).

The proportion of known pregnancies ending in abortion and the abortion rate were positively associated with education level among both women and their husbands. The two measures also differed by employment status: The proportion of pregnancies that ended in abortion was higher among employed than unemployed women (13%

TABLE 1. Lifetime number of abortions, miscarriages and stillbirths among married women aged 15–49; and percentage distribution of such women, by lifetime number of abortions, miscarriages and stillbirths, Tehran Survey of Fertility, 2009 and 2014

Measure	2009 (N=2,934)		2014 (N=3,012)		
	Abortion	Miscarriage	Abortion	Miscarriage	Stillbirth
NUMBERS/PERCENTAGES					
No. of women with outcome	244	581	169	575	42
No. of outcomes	311	769	195	731	49
% of women with outcome	8.3	19.8	5.6	19.1	1.4
PERCENTAGE DISTRIBUTIONS					
No. of outcomes					
0	91.7	80.2	94.4	80.9	98.6
1	6.6	15.2	4.8	15.2	1.2
2	1.2	3.2	0.6	3.1	0.2
3	0.3	1.1	0.2	0.6	0.0
≥4	0.1	0.3	0.0	0.2	0.0
Total	100.0	100.0	100.0	100.0	100.0

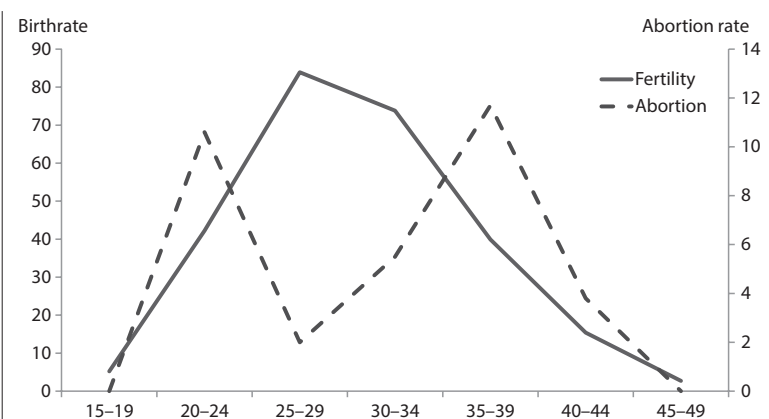
Notes: Women were not asked about stillbirths in the 2009 survey. Percentages may not total 100.0 because of rounding.

TABLE 2. Selected abortion measures for married women aged 15–49, for the year and the six years preceding the survey, Tehran Survey of Fertility, 2009 and 2014

Measure	2009		2014	
	Past year	Past six years	Past year	Past six years
Mean age at abortion	33.5	31.3	33.4	30.7
Median age at abortion	33.0	32.0	33.5	31.0
Age-specific abortion rate				
15–19	0.0	0.0	0.0	0.0
20–24	3.8	1.7	10.6	5.4
25–29	5.6	5.3	2.0	2.1
30–34	12.1	6.9	5.5	6.4
35–39	9.9	10.2	11.7	8.7
40–44	2.1	3.3	3.8	2.4
45–49	2.5	1.8	0.0	0.0
Total abortion rate	0.18	0.15	0.17	0.13
Annual general abortion rate	6.6	5.6	5.4	4.7
% of known pregnancies ending in abortion	8.7	7.3	8.8	6.6
No. of abortions performed annually	10,656	na	8,734	na

Notes: Age-specific abortion rate is number of abortions per 1,000 woman-years in the age-group. Total abortion rate is the average lifetime number of abortions per woman. Annual general abortion rate is annual number of abortions per 1,000 women aged 15–49. na=not applicable.

FIGURE 1. Age-specific rates of fertility and abortion, Tehran Survey of Fertility, 2014



Note: Rates are annual number of events per 1,000 married women aged 15–49.

TABLE 3. Selected measures of abortions and pregnancies in the past six years among married women aged 15–49, by women's characteristics, Tehran Survey of Fertility, 2014

Characteristic	No. of abortions	No. of known pregnancies*	% of pregnancies ending in abortion	Annual abortion rate
All	75	1140	6.6	4.7
Age at abortion				
15–19	3	29	10.3	16.1
20–24	7	175	4.0	5.4
25–29	21	435	4.8	6.3
30–34	26	348	7.5	6.7
≥35	18	153	11.8	2.5
No. of live births				
0	15	15	100.0	13.0
1	29	550	5.3	5.4
2	28	456	6.1	4.2
≥3	3	119	2.5	1.1
Ideal no. of children				
1	28	294	9.5	7.0
2	37	646	5.7	4.3
≥3	10	200	5.0	3.0
Desires more children				
Yes	19	293	6.1	5.9
No	56	772	6.8	4.4
Woman's yrs. of education				
<12	14	267	5.2	3.0
12	28	441	6.3	4.5
>12	33	432	7.6	6.5
Husband's yrs. of education				
<12	17	311	5.5	3.7
12	29	427	6.8	4.9
>12	29	402	7.2	5.3
Employed				
No	55	981	5.6	4.1
Yes	20	159	12.6	7.8
Importance of religion				
Very important	26	647	4.0	2.9
Somewhat important	23	361	6.4	4.5
Not very/not at all important	26	132	19.7	14.2
Woman's ethnicity				
Fars	35	576	6.1	4.0
Turk	17	364	4.7	3.5
Gilak/Mazandarani	7	74	9.5	6.4
Lur/Kurd/other	16	126	12.7	14.2
Husband's ethnicity				
Fars	41	581	7.1	4.7
Turk	21	381	5.5	4.1
Gilak/Mazandarani	5	63	7.9	5.3
Lur/Kurd/other	8	115	7.0	6.9
Household income				
Low	27	625	4.5	3.9
Medium	15	202	7.4	3.2
High	33	313	10.5	5.7
Residential district				
Northern	32	345	9.3	5.8
Central	23	430	5.3	3.9
Southern	20	365	5.5	4.5
Migrant status				
Nonmigrant	51	754	6.7	4.7
Migrated from urban area	21	271	7.7	5.8
Migrated from rural area	3	115	2.6	2.0

*Includes only pregnancies ending in a live birth or abortion, because information on the timing of miscarriages and stillbirths was unavailable.

vs. 6%), as was the abortion rate (7.8 vs. 4.1 abortions per 1,000). Abortion incidence was inversely related to degree of religiosity; compared with women for whom religion was not very or not at all important in their life, those who said that religion was very important had a lower proportion of pregnancies ending in abortion (4% vs. 20%) and a lower abortion rate (2.9 vs. 14.2 per 1,000).

Abortion rates varied by ethnicity. Lurs and Kurds had the highest abortion rate (14.2 per 1,000) and percentage of pregnancies ending in abortion (13%), followed by Gilak and Mazandarani women (6.4 per 1,000 and 10%, respectively). The differences in rates by husband's ethnicity were smaller; women whose husband was Gilak or Mazandarani had the highest proportion of pregnancies ending in abortion (8%).

The proportion of known pregnancies ending in abortion was positively associated with household income, increasing from 5% among women with low income to 11% among the wealthiest women; the abortion rate was also highest among the latter group. Regional differences were evident as well; women in the northern districts had the highest abortion rate (5.8 per 1,000 women) and highest proportion of pregnancies ending in abortion (9%). Finally, analyses by migration status indicated that women who had moved to Tehran from another urban setting had the highest abortion rate (5.8 per 1,000) and proportion of pregnancies ending in abortion (8%); levels were lowest among women who had migrated from rural areas and intermediate among nonmigrants.

Reasons for Undergoing an Abortion

The reasons that women most frequently cited for having had an abortion in the past six years were fertility-related—the desire to limit, space or postpone childbearing. Such reasons were cited by 46% of women in 2009 and 64% of women in 2014 (Table 4). More specifically, limiting births was the most commonly given reason, in both 2009 (34%) and 2014 (53%). While the proportion of abortions obtained for limiting and spacing births increased between the two surveys, the proportion obtained to postpone childbearing

TABLE 4. Percentage distribution of abortions in the six years preceding survey, by women's most important reason for having an abortion, Tehran Survey of Fertility, 2009 and 2014

Reason for abortion	2009 (N=89)	2014 (N=75)
Fertility-related	46.0	64.1
To limit births	33.6	52.9
To space next birth	6.7	10.3
To postpone first birth*	5.7	1.0
Health-related	31.5	18.5
Risk to maternal health	7.9	7.7
Risk to fetal health	19.1	9.2
Bleeding during pregnancy	4.5	1.5
Socioeconomic	22.5	17.4
Economic difficulties	19.1	13.3
Marital problems	3.4	3.6
Sex preference	na	0.5
Total	100.0	100.0

*All of these pregnancies had occurred before or during the engagement period (*aghd*) or outside a marital relationship. Note: na=not applicable.

decreased from 6% to 1%. These results are consistent with the pattern of age-specific abortion rates for the year prior to the 2014 survey (Table 2); the abortion rates were highest among women aged 35–39 (who are approaching their later reproductive years and may resort to abortion to limit childbearing) and those aged 20–24 (who are in the early stages of their reproductive lives and want to space births).

The proportion of abortions in the past six years that had been performed for health-related reasons decreased from 32% in 2009 to 19% in 2014. The proportion of women who cited risk to maternal health as the main reason for their abortion was identical in the two surveys (8%), but the proportions of respondents in 2014 who cited risk to fetal health (9%) and bleeding during pregnancy (2%) were less than half of the proportions who had cited those reasons five years earlier (19% and 5%, respectively). Moreover, 17% of abortions in the six-year period before the 2014 survey were performed for socioeconomic reasons, such as economic difficulties (13%) and marital problems (4%); again, this was a decline from the level seen in 2009 (23%).

Contraceptive Use Before and After Abortion

In 2014, as in 2009, more than 80% of women who had had an abortion in the past six years had been using a modern or traditional method of contraception at the time of conception, suggesting that contraceptive failure, rather than nonuse, was the cause of the vast majority of pregnancies that were terminated (Table 5). While the proportion of abortion recipients who had been using condoms at the time of conception increased from 9% in 2009 to 15% in 2014, the proportions were essentially stable for other modern methods, as well as for withdrawal. Failure in the use of the latter accounted for nearly half of pregnancies terminated in the six years preceding the 2009 and 2014 surveys; together, failure in the use of the pill and condom accounted for about a quarter.

In 2014, 85% of women who had had an abortion in the past six years said they had used a contraceptive method right after the abortion, a slight increase from

TABLE 6. Percentage distribution of married women aged 15–49 who had had an abortion in the past six years, by contraceptive method used after abortion, according to method used at the time of conception, Tehran Survey of Fertility, 2014

Method at time of conception	Method after abortion			
	None	Modern	Traditional	Total
None (N=14)	14.3	42.9	42.9	100.0
Traditional (N=37)	18.9	32.4	48.6	100.0
Modern (N=24)	8.3	75.0	16.7	100.0

the proportion who had been using a method at the time of conception (81%). The proportion using condoms increased from 15% at the time of conception to 27% after the abortion, while the proportion using withdrawal declined from 48% to 37%. Of the women who had not been using a method at the time they became pregnant, 43% started using a modern method (mainly condoms) after their abortion (Table 6) and an identical proportion began using a traditional method (largely withdrawal). Among women who terminated pregnancies resulting from failure of a traditional method (mainly withdrawal), 19% did not use any method after obtaining the abortion, while 32% switched to a modern method, in most cases condoms. Finally, 75% of women who had been using a modern method at the time of conception continued using such a method after their abortion; switching from one modern method to another was common only among condom users, of whom 36% switched to the IUD or pills; 18% switched to withdrawal (not shown).

Characteristics of Abortions

At the time of the abortions reported in the six years prior to the 2014 survey, the mean gestational age was 5.0 weeks, and the median gestational age was 6.3 weeks (not shown). In 93% of cases, the gestational age was 12 weeks or less (Table 7). The most common methods of abortion were curettage and injection, each used in 36% of cases, followed by misoprostol (24%), which in most cases had been self-administered by insertion into the vagina. The majority of abortions were performed at the woman's home (28%) or at the private office of a physician (28%) or midwife (24%). Abortions were most often performed by midwives (40%) or obstetricians (32%), though some were done by nonmedical providers (12%) or the woman herself (9%). About 43% of abortions obtained in the six years before the survey did not result in complications; in other cases, women reported bleeding (32%), menstrual disorder (13%), infection (12%) or other problems. Compared with abortions performed by physicians, those performed by midwives, nonmedical providers or the women themselves were more likely to result in bleeding, infection or depression (not shown).

DISCUSSION

Because abortion is illegal in Iran, reliable data on the incidence of the procedure are lacking. This analysis finds that the annual abortion rate in Tehran in the year preceding

TABLE 5. Percentage distribution of abortions in the six years preceding survey, by contraceptive methods women used at time of conception and after abortion, Tehran Survey of Fertility, 2009 and 2014

Method	2009 (N=89)		2014 (N=75)	
	At time of conception	At time of conception	At time of conception	After abortion
None	18.0	18.7	14.7	
Any modern	28.1	32.0	48.0	
Condom	9.0	14.7	26.7	
Pill	14.6	13.3	12.0	
IUD	4.5	4.0	5.3	
Vasectomy	0.0	0.0	4.0	
Any traditional	53.9	49.3	37.3	
Withdrawal	47.2	48.0	37.3	
Rhythm	6.7	1.3	0.0	
Total	100.0	100.0	100.0	

TABLE 7. Percentage distribution of abortions in the six years preceding the survey, by characteristics of abortions; and percentage of abortion recipients who experienced selected complications, Tehran Survey of Fertility, 2014

Characteristic	% (N=75)
Gestational age (wks.)	
1–4	40.0
5–8	38.7
9–12	14.7
13–16	6.6
Abortion method	
Curettage	36.0
Injection (prostaglandin or oxytocin)	36.0
Misoprostol	24.0
Herbal product/insertion of catheter	4.0
Place of abortion	
Woman's home	28.0
Physician's private office	28.0
Midwife's private office	24.0
Public hospital	9.3
Private hospital	5.3
Provider's home	5.3
Provider	
Midwife	40.0
Obstetrician	32.0
Nonmedical provider	12.0
Woman (self-induced)	9.3
General physician	6.7
Total	100.0
Complications*	
None	42.7
Bleeding	32.0
Menstrual disorder	13.3
Infection	12.0
Chronic pelvic pain	6.7
Infertility	2.7
Other†	3.9

*Total of percentages is greater than 100.0 because respondents could list up to three complications. List in table excludes depression (29.3%) and feelings of guilt (2.7%). †Blood transfusion, shortness of breath, spasms and overweight.

the survey was 6.6 abortions per 1,000 married woman of reproductive age in 2009 and 5.4 per 1,000 in 2014. Both rates are higher than the rate of 3.9 per 1,000 estimated for the city of Tehran for 2000 using the indirect residual technique and Demographic and Health Survey data.¹ Nonetheless, the rates estimated in this study are low relative to the regional rates for Western Asia (where Iran is located);¹² this may be due to a variety of reasons,⁶ including not only underreporting, but also levels of contraceptive use, fertility preferences and women's willingness to terminate unintended pregnancies, all of which are related to variations across countries in abortion rates.¹³

In the 2014 TSF, 82% of married women reported using some method of family planning, and 48% were using a modern method.⁵ Moreover, men's participation in family planning has evidently increased: Between 2009 and 2014, the prevalence of condom use rose from 16% to 21%, and the prevalence of withdrawal rose from 30% to 34%. Although withdrawal is generally considered less effective than other methods, it can be effective when emergency contraceptive pills are used

as backup and spousal cooperation is high. In Tehran, a high proportion of withdrawal and condom users utilize emergency contraceptive pills; in the 2014 TSF, 20% of married women aged 15–49 reported having used emergency contraceptive pills to prevent pregnancy—a proportion greater than the highest proportion (12%) reported in any of the 45 countries included in a recent global analysis.¹⁴ According to the 2014 TSF, Iranian women who use condoms or withdrawal are more likely than other contraceptive users to have experience with emergency contraception; 29% of condom users and 23% of withdrawal users reported having used emergency contraceptive pills. Moreover, Iranian women who rely on withdrawal tend to be more educated and wealthier than other women, and thus may receive greater spousal cooperation, facilitating the effective use of withdrawal.^{5,15} The effectiveness of withdrawal is context-specific and may be much higher in some settings than in others; for example, Bradley and colleagues computed first-year contraceptive failure rates for 20 countries and estimated that failure rates for withdrawal ranged from only 3% in Indonesia to 22% in Armenia.¹⁶

Furthermore, an analysis of pregnancy data from the 2009 TSF found that women who had been using a modern method at the time of conception were 4.6 times as likely as women who had been using withdrawal to consider the pregnancy unwanted, after adjustment for sociodemographic characteristics.¹⁷ This finding likely is related to the fact that withdrawal users in Iran tend to be younger and have fewer children than do other contraceptive users,^{5,15} and thus might not be as inconvenienced by a birth as would users of modern methods, who likely have greater motivation to avoid childbearing. Consistent with this interpretation, 77% of women in Tehran who experienced withdrawal failure reported that the resulting birth was intended (32%) or mistimed (45%).⁵

Together, high contraceptive prevalence, the increase in men's participation in family planning and the use of emergency contraceptive pills appear to be major contributors to the recent decline in the proportion of pregnancies in Tehran that are unwanted (from 10% in 2009 to 6% in 2014),⁵ and hence to the low incidence of abortion.^{*1} However, the latter may also be related to the combination of persistently low fertility and persistently high contraceptive prevalence. Marston and Cleland observed that in countries where the fertility rate decreased and remained stable at a low level, contraceptive prevalence rose while abortion rates declined.¹⁸ Similarly, in Colombia and urban Mexico, the abortion rate declined as contraceptive use stabilized or increased.¹⁹ Such a pattern is evident in Tehran, where the total fertility rate dropped to 1.3 children in 2000 and has remained stable, while contraceptive prevalence increased from 78% in 2000 to 82% in 2014.⁵ In fact, in 2014, high contraceptive prevalence accounted

*The proportion of pregnancies that were reported as mistimed did not change between 2009 (11%) and 2014 (10%).

for 65% of the difference between the theoretical fertility rate (i.e., the rate that would occur if all women were married and none used contraceptives or had abortions) and the observed fertility rate in Tehran, whereas abortion incidence was responsible for only 3.5% of the difference.¹⁵ In the low-fertility context of Tehran, women's desire for small families can be actualized through contraception rather than abortion.¹³

Results of the 2014 TSF revealed a U-shaped distribution in age-specific abortion rates, as well as in the relationship between women's age and the proportion of known pregnancies ending in abortion. A similar pattern has been documented for some countries in Western Europe and North America,¹¹ where abortion rates among adolescents are high because premarital pregnancies are common. In Tehran, the high proportion of pregnancies that are terminated among women in their later reproductive years can be attributed to an intention to limit childbearing, while the elevated proportion among married women younger than 20 may be due to pregnancies that took place outside of marriage or during the engagement period, which are not considered socially acceptable. These findings are consistent with women's citing fertility-related reasons for 64% of the abortions in the six years before the 2014 survey.

Abortion rates were inversely related to women's actual and ideal number of children, suggesting the use of abortion to control fertility. Some women appeared to have a strong desire to stay childless or to have only one child, consistent with recent evidence that 9% of childless married women younger than 36, as well as 7% of childless married women aged 15-49 and 46% of married women aged 15-49 with one child, want no or no more children in the future.^{5,20}

Like past studies in Iran and elsewhere,^{1,21} this analysis found elevated abortion rates among women who were well educated, employed and not highly religious, perhaps in part because educated and employed young couples in Tehran have very low fertility intentions and fertility rates; they feel that childbearing will compete with their personal life, especially their employment and educational aspirations and leisure time.^{20,22}

The abortion rate was higher among women who had migrated to Tehran from other urban areas than among those who had migrated from rural areas, perhaps in part because urban migrants tend to be better educated than rural ones and may be better able to adapt to the norms and culture of their destination. One of their adaptations likely would be to invest in the education of their children; to do so, they would limit their fertility by contraception or abortion, a scenario consistent with recent findings that migrants to Accra, Ghana, have an elevated risk of pregnancy but not live birth during the period after migration.²³

In agreement with past studies,^{24,25} results of the 2014 TSF indicate that four out of every five abortions in the past six years had been obtained for nonmedical reasons, and thus presumably had been performed illegally and clandestinely. The rapid rise in the prevalence of fertility-related reasons for abortion (mostly to

limit births), along with the decline in the prevalence of socioeconomic reasons, indicate that abortion is most often done in Iran because of the desire for a small family rather than because of economic hardship or marital problems. A recent qualitative study found that many Iranian women fear unintended pregnancy and choose abortion because they feel they will be unable to fulfill parental commitments and responsibilities, fear social deprivations resulting from unintended pregnancy and subsequent childrearing, and consider a large family socially undesirable.²⁶

Although the great majority of pregnancies that were terminated occurred among users of withdrawal, condoms or pills, this may be more a reflection of widespread use of these contraceptive methods than of high contraceptive failure rates; however, such rates need to be measured in an independent study. Withdrawal is still the most commonly used contraceptive method in Iran.¹⁹ Results of this study show that even after terminating pregnancies resulting from method failure, only one-fourth of withdrawal users switched to a modern method. Many women and couples prefer to use withdrawal because they fear the potential health and side effects of modern methods, and because they consider withdrawal a natural, convenient, cost-free and effective method.¹⁵

Women who obtain abortions are at risk for severe complications if the procedure is done at an advanced gestational age in nonmedical facilities by untrained providers using nonstandard, unsafe methods.²⁷ Of the abortions women had had in the six years prior to the 2014 TSF, half had been obtained before six weeks' gestation, and 93% had been done in the first trimester. The risk of maternal death associated with such early terminations should be low. Moreover, consistent with a recent Iranian study,²⁸ two-thirds of abortions in this study were performed by injection (mostly using prostaglandin) or with pills; this shift from the use of curettage, which was the primary technique reported in an earlier study,²³ may be associated with declining pregnancy-related maternal mortality rates in Iran.²⁸ However, a substantial minority of the abortions reported in the current study were not performed in medical facilities, and often were done by unqualified providers, both of which elevate the risk and severity of complications. Indeed, the prevalence of such complications as bleeding and infection was elevated following abortions performed by untrained providers (midwives, nonmedical providers and women themselves). Unsafe abortions should be targeted by the Iranian Ministry of Health's newly developed reproductive health program.

Limitations and Conclusion

Although the findings reported in this study are likely the most reliable data on abortion in Iran, a survey-based abortion estimate is always prone to underreporting, because some women prefer not to disclose their abortions in

face-to-face interviews,³ even in countries where abortion is legal.²⁹ Thus, the low estimated prevalence of the procedure in the current study may be due, in part, to under-reporting. In addition, random variation in the samples of the two surveys may have contributed to differences in abortion rates.

The study findings may provide a better understanding of the context of abortion in Tehran, and of the subgroups of women who may benefit from interventions to prevent unwanted pregnancies and reduce the need for abortion. Currently, a new reproductive health program is being developed in response to the recent pronatalist population policies described by Iran's Supreme Leader;³⁰ this program will replace the recently discontinued population control program.³¹ Two of the 14 policies stated by the Leader specify that maternal and child health cannot be compromised by pronatalist decision making and programs. In fact, a hastily-proposed bill approved by the Iranian Parliament to ban surgical sterilization and punish providers of abortion and sterilization (in an attempt to increase the birth rate) was rejected twice by the country's Guardian Council, because the proposals were inconsistent with the policies stated by the Leader. However, if the evolving pronatalist policies begin ignoring the needs of women who require services and counseling to prevent unintended pregnancy, we can expect rates of unsafe abortion and maternal mortality and morbidity to rise.

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RESUMEN

Contexto: Se carece de información precisa y actualizada sobre la incidencia del aborto en Irán, país en donde el procedimiento es ilegal.

Métodos: Se utilizaron datos de 2,934 mujeres casadas en edades de 15 a 49 años que completaron la Encuesta sobre Fecundidad de Teherán (EFT) en 2009 y de 3,012 mujeres con esas características que completaron la EFT en 2014 con el fin de estimar niveles y tendencias del aborto, y medidas relacionadas. Los análisis también examinaron las características de los abortos, de las personas receptoras y proveedoras de abortos, así como las tendencias relacionadas con los motivos de las mujeres para tener abortos.

Resultados: Entre 2009 y 2014, la proporción de mujeres casadas que reportaron haber tenido alguna vez un aborto disminuyó de 8.3% a 5.6%. También ocurrieron disminuciones en la tasa general de aborto (de 6.6 a 5.4 abortos por 1,000 mujeres), la tasa global de aborto (de 0.18 a 0.17 abortos por mujer casada) y el número anual de abortos (de 10,656 a 8,734); sin embargo, la proporción de embarazos que fueron terminados permaneció estable (8.7–8.8%). La proporción de terminaciones obtenidas por razones no médicas aumentó de 69% a 82%. En 2014, las tasas de aborto fueron elevadas en mujeres con mayor educación, mayor riqueza, con empleo, migrantes urbanas o mujeres que no son extremadamente religiosas, así como entre aquellas que no tenían más de un hijo. Los proveedores de servicios de aborto utilizados más comúnmente fueron comadronas (40%) y obstetras (32%). La mitad de los abortos ocurrieron por fallas al utilizar el método del retiro, pero solamente la cuarta parte de las usuarias de este método cambiaron a un método anticonceptivo moderno después del aborto.

Conclusiones: Algunos subgrupos de mujeres tienen un alto riesgo de aborto y pueden beneficiarse de medidas que aumenten el uso efectivo de anticonceptivos.

RÉSUMÉ

Contexte: Il n'existe guère d'information précise et actuelle sur l'incidence de l'avortement en Iran, où la procédure est illégale.

Méthodes: Les données obtenues, respectivement, de 2.934 et 3.012 femmes mariées âgées de 15 à 49 ans dans le cadre des

Enquêtes de Téhéran sur la fécondité (TSF) de 2009 et de 2014 ont servi à estimer les niveaux, tendances et autres mesures de l'avortement. Les caractéristiques des avortements pratiqués, des bénéficiaires et des prestataires, ainsi que les tendances relatives à la motivation des femmes, ont également été analysées.

Résultats: Entre 2009 et 2014, la proportion des femmes mariées ayant déclaré s'être jamais fait avorter diminue, de 8,3% à 5,6%. Le taux d'avortement général est également en baisse (de 6,6 à 5,4 avortements pour 1.000 femmes), de même que le taux total (de 0,18 à 0,17 avortements par femme mariée) et que le nombre annuel d'avortements (de 10.656 à 8.734). La proportion des grossesses interrompues demeure cependant stable (8,7–8,8%). En hausse, la proportion d'IVG obtenues pour raisons non médicales passe de 69% à 82%. En 2014, les taux d'avortement sont élevés parmi les femmes davantage instruites, plus riches, employées, migrantes urbaines ou faiblement religieuses, ainsi que parmi celles mères, tout au plus, d'un enfant. Les prestataires les plus courants sont les sages-femmes (40%) et les obstétriciens (32%). Pour la moitié, l'avortement fait suite à un échec du retrait, mais un quart seulement des femmes pratiquant cette méthode ne passent à une méthode contraceptive moderne après l'avortement.

Conclusions: Certains sous-groupes de femmes présentent un risque d'avortement élevé et pourraient bénéficier de mesures aptes à accroître au sein des couples la pratique efficace de la contraception.

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