Original Article

Factors Associated with Incidence of Induced Abortion in Hamedan, Iran

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Abstract

Background: There is limited reliable information on abortion in Iran, where abortion is illegal and many women of reproductive age seek clandestine abortion to end their unintended pregnancy. This study aims to examine the determinants of induced abortion in the city of Hamedan, Iran.

Methods: The study utilizes recent data from the 2015 Hamedan Survey of Fertility, conducted in a representative sample of 3,000 married women aged 15 – 49 years in the city of Hamedan, Iran. Binary logistic regression models are used to examine factors associated with the incidence of abortion.

Results: Overall, 3.8% of respondents reported having had an induced abortion in their life. Multivariate results showed that the incidence of abortion was strongly associated with women's education, type of contraceptive and family income level, after controlling for confounding factors. Women using long-acting contraceptive methods, those educated under high school diploma or postsecondary education, and those with high level of income were more likely to report having an induced abortion.

Conclusion: The high incidence of abortion among less or more educated women and those with high income level signifies unmet family planning needs among these women, which must be addressed by focused reproductive health and family planning programs.

Keywords: Incidence, induced abortion, risk factors

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Introduction

Intentional termination of pregnancy before viability of the fetus is defined as induced abortion.[1] In many developing countries, induced abortion (hereafter referred to as abortion) is illegal, so they are largely performed clandestinely in unsafe situations.[2] The World Health Organization defines unsafe abortion as "a procedure for terminating a pregnancy that is performed by an individual lacking the necessary skills, or in an environment that does not conform to minimal medical standards, or both".[3] Since 2003, the number of induced abortions fell by 600,000 in the developed world but increased by 2.8 million in developing countries. In 2008, six million abortions were performed in developed countries and 38 million in developing countries – a disparity that largely reflects population distribution. A woman's probability of having an abortion is slightly elevated if she lives in a developing country. In 2014, there were 37 abortions per 1,000 women aged 15 – 44 years in developing countries, compared with 27 per 1,000 in the developed region.[2]

In Iran, where abortion is illegal, there is limited reliable information about the incidence of abortion. At the national level, Erfani and McQuillan[4] estimated an annual incidence of 73,000 abortions for 2000, and Rastegari and her colleagues[5] estimated an annual number of 129,000 non-health related abortions for 2012. Recent local studies have also estimated an annual number of 11,500 abortions for the capital city of Tehran, with a declining trend.[6]

Clandestine and unsafe abortion is associated with maternal morbidities and mortality. Globally, there were an estimated 289,000 maternal deaths in 2013. The global maternal mortality rate (MMR) in 2013 was 210 maternal deaths per 100,000 live births. However, the MMR in developing regions was 14 times higher than that in developed regions.[7] Genital tract injuries, vesicovaginal fistula, gastrointestinal injuries, acute renal failure, uterine perforation, septicemia and infertility are all complications of abortion.[8] Historical cases, like Romania,[9] show that abortion-related maternal mortality and morbidity complications rise, when a country decides to increase its fertility rate by curbing access to family planning services and safe abortion.

In Iran, since the early 1990s, there was a comprehensive and effective family planning program which accounted for 61% of the reduction in fertility.[4] However, due to the enduring below-replacement fertility in the past two decades in the country, the state made a shift toward encouraging childbearing by curbing free delivery of family planning services, especially banning sterilizations.[10] A sudden shift from an anti-natal policy to an increasing population growth rate by limiting access to affordable long-acting contraceptive methods (i.e., sterilization and IUD) can raise unwanted pregnancies and hence push women to use clandestine, unsafe abortion, which can in turn escalate maternal

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mortality and morbidity rates. Therefore, it is imperative to understand the role of factors, including contraceptive use, in the incidence of abortion; this will be examined in the current study, analyzing the latest data from a large-scale fertility survey conducted in the city of Hamedan, Iran.

Methods

Data

This study uses data from the 2015 Hamedan Survey of Fertility (HSF), conducted in a representative sample of 3,000 currently married women aged 15 – 49 years, residing in the historic city of Hamedan, the capital of Hamedan Province, Iran. Hamedan is believed to be among the oldest Iranian cities and one of the oldest in the world, with 530,000 residents.[11] The yearly growth rate of population in Hamedan was reported 2.2% during 2007 to 2012. The total fertility rate was 1.53 based on last reports during this period.[12] Also, the urban rate has increased from 57.6% to 59.2% during 2007 to 2012 and about 71% of Hamedan's population are 15 – 64 years old.[13]

The samples were interviewed face-to-face at the door of their houses by trained female interviewers during April-June 2015. The survey, which is a replication of the 2014 Tehran Survey of Fertility[14] and is modeled similar to a standard Demographic Health Survey, collected a wide range of data, including complete history of live births, contraceptive use, and abortions, as well as data on fertility intention, breastfeeding, and the socio-economic and demographic characteristics of women and their husbands.

The samples were selected from the population of currently married women aged 15 – 49 years residing in Hamedan by employing a stratified systematic random sampling design. The sampling frame was taken from health records of the population of married women registered by public health units in Hamedan. In Iran, each public health unit in a city or rural area normally registers married women of reproductive age, living within its geographic jurisdiction, to monitor their maternal and child health status and provides them with some basic health services. So, the health unit has a close-to-complete coverage of health records of married women. The Hamedan University of Medical Sciences granted permission to the authors to access the health records of married women solely for the purpose of sampling.

The city of Hamedan has been stratified by these 38 health units. First, the sample size was distributed among these 38 health unites based on the probability proportion to the size of their health records. Then, the number of samples allocated to each health unit was selected from the list of health records of women registered in that unit by systematic random sampling. Name and home address of women in the selected health records were given to the interviewers to complete the interviews. To validate the representativeness of the study sample, demographic characteristics of samples were compared with those of the population of Hamedan, enumerated in the 2011 census.[11] The results (not shown here) indicated that the study samples greatly represent the corresponding population of the city of Hamedan.

Measures

This study examined associations between having an abortion and 9 demographic and socioeconomic characteristics of women: age, parity (number of living children), contraceptive use, years of schooling obtained, employment status, importance of religion (ranging from "very important" to "not at all"), ethnicity, family income level (measured indirectly by household monthly expenditure), and migration streams. The dependent variable was the lifetime experience of an abortion, measured by a dummy variable. In the survey, respondents were asked, "Have you ever had an induced abortion in your lifetime?" (Yes/No).

Statistical analysis

Since the dependent variable is a dummy variable, multiple binary logistic regression analysis was used to study the net effect of determinants of incidence of induced abortion. Crude and adjusted odds ratios (OR) were calculated for each covariate with 95% confidence intervals. We considered level of significance at 0.05. Data were analyzed using SPSS version 24.

Results

The mean age was 34.3 (± 7.6) years. About 1.6% (49 subjects) of women were under 20 years of age. Almost one fourth of women (23.4%) had academic education. This rate was about 26% for women's spouses. More than fifty percent (57%) of women's mothers were illiterate. Regarding ethnicity, the majority of women were Turks and Persians (45.4% and 39.5%, respectively). About 88% (2636 subjects) of women were housewives.

The general and reproductive characteristics of women are shown in Table 1. Five hundred and ninety-one women (20%) had more than three live births. Still birth was reported by only 1.3% of women. About 382 (14.5%) of women reported unwanted pregnancy for their last birth. Of the total respondents, 18.4% and 3.8% women reported that throughout their lifetime, they had a spontaneous or induced abortion, respectively. About 31% of women had undergone abortion in a center except hospital or private clinic under physician's supervision (data not shown).

Table 2 shows bivariate logistic regression analyses examining the association between demographic and socioeconomic variables and the incidence of abortion. Women's age was a risk factor for induced abortion. The incidence of induced abortion was 10.4 times higher among women aged 40 – 49 years than those aged 15 – 29 years ($P = 0.001$). Increasing number of living children ($P = 0.002$), using long acting method of contraception ($P = 0.001$), high family income ($P = 0.001$), and migration from other urban areas to Hamedan ($P = 0.03$) were associated with higher risk of induced abortion. Employed (*vs.* unemployed) and Persian women compared to Turks were more likely to experience induced abortion. Women who had completed high school (12 years of schooling) reported a lower odds of abortion, compared with those having less than 12 years of schooling ($P = 0.02$).

Table 3 illustrates the multivariate analysis of determinants of experiencing abortion. After controlling for other factors, only education, income and type of contraceptive were significantly associated with the incidence of abortion. Women who had completed high school were about 43% less likely to perform an abortion, compared to those having less than 12 years of schooling (Adjusted OR: 0.57; $P = 0.03$). This difference was not significant for women with 13 years or more of schooling. Moreover, women who used a long-acting contraceptive at the time of the interview were 76% more likely to report performing abortion in their life, in comparison to contraceptive non-users (OR = 1.76; $CI_{95\%}$: 1.11 – 2.80). Women with a high level of income were 2.33 times more likely to experience abortion compared with those having a low income level ($CI_{95\%}$: 1.31 – 4.17; $P = 0.004$).

Table 1. Reproductive and medical characteristics of studied women (n = 3000), Hamedan fertility survey, 2015

Variables	Number	Percent
Number of live births		
0	359	12.0
1	952	31.7
2	1098	36.6
+3	591	19.7
Still birth		
Yes	35	1.30
No	2705	98.7
Planning status of the last birth		
Wanted	2003	75.9
Mistime	382	14.5
Unwanted	250	9.4
No difference	5	0.20
Ever had a spontaneous abortion		
Yes	505	18.4
No	2236	81.6
Ever had an induced abortion		
Yes	113	3.8
No	2887	96.2
Ever use of contraceptive		
Yes	2510	83.7
No	490	16.3
Type of contraception		
Tubal ligation	364	14.5
Vasectomy	107	4.3
Intra uterus devices	267	10.6
Hormonal (including pills & injection)	253	10.1
Condom use	589	23.5
Withdrawal and safe period	930	37.1

Discussion

The current study examined factors associated with the incidence of abortion in the city of Hamedan in Iran. Overall, 3.8% of women in reproductive age in this study reported that they had had an induced abortion in their life. This figure seems to be low, compared with global abortion levels[15] and a study conducted in the city of Urmia, Iran which found that about 17% of women reported having had an induced abortion in their life.[16] The high proportion of women with abortion in this study can be due to selectivity issue in the selected samples, who were women referring to public health centers affiliated to the Ministry of Health and the Social Security Organization. Also, differences in data collection methods can contribute to variations in estimated abortion levels. In the current study, data on abortion was collected through face-to-face interviews at the door of respondents' home. The study in Urmia gathered data form clients who had attended health centers. Our low abortion incidence can be also due to a prestige bias and fear that women feel in reporting their likely abortion at a house to house interview compared to health centers. Cultural and ethnic differences can also contribute to variations in abortion reports between conservative and liberal residents of cities. For example, in a similar study conducted in the capital city of Tehran, where women generally hold more liberal attitudes to abortion and family formation, about 8% of women reported having had a lifetime abortion.[17]

In addition to a likely abortion underreporting, the low proportion of women reporting abortion incidence in this study can be due to the fact that 84% of married women in Hamedan reported using modern contraceptives, which help in preventing unintended pregnancies. Over the past decade, the rate of unintended pregnancies in Iran has been declining, along with increasing contraceptive use.[18] So, in countries where induced abortion is not legal and access to safe induced abortion is not available, it is imperative that stakeholders and policymakers focus on improving family planning services and knowledge to prevent unplanned pregnancies.

Multivariate results showed that women with moderate education (a high school diploma) were less likely to report abortion, compared with women who were illiterate or had some secondary or post-secondary education. This result is consistent with findings of a study conducted by Ranji and her colleagues in the northwestern Iran.[16] They found that women who completed secondary school were 13% less likely to report having abortion, compared with women who have some secondary schooling, while they found that women with post-secondary schooling were 83% more likely to have an abortion. A study conducted in Ethiopia revealed a positive association between performing induced abortion and mother's education. In fact, the risk of abortion among mothers with high school and post-secondary education was about 10 times greater than that among illiterate women.[19] In another study, however, women who were illiterate experienced a higher level of induced abortion, compared to educated women.[20]

Table 2. Percent distribution and odds ratio of ever having induced abortions by selected covariates among married women aged 15 – 49 years living in the city of Hamedan, Iran, 2015 (n = 3000)

Covariates	Ever had induced abortion in lifetime			Odds ratio (95% CI)	*P*–Value
	Yes (%)	No (%)	N		
All Women	3.8	96.2	3,000	- - - -	- - - -
Age					
29–15	0.7	99.3	851	1.00	
39–30	3.8	96.2	1332	5.61 (2.40–13.12)	0.001
49–40	6.9	93.1	817	10.36 (4.44–24.19)	0.001
Number of living children*					
1 or none	2.5	97.5	1257	1.00	
2+	4.7	95.3	1743	1.95 (1.28–2.97)	0.002
Years of schooling completed					
< 12	4.5	95.5	1329	1.00	
12	2.7	97.3	968	0.58 (0.37–0.93)	0.024
13+	3.8	96.2	703	0.85 (0.53–1.34)	0.476
Current use of contraceptive methods					
Long–acting methods**	6.0	94.0	772	2.17 (1.42–3.32)	0.001
Pills	2.7	97.3	220	0.96 (0.40–2.29)	0.928
Male methods***	2.8	97.2	1517	1.00	- - - - -
None	3.7	96.3	491	1.30 (0.74–2.28)	0.352
Employment status					
Unemployed	3.6	96.4	2700	1.00	
Employed	5.3	94.7	300	1.51 (0.88–2.60)	0.136
Level of monthly household income					
Low	2.2	97.8	821	1.00	
Middle	3.6	96.4	1176	1.65 (0.94–2.89)	0.079
High	5.3	94.7	1003	2.49 (1.45–4.28)	0.001
Ethnicity					
Turk	3.5	96.5	1361	1.00	
Persian	4.0	96.0	1186	1.15 (0.77–1.74)	0.49
Kurd/Lur/Others	3.8	96.2	453	1.07 (0.61–1.87)	0.82
Importance of religion in life					
Very important	3.9	96.1	2059	1.00	
Somewhat Important	3.4	96.6	872	0.87 (0.57–1.33)	0.52
Not too important/not at all	2.9	97.1	69	0.66 (0.18–3.03)	0.66
In–migration streams to Hamedan					
Non–migrant	3.3	96.7	1919	1.00	
Urban–Hamedan	5.3	94.7	507	1.63 (1.03–2.58)	0.038
Rural–Hamedan	3.8	96.2	574	1.16 (0.71–1.89)	0.567

Note: *includes current pregnancies; **includes sterilization, IUD, Norplant and injections; *** includes Condoms and withdrawal; NA: not applicable.

This inconsistency in findings could be due to difference between cultures and demographic characteristics of studied women. In Iranian studies, the rate of induced abortion was lower among women with moderate education. It seems that illiterate and less educated women do not have enough knowledge about risk of induced abortion and also they are more determined to abort an extra unplanned pregnancy as they usually have achieved their desired number of children. In a study by Jarahi, et al. educated women had better knowledge about abortion legislations and using modern contraceptives.[21] On the other hand, more educated women have greater knowledge about the methods of induced abortion. This might explain why the incidence of induced abortion is low among more educated women in the current study. The last explanation can also be applied to our other finding regarding the higher incidence of abortion among women with high level of income. It appears that women with a higher level of income have a higher level of education and hence, have better access to health facilities required for performing an abortion. We found out that women from families with high income had experienced more induced abortion compared to women with low

Table 3. Adjusted odds ratios of ever having induced abortions by selected covariates among married women aged 15–49 years residing in the city of Hamedan, Iran, 2015 (n = 3000)

Covariates	B	Wald test	*P*–value	Odds ratio	Confidence interval (95%)
Number of living children*					
1 or none (ref.)				1.00	
2+	0.30	1.61	0.204	1.35	2.16–0.84
Years of schooling completed					
< 12 (ref.)				1.00	
12	–0.572	4.67	0.031	0.57	0.95–0.34
13+	–0.392	1.53	0.216	0.68	1.26–0.36
Current use of contraceptive methods					
Long–acting methods**	0.565	5.71	0.017	1.76	2.80–1.11
Pills	–0.080	0.03	0.858	0.93	2.22–0.38
Male methods*** (ref.)	NA	NA	NA	1.00	NA
None	0.278	0.93	0.334	1.32	2.32–0.75
Employment status					
Unemployed (ref.)				1.00	
Employed	0.354	1.12	0.290	1.43	2.75–0.74
Level of monthly household income					
Low (ref.)				1.00	
Middle	0.465	2.59	0.108	1.59	2.81–0.90
High	0.847	8.19	0.004	2.33	4.17–1.31
Ethnicity					
Turk (ref.)				1.00	
Persian	0.265	1.27	0.261	1.30	2.07–0.82
Kurd/Lur/Others	–0.014	0.002	0.962	0.99	1.76–0.55
Importance of religion in life					
Very important (ref.)				1.00	
Somewhat Important	–0.138	0.38	0.537	0.87	1.35–0.56
Not too important/not at all	–0.396	0.29	0.591	0.67	2.85–0.16
In–migration streams to Hamedan					
Non–migrant (ref.)				1.00	
Urban–Hamedan	0.417	2.78	0.096	1.52	2.48–0.93
Rural–Hamedan	0.062	0.05	0.826	1.06	1.84–0.61

Note: *includes current pregnancies; **includes sterilization, IUD, Norplant and injections; ***includes Condoms and withdrawal; NA: not applicable; ref: reference group; B: the regression coefficient

income. This finding was consistent with findings of Ranji, et al.[16] The positive relation between level of education and income and incidence of abortion has been well documented.[22]

Women who used long acting contraceptive methods were more likely to report abortion, compared to those using male contraceptive methods (largely withdrawal). This could be due to the stronger intention of women, using long-acting methods, to stop childbearing, while women using male methods would not mind to keep their unwanted births.[23,24] Also, current users of long-acting methods most likely had been using a less effective method (with higher failure rates leading to unwanted pregnancies) before switching to the current effective method.

The most important strength of the current study is using a large and representative sample size in a specified population for the first time.

In conclusion, we found that the proportion of induced abortion in studied women is 3.8% (95% confidence interval: 3.1% – 4.5%). The most important predictors of induced abortion were education, family income and method of contraception in women. The findings of the current study help policy makers to plan the best programs for high risk women in order to control induced abortion and finally unwanted pregnancy.

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