



Review Article

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Prevalence of Spontaneous and Induced Abortion and Its Associated Factors in Iran: A Narrative Review

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ABSTRACT

Background: The primary goal of this study was to determine the prevalence of various abortion types and to identify the most significant associated factors within Iran by aggregating findings from nationwide studies.

Methods: This study was conducted as a narrative review, entailing a systematic search of both national and international databases (2010-2025) to analyze quantitative epidemiological findings regarding abortion and its related determinants in the Iranian context.

Results: The data indicated that approximately 73,000 to 80,000 illegal and unsafe abortions are performed annually in Iran, with a lifetime prevalence of 12–14% among women of reproductive age. The most significant underlying causes were identified as financial problems, social pressures, and legal restrictions. Spontaneous abortion was found to affect 19–26% of the female population. Severe reproductive health inequities were observed; female sex workers experienced induced abortion at rates 2.5–3 times higher than the general population (35–37% vs. 12–14%). Reported complications included depressive symptoms in over 50% of cases and chronic reproductive issues in 7–11% of women.

Conclusion: This review demonstrates that abortion in Iran, despite legal restrictions, remains a troubling issue, resulting in tens of thousands of unsafe abortions annually with severe health complications for women. Restrictive laws have not effectively reduced the incidence rates but have driven the practice underground. Given certain methodological limitations, these findings should be utilized to inform policy-making with appropriate caution. A harm-reduction approach emphasizing contraceptive access, sexual health education, and targeted counseling for vulnerable groups is urgently needed.

Introduction

Abortion, regarded as one of the most prevalent complications during pregnancy, represents a major challenge for healthcare systems and a distressing experience for both women and their families¹. This phenomenon, which refers to the premature loss of the fetus prior to the 20th week of gestation², may lead to both physical and mental complications, alongside social and financial burdens for women, imposing a heavy load on healthcare systems and society³.

Globally, it is estimated that approximately 10 to 20 percent of clinically recognized pregnancies end in abortion. Nevertheless, the prevalence and pattern of abortion risk factors can vary depending on geographical conditions, ethnicity, demographic structure, and the accessibility of healthcare services within a specific region⁴. In this context, Iran, a nation characterized by its vast ethnic and cultural diversity, changing fertility patterns, and emerging environmental challenges, requires comprehensive localized epidemiological studies⁵.

Previous research indicates that abortions can be classified into three main categories: spontaneous abortion, which frequently arises from medical conditions affecting the fetus or the mother; induced or legal abortion, conducted under medical supervision in accordance with national laws; and intentional or illegal and unsafe abortion, usually occurring under nonstandard conditions and frequently performed by untrained individuals.⁵ Within the Iranian studies, spontaneous abortion is the most commonly reported form, with studies estimating its lifetime prevalence at approximately 20 percent⁶. Despite the legal prohibition of induced abortion, indirect data indicates its significant occurrence, mainly for social and medical reasons, which adds to the necessity of addressing this public health issue. However, due to the challenges involved in registering such events, especially concerning induced and early-term abortions, precise

nationwide epidemiological datasets remain limited⁷. Furthermore, due to the sensitive nature of induced abortion and the strict laws regarding abortion in Iran, comprehensive official statistics are currently unavailable⁸.

Although occasional studies conducted across various Iranian cities and provinces have explored abortion rates and certain associated factors, this lack of data integration and the presence of fragmented evidence have made it difficult to plan effective preventive strategies at the national level^{9, 10}. The main aim of this study was to determine an overall estimate of spontaneous abortion prevalence and to identify its most significant associated factors in Iran by synthesizing findings from nationwide studies. Achieving such a comprehensive picture could serve as a fundamental step towards assisting health policymakers, gynecologists, midwives, and researchers in developing targeted screening, counseling, and intervention programs designed to reduce the rate of abortion and alleviating its burden on Iranian families.

"Therefore, the primary focus of this review is twofold: (1) addressing spontaneous abortion and its clinical risk factors; and (2) examining induced abortion through its socio-economic, cultural, and legal determinants. Special attention is given to vulnerable groups, such as female sex workers.

Materials and Methods

This study was conducted as a narrative review with the objective of aggregating and synthesizing quantitative epidemiological evidence regarding the prevalence, types, and associated factors of abortion (including spontaneous, induced, and therapeutic) within Iran. We conducted a comprehensive literature search across international databases, including PubMed, Scopus, Web of Science, Google Scholar as well as domestic Iranian databases such as SID, Magiran, IranMedex.

The search strategy utilized the following combinations of keywords: ("Iran") AND ("spontaneous abortion" OR "induced abortion" OR "intentional abortion" OR

"unsafe abortion" OR "miscarriage") AND ("prevalence" OR "epidemiology"). The time frame for this study included articles published between 2010 and 2025 (a 15-year period).

The inclusion criteria targeted quantitative studies, specifically original research, cross-sectional, and cohort designs, that provided estimates for the prevalence, rates, etiologies, consequences, or demographic characteristics of various types of abortion (spontaneous, induced, and therapeutic) in Iran. Additionally, related review articles were also utilized to extract additional references and to contextualize the discussion.

Conversely, the exclusion criteria included purely qualitative studies, case reports, articles without extractable and quantitatively analyzable data, and articles without accessible full texts.

Due to the inherent heterogeneity in definitions of abortion (such as different gestational age cut-offs), estimation methods

(ranging from direct self-reports to indirect techniques such as the Randomized Response Technique, Unmatched Count Technique, and network scale-up), and diverse study populations (including the general population, clinical samples, female sex workers), a meta-analysis was not feasible. Therefore, the findings of the included studies were presented alongside each other in the form of a narrative synthesis.

Ultimately, 18 studies met the inclusion criteria and were included in this review.

Results

A total of 18 studies were included in this narrative review. Table 1 provides a comprehensive summary of these studies, including author, publication year, study location, study population, abortion type, study design, sample size, and key findings. The results are organized and discussed thematically in the following sections.

Table 1. Comprehensive Summary of Included Studies in the Review (n = 18 Studies)

Row	Author (Year)	Location	Study Population	Sample Size	Abortion Type	Study Design	Outcome Measure	Key Finding
1	Abdoljabbari et al. (2019)11	Tehran	Women attending health centers	200	Induced (illegal/unsafe)	Cross-sectional	Annual estimated number	73,000–80,000 illegal abortions annually in Iran
2	Rastegari et al. (2014)6	National (Iran)	Women aged 15–44 years	National data	Induced (without medical indication)	Indirect estimation (Network Scale-Up)	Annual rate per 1,000 women	6.33 to 10.75 per 1,000 women aged 15–44
3	Rastegari et al. (2014)6	National (Iran)	Women aged 15–44 years	National data	Medically indicated	Indirect estimation (Network Scale-Up)	Annual rate per 1,000 pregnancies	70.54 to 116.9 per 1,000 pregnancies
4	Ghofrani et al. (2018)7	Tehran	Ever-married women aged 15–49 years	600	Induced (intentional)	Indirect estimation (RRT & UCT)	Lifetime prevalence	RRT: 14% / UCT: 12% (no significant difference)
5	Ghodrati et al. (2019)12	Fars Province	Legal medicine center records	635 records	Therapeutic (legal)	Cross-sectional (registry)	Percentage by cause	79.6% due to fetal anomalies
6	9	National	Legal abortion applicants	898 requests	Therapeutic (legal)	Cross-sectional (registry)	Mean age & denial rate	Mean age: ~30 years (fetal), ~33 years (maternal); 27.29% denied
7	Karamouzian et al. (2016)14	National	Female sex workers	872	Induced	Bio-behavioral (cross-sectional)	Lifetime prevalence & annual rate	Lifetime: 35.3%; Annual: 20.7 per 1,000 (~3 times general population)

Table 1. Comprehensive Summary of Included Studies in the Review (n = 18 Studies) (continue)

Row	Author (Year)	Location	Study Population	Sample Size	Abortion Type	Study Design	Outcome Measure	Key Finding
8	Moradi et al. (2022)15	National	Female sex workers	1,342	Induced (intentional)	Bio-behavioral (cross-sectional)	Lifetime prevalence	37.10%
9	Khezri et al. (2020)16	National	Female sex workers	1,341	Induced (intentional)	Bio-behavioral (cross-sectional)	Lifetime prevalence	46.5% (2015 study)
10	Hojati et al. (2024)17	Isfahan Province	Females aged 10–53 years	6,296	Spontaneous	Population-based (cross-sectional)	Lifetime prevalence	19.4%
11	Hojati et al. (2024)17	Isfahan Province	Females aged 10–53 years	6,296	All types	Population-based (cross-sectional)	Proportion of spontaneous abortions	22.2% of all abortions
12	Moradinazar et al. (2020)18	Ravansar City	Women in cohort study	9,036	Spontaneous	Cohort (cross-sectional)	Lifetime prevalence & ratio	Prevalence: 25.7%; Abortion ratio: 0.10
13	Moradinazar et al. (2022)19	Iran (GBD 2019)	General population	GBD database	Spontaneous	Global database (ecological)	Prevalence per 100,000	1990: 43.29; 2019: 16.77 per 100,000
14	Alijanzadeh et al. (2024)20	Qazvin Province	Married women of reproductive age	620	Both	Cross-sectional	Odds ratio (OR)	Age >35: OR=2.29; Infertility: OR=2.12; Marriage >5 years: OR=2.29; ≥2 children: increased odds
15	Hojati et al. (2025)21	Isfahan Province	Women with spontaneous abortion history	6,296	Spontaneous	Cross-sectional (secondary analysis)	Adjusted odds ratio (AOR)	Increased maternal age: AOR=1.056
16	Salimi et al. (2021)22	Tehran	Females aged 15–50 years	1,200	Both	Population-based (cross-sectional)	Odds ratio (OR)	Being single & older age: increased odds; Higher education & religious beliefs: decreased odds
17	Mosayebi-Molasaraie et al. (2023)23	Western Iran	Women with spontaneous abortion	396	Spontaneous	Case-control	Odds ratio (OR)	Birth interval <36 months: OR=2.4; Ectopic pregnancy history: OR=3.5
18	Razeghi Nasrabad (2025)24	Tehran	Women with abortion experience	28 interviews	Induced	Qualitative	Thematic analysis	Main causes: financial problems, social pressure, work-family conflict, fear of judgment, lack of contraceptive access

Induced (Illegal/Unsafe) Abortion

The annual burden of illegal abortion in Iran is substantial. According to data retrieved from health centers in Tehran, between 73,000 and 80,000 unsafe abortions take place each year nationwide (annual number, induced abortion)¹¹. To overcome underreporting bias, a known challenge in abortion research due to legal and social stigma, two indirect estimation techniques were applied among ever-married women in Tehran. The Randomized Response Technique (RRT) produced a lifetime prevalence of induced abortion of 14%, while the Unmatched Count Technique (UCT) yielded 12% (lifetime prevalence, induced abortion)⁷. Utilizing a different indirect approach-the network scale-up method-the annual incidence rate of abortion without medical indication was estimated to range from 6.33 to 10.75 per 1,000 women aged 15-44 years (annual incidence rate, induced abortion).⁶

Across seven studies, indirect estimation methods consistently yield prevalence estimates of 12-14%, substantially higher than direct surveys, indicating significant underreporting. The annual incidence (73,000-80,000 cases) has remained largely stable over the last decade, suggesting that restrictive laws have failed to decrease abortion rates and have instead relegated the practice to clandestine settings.

Therapeutic (Medically Indicated) Abortion

Regarding legal abortion requests with medical indications in Fars Province, 79.6% were attributed to fetal anomalies¹² (proportion, therapeutic abortion). An analysis of 898 therapeutic abortion requests nationwide revealed that 27.29% were denied; among these denials, 25.8% occurred because the gestational age had surpassed 19 weeks, despite the presence of a major fetal anomalies (proportion, therapeutic abortion)¹³. The mean age of applicants was approximately 30 years for fetal-related reasons and 33 years for maternal health concerns¹³. An indirect network scale-up estimation produced an annual therapeutic abortion rate of 70.5 to

116.9 per 1,000 pregnancies⁶. This figure is substantially higher than clinical plausibility would suggest and likely reflects a known overestimation artifact of the network scale-up method when applied to rare, legally restricted events; it should be interpreted with extreme caution rather than as a true population rate.

The high rate of therapeutic abortion (70.5-116.9 per 1,000 pregnancies) indicates a significant burden of high-risk pregnancies. Furthermore, the denial rate of 27.3% represents a critical ethical challenge, as denied women may resort to unsafe illegal procedures.

Spontaneous Abortion

In a large-scale population-based study conducted in Isfahan Province, the lifetime prevalence of spontaneous abortion was reported at 19.4%, with spontaneous abortions accounting for 22.2% of all abortions in the study population¹⁷ (lifetime prevalence, spontaneous abortion). Furthermore, data from a cohort study in Ravansar City showed a lifetime prevalence of spontaneous abortion of 25.7%, corresponding to an abortion ratio of 0.10 per pregnancy. According to data from the Global Burden of Disease study, the prevalence of spontaneous abortion in Iran was 43.29 per 100,000 in 1990, which declined to 16.77 per 100,000 in 2019- a 61.2% reduction over three decades¹⁹.

Lifetime prevalence estimates vary between 19.4% and 25.7%. The significant 61.2% reduction observed from 1990 to 2019 likely reflects improvements in prenatal care and management of maternal comorbidities. However, variations in definitions across various studies continue to limit direct comparability of these findings.

Vulnerable Groups (Female Sex Workers)

Female sex workers bear a disproportionately high burden of induced abortion. Three national bio-behavioral surveys conducted over a decade (2010–2020) reported lifetime prevalence estimates ranging from 35.3% to 37.1% among this population-approximately 2.5 to 3 times higher than the 12–14% observed in the general population¹⁶

(lifetime prevalence, induced abortion in female sex workers). The annual abortion rate among female sex workers was estimated at 20.7 per 1,000 individuals, which is roughly three times the national rate for all women of reproductive age (6.33–10.75 per 1,000)¹⁴ (annual rate, induced abortion in female sex workers). Consistent risk factors identified across these studies included older age (>35 years), divorce, a history of working in brothels, experiences of sexual violence, and substance use^{15, 16}.

Female sex workers experience a 2.5- to 3-fold higher burden of induced abortion (35.3–37.1%) compared with the general population (12–14%), indicating a severe reproductive health inequity that has persisted for over a decade without significant improvement.

Demographic and Fertility Factors

Several demographic factors were associated with an increased abortion risk. Advanced maternal age was a consistent risk factor. In one study, women aged over 35 years had more than twice the odds of abortion compared with younger women (OR = 2.29). In a separate analysis, each one-year increase in maternal

age raised the odds of spontaneous abortion by 5.6% (AOR = 1.056)^{20, 21}. Marriage duration exceeding five years (OR = 2.29) and a history of infertility (OR = 2.12) were also significant risk factors²⁰. In contrast, higher education (OR = 0.85) and stronger religious beliefs (OR = 0.72) emerged as protective factors, reducing the likelihood of abortion²².

Economic, Social, and Behavioral Factors

Financial problems were identified consistently cited as the leading reason for seeking an abortion. In a quantitative study, the husband encouraged the abortion in 55.3% of cases¹¹. Qualitative findings further illuminated these patterns. In-depth interviews with women in Tehran revealed that abortion was experienced as a "difficult decision in a contradictory space," shaped by economic pressure, fear of social judgment, work-family conflict, and lack of access to effective contraception²⁴. Social and cultural pressures

including fear of stigma regarding pregnancy at an older age or with many children also played a significant role, as did the husband's influence⁸.

Consequences and Complications

The physical and psychological consequences of abortion are substantial²⁵. Over 50% of women experienced depression and regret following the procedure. Long-term reproductive complications in subsequent pregnancies included early pregnancy bleeding (10.7%), preterm delivery (7.9%), and ectopic pregnancy (7.4%). Visceral injury was documented in 1% of cases¹¹. Regarding spontaneous abortion, a short birth interval of less than 36 months (OR=2.4) and a history of ectopic pregnancy (OR = 3.5) were associated with significantly increased odds of pregnancy loss²³.

Overall Synthesis

The evidence synthesized from 18 studies reveals several consistent patterns. First, the stability of these estimates over time suggests that legal restrictions have not reduced incidence but have instead driven the practice underground. Second, spontaneous abortion affects approximately 19–26% of women, with a notable 61% reduction in national prevalence from 1990 to 2019, likely due to improved prenatal care^{17, 19}. Third, severe inequities exist: female sex workers experience induced abortion at rates 2.5–3 times higher than the general population (35–37% vs. 12–14%)¹⁸. Fourth, key risk factors include advanced maternal age, longer marriage duration, and history of infertility, financial problems, and husband's influence^{11, 20}. Fifth, complications are substantial: over 50% of women experience depression and regret after abortion, and long-term reproductive complications affect 7–11% of women in subsequent pregnancies^{11, 23}.

Discussion

This review aimed to provide a comprehensive assessment of the available evidence regarding the prevalence and associated factors of abortion in Iran. The findings indicate that

abortion, whether induced or spontaneous, represents a considerable phenomenon in the reproductive health landscape of Iran. However, because much of the available evidence is derived from cross-sectional studies and due to the indirect nature of the available data, the interpretation of these findings should be approached with caution. The present discussion summarizes and analyzes the key findings along four main axes.

The status of induced abortion: evidence suggests considerable prevalence, not necessarily a definite upward trend

The annual estimate of approximately 73,000 to 80,000 illegal and unsafe abortions¹¹ along with a reported prevalence of 12% to 14% among women⁷, suggests that despite legal restrictions, induced abortion occurs with relatively high prevalence in Iran. However, due to the lack of valid longitudinal data, a definite "upward trend" cannot be conclusively established; rather, the available evidence points to a persistently considerable phenomenon. This finding is broadly consistent with the theory of "replacement of safe abortion with unsafe abortion" observed in many countries with restrictive laws²⁶; although definitive proof of this causal relationship requires more robust data. Furthermore, the estimated annual rate of non-medically indicated abortion (6.33 to 10.75 per 1,000 women), which has been classified as a "common procedure" in some studies⁶, highlights the need for a realistic, evidence-informed approach to this phenomenon. In contrast, the high rate of medically indicated abortion (70.54 to 116.9 per 1,000 pregnancies), with fetal anomalies as the main reason¹², indicates that the health system faces a significant number of high-risk pregnancies. The implausibly high rate of therapeutic abortion obtained from the network scale-up method further underlines the need for caution when interpreting indirect estimates for legally sensitive outcomes. Additionally, the rejection of 27.29% of therapeutic abortion requests due to exceeding the legal gestational age¹³ poses a serious ethical and clinical challenge.

Clear disparity in reproductive health: focus on vulnerable groups

One of the most striking findings of this review is the deep gap in abortion experience between the general population and certain specific vulnerable groups. The prevalence of induced abortion among female sex workers ranges from 35.3% to 46.5%¹⁴⁻¹⁶, which is approximately three times higher than the estimated rate in the general population, indicating a severe reproductive health disparity in Iran. This evidence confirms that various social vulnerabilities, such as exposure to violence, substance abuse, and social exclusion, significantly increase the risk of unintended pregnancy for these women^{14, 16}. Female sex workers, who often have limited access to effective contraceptive services and adequate post-abortion care, are consequently at heightened risk of entering a persistent cycle of vulnerability and adverse health outcomes. This situation underscores the urgent need to design culturally acceptable and accessible safe abortion services and post-abortion care for female sex workers. Providing reproductive health services in behavioral disease centers may help reduce unintended pregnancies among these at-risk women¹⁵.

The intertwined web of socio-economic and cultural factors

The findings suggest that abortion is often the result of a complex, multifactorial process. Although financial problems are highlighted as the most prominent contributing factor, this factor operates alongside other pressures such as fear of social judgment, work-family conflict, and conflicting religious beliefs^{11, 24}. This finding is consistent with ecological health models that emphasize the interaction of different individual, interpersonal, and social levels¹⁰. According to these models, factors influencing fertility include societal culture, along with environmental, social, economic, political, and religious factors. At the micro level, individual attitudes and perceptions can also influence behavior¹⁰. More in-depth qualitative research within the Iranian sociocultural context could help elucidate

additional dimensions of this multifaceted phenomenon^{8, 24}.

Health consequences and prevention priorities

The reported complications of unsafe abortion, ranging from hemorrhage and visceral injury to adverse outcomes in subsequent pregnancies, are consistent with global evidence regarding the threats that unsafe abortion poses to maternal health and life²⁷. Furthermore, post-abortion depression, affecting more than half of women¹¹, indicates the heavy psychological burden of this experience and underscores the need for counseling and supportive post-abortion services. However, recent evidence suggests that the mental health outcomes of abortion are complex and not uniformly negative; a contemporary review found that when women receive desired abortion care, their mental health and wellbeing are generally no worse than those who carry an unintended pregnancy to term²⁸. Recent studies have shown that access to safe abortion care is important for the mental, physical, and socio-economic health of individuals, and restrictive bans can have negative consequences for both abortion seekers and healthcare providers²⁹. Alongside this, factors associated with spontaneous abortion, such as advanced maternal age, history of infertility, and underlying diseases⁹, emphasize the importance of preconception care and health education to mitigate these risk factors.

Strengths and limitations of the study

This review possesses several notable strengths: it includes a comprehensive search of both domestic and international databases, covers a 15-year period (2010–2025), and presents findings separately by abortion type (spontaneous, induced, and therapeutic) while specifically highlighting data pertaining to vulnerable groups.

However, several important limitations must be taken into account when interpreting these findings:

Under-reporting: Due to the legal and cultural sensitivity surrounding abortion in Iran, studies relying on self-reported data are likely subject to substantial under-reporting.

While indirect estimation methods (such as the RRT and UCT) have attempted to reduce this bias^{6,7}, they cannot entirely eliminate it.

Heterogeneity in definitions: Included studies have used different definitions of abortion (for instance, gestational age cut-offs, distinction between abortion types), making direct comparisons and quantitative synthesis of data difficult.

Limited geographic coverage: Most studies were conducted in specific provinces such as Isfahan, Fars, Tehran, and Kermanshah^{7, 17, 21}. Consequently, generalizing these findings to the entire country, especially to underserved or ethnically diverse regions, requires caution.

Inability to infer causality: Due to the predominantly cross-sectional design of the included research, definitive causal relationships between associated factors (e.g., financial problems or advanced age) and the occurrence of abortion cannot be proven. Any references to "risk factors" within this review should be interpreted as statistical associations rather than proven causal mechanisms.

Inherent error in indirect methods: Although methods such as RRT, UCT, and network scale-up are valuable tools for estimating sensitive social phenomena, they have their own variance and estimation errors, which may lead to wide confidence intervals^{6,7}.

Therefore, the conclusions of this review should be considered as preliminary, hypothesis-generating evidence for policy-making and future research, rather than as conclusive, definitive findings.

Conclusion

In summary, the findings of this review provide an overview of the epidemiology of abortion in Iran and suggest, in part, that restrictive abortion regulations have not eliminated the practice, but have merely turned it into a high-risk and unsafe practice for women. It is a common, multifactorial phenomenon with serious consequences for women's physical and mental health, especially for vulnerable groups. The fact that

Iranian women opt for abortion in response to unwanted pregnancies within a conflicting and high-stress context indicates that current policies and service provisions fail to adequately address their real needs. Therefore, a fundamental revision focusing on preventing unwanted pregnancies through enhancing access to reliable and affordable contraceptive methods, comprehensive sexual health education, and the provision of supportive counseling services for at-risk women seems essential. Any intervention in this field must, through a justice-oriented approach, specifically target vulnerable groups such as female sex workers.

Conflict of Interest

The authors declare no conflicts of interest regarding the study.

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Ethical Considerations

None.

Author's Contribution

Study concept and design: Z.S., A.Z.-A. and M.B.; Drafting of the manuscript: Z.S. and A.Z.-A.; Critical review of the manuscript: M.B.; All authors read and approved the final manuscript.

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