



# Short-Term Physical and Psychological Health Consequences of Induced and Spontaneous Abortion: A Cross-sectional Study

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## Abstract

**Background:** Abortion is an important pregnancy complication with short-term and long-term adverse physical and psychological effects on women.

**Objectives:** The present study aimed to investigate the short-term physical and psychological effects of various types of medical abortion in pregnant women referring to educational and medical centers in Shiraz, Iran.

**Methods:** In this cross-sectional study, among 5176 deliveries by the women referring to Shiraz Educational and Forensic Medicine Centers during a 4-month period, 437 pregnancies ended in abortion and thus were included in this study. A questionnaire was completed for each of the abortions, recording demographic characteristics and midwifery information. As well, the Mississippi Post Traumatic Stress Disorder Scale (M-PTSD) was filled. Data were analyzed by SPSS software using appropriate statistical tests.

**Results:** The most common physical complications of induced and spontaneous abortion were fever (10.3%) and the need for transfusion of blood products (4.6%). Among the patients who received abortion therapy, 73.1% had moderate stress due to psychological complications.

**Conclusions:** Since the most common complications after abortion are fever, the need for blood transfusion, and bleeding, it is recommended to prepare a protocol to standardize post-abortion care. Most women in both induced and spontaneous abortion groups had moderate levels of stress. Due to the lack of attention to the mental health of the women experiencing abortion, it is necessary for these women to receive adequate supportive counseling, in addition to other medical services, after abortion.

**Keywords:** Abortion, Physical, Complication, Termination, Pregnancy, Psychological Women, Medical, Spontaneous, Induced

## 1. Background

It is estimated that 42 million abortions occur every year; 20 million of which are unsafe. The complications of unsafe abortion result in 70,000 maternal deaths and 5 million temporary or permanent maternal disabilities each year. It has also been mentioned that both spontaneous and induced abortion are recorded as spontaneous in medical centers in order to receive post-abortion care (1). Various studies have reported that early vaginal bleeding (a risk factor for miscarriage) has been associated with adverse pregnancy outcomes such as preterm delivery, premature rupture of membranes (PPROM), low birth weight (LBW), intrauterine growth retardation (IUGR), small infants for gestational age (SGA), placental abruption, manual placental abruption, and pregnancy-induced hypertension (PIH) (2-4). Bleeding and infection (endometritis,

infectious abortion) are also common following abortion (5). Some studies have reported that miscarriage is a risk factor for breast cancer (6, 7). Job loss, divorce, instability in emotional relationships, and delayed gestational care have also been reported to commonly occur after abortion (8). Vaginal bleeding is a usual problem in pregnancy and is considered an adverse pregnancy outcome and an ominous complication.

Women's reproductive history determines their health outcomes. The women experiencing pregnancy complications and recurrent miscarriages are more prone to bleeding and infection, which are the leading causes of maternal mortality, as well as other adverse outcomes (9). Regarding the psychological effects of abortion, the number and types of distress response symptoms are grouped into four classes: Psychological, emotional, physical, and

cognitive/behavioral (10). For some women, abortion can be a traumatic event (10) with long-term psychological effects (11, 12). Pregnancy itself is a period during which women are exposed to high levels of emotional distress, but miscarriage is a traumatic experience. A longitudinal study reported the incidence of a significant proportion of psychological complications shortly after abortion. Most women experience grief, depression, or both after a miscarriage. Some women also experience anxiety, anger, posttraumatic stress disorder (PTSD), and feeling of guilt about having children in future (13). High levels of anxiety, depression, and sadness in some women may persist for a long time after physical recovery. The signs and symptoms of anxiety and depression, which occur after an abortion, may also be extended to subsequent pregnancies (13). Instead of perceiving pregnancy as a happy event, the women bearing a history of abortion often experience the subsequent pregnancy as a time of alertness and excessive and constant caution (14). Hamama et al. showed that spontaneous or selective abortion increased the risk of PTSD in subsequent pregnancies (15).

A cohort study on 1,457 women in Sweden showed the development of psychological complications after abortion among 742 women who were followed up for three months and 641 women screened for six months. The prevalence of PTSD before and after abortion was 4.3% and 23.5%, respectively, which was accompanied by high levels of anxiety, depression, and dropout (16). Evidence shows that within one month after abortion, 10% of women may develop ASD diagnostic criteria, and 1% may reveal PTSD symptoms (10). The patterns and trends of access to abortion therapy and perpetrating an abortion in Iran (where abortion is illegal) have changed in recent years. This is important as performing abortion therapy in a hospital is associated with fewer complications for the mother, leading to the application of abortion therapy more safely and effectively in healthcare settings. Since having a successful pregnancy is the dream of every family, the quality of life of each family member will be severely affected if it is not achieved (17, 18). In addition, abortion is a pregnancy complication associated with the occurrence and exacerbation of women's mental disorders (19). In particular, being pregnant with a malformed fetus is a challenge that makes it difficult for the family, the community, and the physician to make decisions (5). Therefore, the importance of having psychological support for the women experiencing abortion due to abnormal fetuses or mothers with high-risk pregnancies has been emphasized by researchers (20, 21). Due to the presence of a few studies in this field, short-term physical and psychological complications during maternal hospitalization need to be studied.

## 2. Objectives

The present study aimed to investigate the short-term physical and psychological complications of the women undergoing medical abortion at the educational and medical centers of Shiraz. Our results could help medical staff and health policymakers in improving post-abortion care.

## 3. Methods

This was a cross-sectional epidemiological study conducted in 2018. The study population included all the women whose pregnancies were aborted in the hospitals affiliated with Shiraz University of Medical Sciences, Shiraz city, Iran. According to the following formula and considering a 95% confidence interval, as well as a sample loss of 10%, 5176 people were enrolled.

$$N = \frac{Z_{1-\frac{\alpha}{2}}^2 \times P(1-P)}{d^2}$$

$$\alpha = 0.05; P = 0.08; d = 0.1 \times P$$

During four months, all the women who were hospitalized for abortion and those who referred to forensic medicine departments to receive written permission for abortion were included in the study, of whom 437 women accomplished abortion.

Finally, to evaluate physical and psychological complications based on the monthly rate of abortion in each hospital and considering a previous study (22), 104 people were included in this study.

$$n = \left[ \left( \frac{Z_{1-\frac{\alpha}{2}} + Z_{1-\beta}}{C} \right)^2 \right] + 3$$

$$r = 0.64; \alpha = 0.01; \beta = 0.05; Z_{1-\beta} = 1.65$$

### 3.1. Data Collection Tools

#### 3.1.1. Demographic Information Questionnaire

This tool contained 60 researcher-made items categorized into three sections: (1) personal characteristics, (2) midwifery information, and (3) abortion symptoms and complications.

This questionnaire was used to collect demographic information (including age, education, occupation, per capita income, place of residence, and pre-pregnancy BMI), midwifery information (including information about the current pregnancy such as gestational age, pregnancy complications and problems, pelvic exam results, and vital signs), and finally abortion information (including the cause of abortion, gestational age at the time of abortion, number of abortions, primary or secondary abortion, type

of abortion, i.e., spontaneous, obstetric indication, or referral by a forensic doctor in the case of induced abortion). The content validity method was used to determine the scientific validity of the questionnaire. For this purpose, after studying valid scientific books and articles and fully recognizing confounding variables, the questionnaire form was prepared and then approved by several faculty members.

### 3.1.2. Mississippi Post Traumatic Stress Disorder Scale (M-PTSD)

This tool included 35 items scored based on a 5-point Likert scale from 1 to 5 (23) to assess women's mental health after abortion. The total score ranged from 35 to 175, and a score of 107 or higher indicated severe PTSD. The scores of 35 - 70 indicated mild stress; the scores of 70 - 107 indicated moderate stress, and the scores of 107 - 175 indicated severe stress.

The Cronbach's alpha coefficient of M-PTSD was reported from 0.86 to 0.94 (24). Sajjad Basharpour reported a Cronbach's alpha coefficient of 0.79 for M-PTSD in Iran (25). M-PTSD has a high validity and a well correlation with other PTSD measurement tools (26). M-PTSD was validated in Iran by Goodarzi (2002) with a Cronbach's alpha coefficient of 0.92 (27).

Inclusion criteria were being in the age range of 10-49 years, experiencing either spontaneous or induced abortion, having no history of taking psychological treatments including medications and psychotherapy, having enough literacy to fill the questionnaires, and having Iranian citizenship. Exclusion criteria were the occurrence of a crisis or stressful event for the patient and the unwillingness to continue cooperation. As mentioned, all types of abortion (unavoidable, complete, missed, incomplete, and induced abortion) were included in this study.

After reviewing the inclusion and exclusion criteria and explaining study objectives to participants, the researcher asked them to complete the questionnaires. The subjects were ensured that their information would remain confidential. Data were analyzed by SPSS 21 statistical software using descriptive statistics.

## 4. Results

The mean age of the women was  $30 \pm 5$  years (15 - 45), and the mean age of their husbands was  $33 \pm 6$  years (22 - 58). Among the women, 75% (330 people) were housewives, and the rest were either self-employed or state-employed. Among their husbands, 66% (292 people) were self-employed, 2% were unemployed, and the rest were state-employed. Most of the women and their husbands had a high school diploma; 27% of the women and 12.1% of their husbands had lower than high school diploma education, and the rest in both groups had academic degrees.

Regarding short-term physical complications after abortion, 9.33% of mothers with induced abortion and 13.3% of mothers with spontaneous abortion had fever. The need for transfusion of blood products and bleeding were the second most common symptoms in induced (5.42%) and spontaneous (6.7%) abortion groups, respectively. Overall, the most common symptom in all women was fever (10.3%) (Table 1). In 33 patients with spontaneous abortion, 21.2, 72.7, and 6.1% had mild, moderate, and severe stress, respectively. In 71 patients with induced abortion, 18.3, 73.23, and 8.45% had mild, moderate, and severe stress, respectively (Table 2).

## 5. Discussion

According to our results, the most common symptom in all women experiencing abortion was fever (10.3%), and the second most common complication was the need for being transfused with blood and blood products. In Nepal, a study was performed on 300,000 abortions, demonstrating that 8 out of every 1000 women had abortion complications (28). A study in Ivory Coast showed that the most common complications of abortion were infections (81.8%) and bleeding (68.2%) (29). Shekarchi reported spotting (65.4%) and severe bleeding (54.7%) as the most common symptoms (30), while bleeding was the most common symptom in studies by Saharkhiz (37%) (31) and Fouad (38.4%) (32). It is noteworthy that Saharkhiz studied the women using infertility therapeutic methods, and Fouad studied infection-induced abortion. Fever can be due to both infections and consuming misoprostol for abortion. The high percentage of infections and bleeding in the above-mentioned studies could be due to unsanitary abortions outside the hospital. In the present study, however, all abortions were performed in a hospital. Usually, a pregnant woman knows that she should report vaginal bleeding immediately to receive prompt treatment. Although vaginal bleeding is a common complication of pregnancy (33) and occurs in about 20 - 25% of women early in pregnancy, other causes of bleeding should also be considered, including intrauterine fetal implantation, abortion, ectopic pregnancy, hydatidiform mole, cervical changes, infections, local lesions such as polyps, and bleeding due to embryonic factors and fibroids (34-37). The results of a study on infection-induced abortion showed that uterine perforation with or without intestinal damage (13%), septicemia (61%), peritonitis (15%), and disseminated intravascular coagulation (DIC) (2%) occurred in these women (38). A study on unsafe abortion in Pakistan showed that the most common complication was uterine perforation and gastrointestinal damage (54%), followed by bleeding (26%) and death (12%)

**Table 1.** Comparison of Post-abortion Complications Between Induced and Spontaneous Abortion Groups

Maternal Physical Symptoms	Induced Abortion, No. (%)	Spontaneous Abortion, No. (%)	Total, No. (%)
<b>Uncomplicated</b>	236 (71.8)	73 (69.5)	309 (70.7)
<b>Bleeding</b>	10 (3.01)	7 (6.7)	17 (3.9)
<b>Fever</b>	31 (9.33)	14 (13.3)	45 (10.3)
<b>Remaining residues and need to D&amp;C</b>	14 (4.21)	3 (2.9)	17 (3.9)
<b>Hypertension</b>	3 (0.9)	0 (0)	3 (0.7)
<b>Tubectomy</b>	1 (0.3)	0 (0)	1 (0.2)
<b>Bleeding and remaining residues</b>	3 (0.9)	0 (0)	3 (0.7)
<b>Anemia</b>	3 (0.9)	1 (1)	4 (0.9)
<b>Asthma</b>	3 (0.9)	0 (0)	3 (0.7)
<b>Edema</b>	1 (0.3)	1 (1)	2 (0.5)
<b>Transfused with blood and blood products</b>	18 (5.42)	2 (1.9)	20 (4.6)
<b>Placenta Accreta</b>	4 (1.2)	4 (3.8)	8 (1.8)
<b>Hypotension</b>	1 (0.3)	0 (0)	1 (0.2)
<b>Tachycardia, chest pain</b>	4 (1.2)	0 (0)	4 (0.9)
<b>Total</b>	332 (100)	105 (100)	437 (100)

**Table 2.** Distribution of Stress in the Induced and Spontaneous Abortion Groups Immediately After Abortion

Posttraumatic Stress Score	Induced Abortions	Spontaneous Abortions	Total
<b>Low (35 - 70)</b>	13 (18.3)	7 (21.2)	20 (19.2)
<b>Medium (70 - 107)</b>	52 (73.23)	24 (72.7)	76 (73.1)
<b>High (107 - 175)</b>	6 (8.45)	2 (6.1)	8 (7.7)
<b>Total</b>	71 (100)	33 (100)	104 (100)

(39). A study in Ardabil, Iran, showed that vaginal bleeding (5.70%) and infections (4.7%) were common events following induced abortion (40). This indicates that bleeding and infections are among the most common complications in studies on deliberate abortions and the manipulated abortions performed in unsafe environments. In another study, the most common complications of abortion were fever and lower abdomen pain (41). Also, fever was the most common complication in the present study as well, which may be explained by consuming misoprostol, the most common drug used for abortion, by a considerable proportion of women in these two studies. Fever, as a side effect of misoprostol caused by the effect of the drug on prostaglandins, can be easily managed by taking painkillers and antipyretics (42).

The present study showed a 73.1% prevalence of PTSD in both induced and spontaneous abortion groups. Since there were no studies on the frequency of psychological stress caused by abortion in Iran and other countries, the results of the present study were compared with studies related to the prevalence of psychological stress in high-risk

pregnancies. In a review study by Abdollahpour (2019), the overall prevalence of traumatic delivery was 51.3% (out of 800 cases), while the overall prevalence of PTSD was 29.1% out of 2687 samples (43). In a systematic review and meta-analysis by Yildiz (2017), 59 studies were reviewed, and the prevalence of PTSD was reported 4% in the total population and 18.5% in high-risk pregnancies. Most of the reviewed articles had examined patients 6-8 weeks postpartum. The prevalence of PTSD in the general population of Iran was reported to be 77.5% (44). Abdollahpour (45) and Modarres (46) reported the total prevalence of traumatic labor in Iran as 48.3 and 54.4%, respectively. Similar to the present study, both of the above studies had used DSM-IV-A to determine traumatic deliveries, which is an appropriate diagnostic tool for primary trauma (47). The present study did not investigate the prevalence of stress; however, some mothers had mild stress while the majority had moderate stress. This is important as chronic stress during pregnancy can lead to anxiety and PTSD.

The results of a review study by Reardon showed that abortion was always associated with an increase in the inci-

dence of mental disorders, as compared with women without any record of abortion. Indeed, abortion has been directly related to mental health problems. One of the identified risk factors is a previous history of mental illnesses, exaggerating the risk of such problems in the women experiencing abortion. Nevertheless, it is difficult to determine that to what extent such mental illnesses are caused by abortion or if they can be reliably attributed to abortion (19). About one-fourth of all pregnancies end in one type of pregnancy loss during the prenatal period (14). Generally, abortion can be highly stressful for mothers, fathers, families, doctors, and others working in the social protection system (10). Hence, the need for familial support in the pregnancies leading to abortion should be considered by health care officials. There is a need for more studies in this field and on women at different ages, and the results should be made available to the medical community (in particular midwifery experts), as well as the women and mothers who intend to become pregnant. It is of particular importance for medical teams to become acquainted with psychiatry concepts and jurisprudential and religious laws of abortion and identify risk factors for psychological stress so that they can consult women to adapt after abortion and psychologically help them in subsequent pregnancies (48, 49). In addition, screening women before pregnancy and after delivery is recommended to identify those who have experienced a traumatic delivery. It is also recommended to use structured clinical interviews in future studies to evaluate the effectiveness of midwife-assisted brief counseling interventions on post-abortion women's mental health. Therefore, according to the results of this study, due to the high number of abortions in the society and its subsequent psychological damage, it is necessary for the women undergoing abortion to seek psychological counseling and support.

### 5.1. Conclusions

The most common post-abortion complications were fever, transfusion of blood and blood products, and bleeding. Overall, it is recommended to develop a protocol to standardize post-abortion care. Most of the participants in both induced and spontaneous abortion groups had moderate levels of stress. Considering the lack of Persian language articles on the psychological trauma caused by abortion and the lack of attention to the mental health of the women who experience abortion, it is necessary for these individuals to benefit from counseling support, along with other medical services, after abortion. Providing basic educational content in mental health to all those who work in the field of women's health is of special importance and should be considered.

### Footnotes

**Authors' Contribution:** MA and NT prepared the first draft of the manuscript, and MA and MZ made critical revisions to the paper and responded to reviewers. SA helped in searching the literature and conducting clinical research.

**Conflict of Interests:** The authors declare no conflict of interest.

**Ethical Approval:** The study was approved by the Ethics Committee of Shiraz University of Medical Sciences (ethical code: IR.SUMS.REC.1396.S673).

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