

The Severity of Post-abortion Stress in Spontaneous, Induced and Forensic Medical Center Permitted Abortion in Shiraz, Iran, in 2018

Abstract

Background: Abortion and loss of pregnancy in the first trimester may affect maternal mortality and morbidity. This study aimed to determine the severity of post-abortion stress in spontaneous abortion, induced abortion, and Forensic Medical Center (FMC) referral abortions immediately after abortion and after 1 month of follow-up in Shiraz, Iran, in 2018. **Materials and Methods:** This cross-sectional study was conducted on 104 mothers selected through convenience sampling method in 2018. The data collection tools included a demographic characteristics questionnaire and the Mississippi Post-Traumatic Stress Disorder (M-PTSD) Scale that were filled out by mothers immediately and 1 month after the abortion. Data were analyzed using one-way ANOVA and post-hoc LSD test in SPSS software. Moreover, $p < 0.05$ was considered as statistically significant. **Results:** The mean (SD) of post-traumatic stress scores was 83.87 (18.35) and 77.40 (9.88) in spontaneous abortion, 82.28 (13.27) and 75.71 (14.73) in FMC permitted abortions, and 86.66 (10.10) and 74.98 (12.99) in induced abortions immediately and 1 month after abortion, respectively. Stress was reduced in the three groups of mothers, after one month of severe value. The score for frequency of stress was 3.10% in FMC-permitted abortions and 5.10% in induced abortions; moreover, no stress was observed in the spontaneous abortion cases. **Conclusions:** Stress was gradually reduced over time. The level of PTSD was lower after 1 month in women who had experienced spontaneous abortion. Given that 1 month after abortion, women are still often moderately stressed, follow-up care, and appropriate counseling for these women are necessary.

Keywords: Abortion, forensic, post-traumatic, spontaneous, stress

Introduction

Abortion is defined as the termination of pregnancy before sufficient development of the embryo to continue its life, whether spontaneous or intentional. The American College of Obstetricians and Gynecologists (ACOG) has reported that the most common type of pregnancy loss is spontaneous abortion or miscarriage. It is estimated that 26% of all pregnancies have ended in abortion and up to 10% have clinical symptoms. Additionally, 80% of early pregnancy loss occurs in the first trimester and before the 13th week, and the risk of abortion is reduced after 12 weeks of gestation.^[1] A study carried out in 2011 in Iran reported 11500 cases of abortions per year among married women. The pooling survey carried out 1 year before the start of this study estimated the total rate as 0.16 abortions per woman. The annual abortion rate is reported as 5.5 cases per 1,000 women.

In general, the abortion rate has increased to its highest amount, namely 11.7 cases among women aged 30–34 years.^[2] Moreover, in a study conducted in Ardabil, the prevalence of induced abortion among 1200 pregnant women was estimated as 8.3%.^[3] In another study on 1247 women in rural areas of Fars Province, Iran, 22% had experienced at least 1 abortion.^[4] The Legal Medicine Organization of Iran reported 1664 cases of abortions from 2007 to 2013 of which 339 were due to maternal causes and 1325 were cases of intentional fetal abortion.^[5,6]

Because fertility holds a very high value in most cultures, the desire to have a child is one of the most important aspirations of individuals. Pregnancy and maternity are evolutionary bases of the woman's life, and the concept is strongly emphasized in the Iranian culture. Failed attempts for fertility and childbearing can turn into a destructive emotional experience that threatens the

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mental health of the mother.^[7,8] Spontaneous abortion is one of the most important complications of pregnancy, with both long-term and short-term negative psychological effects on women.^[7,9,10] Pregnancy is associated with a high level of emotional stress, and spontaneous abortion and stillbirth is a traumatic event both physically and psychologically and is accompanied by Post-Traumatic Stress Symptoms (PTSS).^[11,12]

The majority of women experienced sorrow and distress or both after the abortion.^[13] These events have harmful effects on the relationship of the couples.^[9] Lundell *et al.* reported the prevalence of Post-Traumatic Stress Disorder (PTSD) in induced abortions as 3.4%, 2%, and 0.9%, respectively, before, 3 months after, and 6 months after the abortion.^[10] In addition, they reported the implication rates of PTSS as 23.5%, 6.6%, and 1.6%, respectively.^[10]

Abortions permitted by the Forensic Medical Center (FMC) are considered as negative events of pregnancy that affect the individual and social aspects of the individual's life, leading to a reduction in Quality of Life (QOL) and incidence of depression and anxiety.^[14] It should be noted that FMC abortions are performed in Iran based on the evidence that the pregnancy could endanger the mother's life or the embryo has a genetic defect that leads to disturbance and discomfort for the mother. This permission is granted before the 4th month (20 weeks; before the transmigration of the soul to the fetus).^[5,15] There are few studies on whether elective and/or spontaneous abortions are harmful to mental health and cause issues such as depression, anxiety, and suicidal behaviors.^[16] Hamama *et al.* highlighted the importance of identifying the form of elective and/or spontaneous abortion. Health care providers should assess the medical history of mothers and plan to reduce their distress and triggers. This will result in the pregnant woman's well-being, prevention of PTSD and depression, and positive perinatal outcomes.^[8] Moreover, in some cases, the mother decides to have an abortion without having any feelings of impenitence and discomfort or serious emotional changes after the action.^[17] A longitudinal, cohort study was conducted by Biggs *et al.* to assess the risk of PTSD and the symptoms of PTSS more than 4 years after abortion.^[18] The results showed that "women who underwent abortion were at no higher risk of PTSD than those who denied an abortion".^[18] Abortion is prevalent in the reproductive ages, but there are controversial opinions about the occurrence of post-abortion stress.^[16] Therefore, due to the fact that psychological changes are influenced by the socio-religious status of societies, and also given that few comparative (spontaneous vs. induced) researches have been carried out on these criteria, this study was conducted with the aim to determine the severity of post-abortion stresses in spontaneous, induced, and FMC referral abortions, immediately after abortion and after 1 month of follow-up.

Materials and Methods

This cross-sectional and analytical study was conducted in the selected hospitals affiliated with Shiraz University of Medical Sciences, Iran, namely, Hazrat Zeinab and Shahid Faghihi hospitals, in 2018. The reason for the selection of the above-mentioned hospitals is their affiliation to Shiraz University of Medical Sciences; moreover, for abortion in university hospital, there should definitely be scientific indications. The sample size was primarily calculated as 74 individuals based on the estimation of the correlation coefficient obtained from the study conducted by Cowchock *et al.*^[19]; it was then changed to 82 people, considering the probability of a 10% dropout and $r = 0.64$, $\alpha = 0.01$, $\beta = 0.05$, and $Z_{1-\beta} = 1.65$. However, the researcher surveyed 104 mothers due to the frequency of the subjects (32 cases with a FMC letter, 39 with obstetric indications, and 33 with a spontaneous abortion). Convenience sampling method was used and approximately equal numbers of subjects were selected from each hospital. All the mothers were cooperative until the end of the survey, and we did not lose any participants.

The inclusion criteria were the ability to answer the questions in the questionnaires, experience of a single type of abortion, and lack of chronic diseases. In the case of induced abortions and referral from FMC for abortion in a hospital, a written letter of permission for abortion before 4 months (20 weeks) and two ultrasounds from two different radiologists were necessary. There are several cases of induced abortions when a mother refers to the hospital directly: spontaneous abortion with bleeding, pain, etc., an obstetric indication, such as hypertension in the mother, car accident, or bleeding with no specific reason, or as complications of an illegal intervention (e.g., in unwanted pregnancies). There was no information in the files on whether the mother had had bleeding with no cause or had deliberately terminated the pregnancy.

The exclusion criteria included the participant's willingness to withdraw from the study and the occurrence of any incident that could make the mother depressed, such as financial crisis or bereavement. The instruments used to collect the data included a demographic information questionnaire and the Mississippi PTSD Scale (M-PTSD). The demographic questionnaire consists of 2 parts and 17 questions (personal characteristics, midwifery information, and pelvic examination results). After the approval of the research team, the final version of the questionnaire was also confirmed by some of the faculty members of the midwifery group.

The M-PTSD is a self-report scale developed by Keane *et al.* in 1988 to assess the severity of PTSD symptoms. This scale consists of 35 questions, and a total score of 107 or higher in this scale indicates the occurrence of PTSD.^[20,21] The M-PTSD was validated by Goodarzi in Iran (2002) with a Cronbach's alpha coefficient of 0.92. A score of

35-70, 70-107, and higher than 107, respectively, represents low severity of symptoms, moderate severity of symptoms, and severe PTSD symptoms.^[22] This validation process was utilized as a basis for the present study. The researcher first arranged a set of training courses for women who had experienced abortions in order to teach them how to fill the questionnaires, explain the purpose of this study to them, and assure them that all their private information would remain confidential. Then, the examinees provided consent forms for participation in the study. By collecting written consent forms and demographic information, M-PTSD was used to measure the stress levels in the cases of abortion. The questionnaires were completed twice, immediately after the abortion, and after 1 month of follow-up via telephone contact. Then, 4 weeks after the abortion, based on the previous coordination, the mothers referred to the hospital to be assessed in terms of post-abortion symptoms and a pathology reports. Data were analyzed using SPSS software (version 21, IBM Corporation, Armonk, NY, USA). After the collection of data, the researcher applied one-way ANOVA and post-hoc LSD in order to compare the stress levels in the three related groups, and T-squared test was used to compare the stress levels in each group. $p < 0.05$ was considered as statistically significant.

Ethical considerations

This research project was approved by the Ethics Committee of Shiraz University of Medical Sciences with the code number IR.SUMS.REC.1396.S673. In addition, written informed consents were obtained from all the participants. This study was financially supported by Shiraz University of Medical Sciences. The mothers could withdraw from the study at any stage. Moreover, the women's information remained confidential. The mothers did not have to write their names when completing the questionnaires. The research results have been submitted to the University Vice-Chancellor for Research and will be made available to hospital administrators upon request.

Results

The demographic characteristics of the participants and the results of their comparison among the three abortion groups are presented in Table 1. Furthermore, the comparison of fertility characteristics among the 3 different types of abortions showed that there was no significant relationship between the number of unwanted pregnancies ($p = 0.538$), parity of women ($p = 0.110$), previous alive births ($p = 0.511$), and abortions in previous pregnancies ($p = 0.349$) [Table 1]. One-way ANOVA results between the mean age ($p = 0.308$) and Body Mass Index (BMI) ($p = 0.437$) and Fisher's exact test results between education ($p = 0.951$) and occupation ($p = 0.648$) did not show a significant difference in the PTSS level score [Table 2]. Therefore, the correlation between stress level and kind of pregnancy showed was significant ($\chi^2 = 20.02$; $df = 2$; $p = 0.028$). In addition, the highest frequency

of stress in mothers with abortion in all three groups was in average, and the relationship between the two variables was significant ($\chi^2 = 24.10$, $df = 6$, $p = 0.002$) [Table 2]. Immediately after the abortion, PTSS was observed in 78.10%, 72.70%, and 69.20% of mothers with permission from the FMC, spontaneous abortion, and obstetric indications, respectively [Table 3].

One-way ANOVA results showed that there was no statistically significant difference in the level of stress immediately and after the abortion ($p = 0.511$). It was also found that the level of stress 1 month after the abortion was the same in these three groups, and there was no significant difference among them ($p = 0.757$). Moreover, the rate of variations between these three groups, was not significant ($p = 0.239$). However, it seems that this difference was higher in the induced group compared to the FMC referrals [$r = 11.68$ (12.14)]. However, an intra-group analysis with a paired *t*-test showed that there was a significant difference between the prevalence of PTSD immediately after abortion and after 1 month of follow-up in the three groups of spontaneous abortion ($t_{20} = 3.34$, $p = 0.002$), induced abortions with obstetric indication ($t_{29} = 6.01$, $p < 0.001$), and FMC referrals ($t_{28} = 3.53$, $p < 0.001$) [Table 4].

Discussion

The present study showed that PTSS was at a median level in all three types of abortion. Since studies on the frequency of PTSD due to abortion in Iran and other countries were not found, in the present study we compared the prevalence of PTSD with that of high-risk pregnancies (stillbirth, maternal disease, etc.). In one study in Iran, it was shown that about 54.4% of the subjects experienced labor as an accidental traumatic event, and one third of them (37.7%) suffered from PTSD.^[23] In another study in Iran, 39% suffered from PTSD (2). The prevalence of PTSD due to abortion in other countries was much lower than that in Iran (below 10%).^[24-27] The present study did not address the prevalence of stress, but all mothers with abortion had some degree of post-traumatic stress and the majority of them had a moderate level of stress because severe maternal stress during pregnancy causes anxiety and PTSD.^[28] Factors associated with PTSD are numerous in childbearing ages, including neonatal abnormalities, admission in the Neonatal Intensive Care Unit (NICU), unwanted pregnancy, maternal emotional distress, and maternal personality.^[29,30] Health care providers should be familiar with the risk factors of PTSD and should carefully evaluate women in pregnancy and postpartum visits. In the Iranian society, support is very high in the first few weeks after childbirth, but with the passage of time from childbirth or abortion, the support is gradually decreasing. The need for family participation in pregnancies leading to abortions should be considered by health care authorities.

Table 1: Demographic characteristics of the research community

Variable	Mean (SD)			Statistical test	df	p
	Induced abortions (FMC permission)	Induced abortions	Spontaneous abortions			
Age (year)	32.22 (6.65)	30.41 (6.21)	29.30 (5.25)	$F=1.25$	2	0.15*
BMI (kg/m ²)	25.71 (4.69)	25.15 (3.94)	27.30 (5.64)	$F=1.20$	2	0.16*
Education	N (%)	N (%)	N (%)	$\chi^2=1.46$	3	0.85**
Primary school	12 (37.50)	15 (38.50)	9 (27.25)			
Secondary school	12 (37.50)	16 (41)	15 (45.50)			
University	8 (25.00)	8 (20.50)	9 (27.25)			
Total	32 (100)	39 (100)	33 (100)			
Occupation				$\chi^2=0.97$	2	0.72**
Housewife	30 (93.70)	34 (87.20)	29 (87.90)			
Employed	2 (6.30)	5 (12.80)	4 (12.10)			
Total	32 (100)	39 (100)	33 (100)			
Kind of pregnancy				$\chi^2=1.24$	4	0.54**
Unwanted pregnancy	28 (87.50)	32 (82.10)	30 (90.90)			
Wanted pregnancy	4 (12.50)	7 (17.90)	3 (9.10)			
Total	32 (100)	39 (100)	33 (100)			
Number of pregnancies				$\chi^2=15.66$	3	0.11**
1	7 (21.87)	6 (15.40)	9 (27.30)			
2	8 (25.00)	14 (35.90)	9 (27.30)			
3	12 (37.50)	8 (20.50)	6 (18.10)			
4 ≥	5 (15.63)	11 (28.20)	9 (27.30)			
Total	32 (100)	39 (100)	33 (100)			
Previous alive births	N (%)	N (%)	N (%)	$\chi^2=7.24$	2	0.51**
0	10 (31.20)	10 (25.65)	14 (42.40)			
1	8 (25.00)	14 (35.89)	9 (27.30)			
2	11 (34.40)	10 (25.65)	8 (24.20)			
3 ≥	3 (9.40)	5 (12.81)	2 (6.10)			
Total	32 (100)	39 (100)	33 (100)			
Previous abortion	N (%)	N (%)	N (%)	$\chi^2=11.11$	2	0.42**
1	24 (75.00)	27 (69.20)	21 (63.64)			
2	7 (21.90)	11 (28.20)	8 (24.24)			
3 ≥	1 (3.10)	1 (2.60)	4 (12.12)			
Total	32 (100)	39 (100)	33 (100)			

BMI: Body Mass Index. *One-way ANOVA; **Fisher's exact test; FMC: Forensic Medical Center

The results of this study showed that the intra-group variation in stress scores was significant in all three types of abortion after 1 month of follow-up. The psychological impacts were gradually reduced by the passage of time. In a study carried out by Wallin Lundell *et al.* in 2013, the prevalence of PTSD was 7.2%, 2.9%, and 3.2%, immediately after abortion, 3 months after abortion, and 6 months after abortion, respectively.^[30] Therefore, very few cases of PTSD were observed after abortion.^[31] The discrepancies with the present research were that this study was only conducted on induced abortions, assessed the mothers' psychological disorders through the distribution of a questionnaire, and had a larger sample size.^[32] Pregnancy and maternity, as periods with incredible excitement, affect mothers' mental health. If there is a problem that results in the loss of pregnancy, maternal mental illness, and negative reactions occur. The severity of this reaction was greater in our study. However, it seems that the intensity of stress has been

reduced in advanced countries, where relatively healthy deliveries occur. There may also be a cultural difference in the response of Iranian women to childbirth compared to women in Western countries. Furthermore, post-abortion stresses were slightly reduced with the passage of time in these two studies; this is in line with the results of the present study. This might be because ordinary experiences that threaten individuals' lives lead to the remembrance of previous incidents; therefore, unpleasant memories of abortion require a longer period to be forgotten.^[28,33] Moreover, individuals respond to this asperity with fear and prostration, by constantly visualizing of the incident in their minds, and want to avoid the reminiscence.^[34] In this study, the average severity of stress in spontaneous abortion was less than the two other types of induced abortion. Moreover, severe stress was not observed in cases of spontaneous abortion. The average rates of PTSD were estimated as 3.10% and 5.10% in FMC referrals and other causes of induced abortions, respectively. It seems

Table 2: Relationship between demographic indicators and maternal stress levels

Variable	Level of PTSD Variables	Mean (SD)				Statistical test	df	p
		Low (<70)	Moderate (70-107)	More than 107	Total			
Age (year)		31.90 (5.43)	30.07 (9.29)	32.63 (5.47)	30.62 (6.09)	F=1.62	2	0.31*
BMI (kg/m ²)		26.21 (4.63)	25.74 (4.89)	28.02 (4.48)	26.01 (4.80)	F=1.51	2	0.45*
Education		N (%)	N (%)	N (%)	N (%)			0.95**
	Primary school	6 (30.00)	27 (35.50)	3 (37.50)	36 (34.60)	$\chi^2=5.65$	4	
	Secondary school	9 (45.00)	30 (39.50)	4 (50.00)	43 (41.30)			
	University	5 (25.00)	19 (25.00)	1 (12.50)	25 (24.10)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			
Occupation	Housewife	17 (85.00)	68 (89.50)	8 (100)	93 (89.40)	$\chi^2=3.38$	2	0.34**
	Employed	3 (15.00)	8 (10.50)	0 (0)	11 (10.60)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			
Kind of pregnancy	Unwanted	20 (100)	65 (85.50)	5 (62.50)	90 (86.50)	$\chi^2=20.02$	2	0.028**
	Wanted	0 (0)	11 (14.50)	3 (37.50)	14 (13.50)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			
Number of pregnancies	1	2 (10.00)	19 (25.00)	1 (12.50)	22 (21.15)	$\chi^2=6.84$	4	0.15**
	2	11 (55)	19 (25)	1 (12.50)	31 (29.80)			
	3	5 (25.00)	18 (23.70)	3 (37.50)	26 (25.00)			
	4 ≥	2 (10.00)	20 (26.30)	3 (37.50)	25 (24.05)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			
Previous alive births	0	3 (15.00)	30 (39.50)	1 (12.50)	34 (32.70)	$\chi^2=24.10$	6	0.002**
	1	11 (55.00)	18 (23.70)	2 (25)	31 (29.80)			
	2	5 (25.00)	20 (26.30)	4 (50.00)	29 (27.90)			
	3 ≥	1 (5.00)	8 (10.50)	1 (12.50)	10 (9.60)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			
Previous abortion	1	27 (85)	50 (65.78)	5 (62.50)	72 (69.23)	$\chi^2=14.10$	4	0.86**
	2	3 (15.00)	21 (27.65)	2 (25.00)	26 (25.00)			
	3 ≥	0 (0)	5 (6.57)	1 (12.50)	6 (5.77)			
	Total	20 (100)	76 (100)	8 (100)	104 (100)			

BMI: Body mass index, *One-way ANOVA; **Fisher's exact test

Table 3: Comparison of stress intensity in spontaneous, induced, and forensic medical center permitted abortions immediately and one month after abortion

PTSD*score	Time	N (%)			
		Induced abortions (FMC permitted)	Induced abortions	Spontaneous abortions	Total
Low (35-70)	Immediately	6 (18.75)	7 (17.90)	7 (21.20)	20 (19.20)
	1 month after	11 (34.40)	12 (30.80)	11 (33.30)	34 (34.69)
Medium (70-107)	Immediately	25 (78.12)	27 (69.30)	24 (72.70)	76 (73.10)
	1 month after	20 (62.50)	25 (64.10)	22 (66.70)	67 (64.43)
High (107-175)	Immediately	1 (3.13)	5 (12.80)	2 (6.10)	8 (7.70)
	1 month after	1 (3.10)	2 (5.10)	0 (0)	3 (2.88)
Total		32 (100)	39 (100)	33 (100)	104 (100)

*PTSD: Post-traumatic stress disorder

that in FMC referrals-induced abortion, where an embryo and maternity medical indication is observed in the form of diseases and abnormalities of the fetus or risky pregnancies, higher psychological stresses, and accordingly more severe complications, are observed. Henceforth, in mothers deprived of bearing a healthy baby as a result of spontaneous abortion, minor psychological stresses are observed since the situation is not risky.

In one study, it was revealed that women with induced abortions were younger, penurious, and possibly not

very religious, had lower marriage age, and faced more family coercion for abortion compared with women with spontaneous abortion. The pressure by spouse's family might be the main factor for the increase in post-abortion stresses.^[35] The results of the review study by Bellieni and Buonocore showed that the loss of the fetus, as compared to childbirth, would put women at greater risk of mental illness, induce spontaneous abortion, and increase the risk factors for mental disorders.^[36] The results of this study are somewhat similar to those of our study.^[36] Other causes that can be

Table 4: Comparison of stress intensity in spontaneous, induced, and forensic medical center permitted abortion immediately and 1 month after abortion

PTS*score	Mean (SD)			df	t-test	p
	Immediately after abortion	1 month after abortion	Variation			
Induced abortion (FMC permitted)	82.28 (13.27)	75.71 (14.73)	6.57 (10.54)	28	3.53	<0.001
Induced abortions	86.66 (16.32)	74.98 (12.99)	11.68 (12.14)	29	6.01	<0.0001
Spontaneous abortions	83.87 (18.35)	73.42 (9.72)	10.44 (17.96)	20	3.34	0.002
Index	0.676	0.279	1.870			
p	0.511	0.757	0.239			

*PTSD: Post-traumatic stress disorder

attributed to explain the diversity of post-abortion stresses in a variety of abortion types are mentioned in the model suggested by Gemzell-Danielsson *et al.* In this model, the authors have divided the factors that affect the physical and mental health of women who have undergone abortion into 5 conceptual domains one of them is “abortion service delivery environment”. Some researchers believe that spontaneous abortions do not lead to psychological complications; and such factors as pre-existing mental health, family violence, pregnancy tendencies, and economic conditions can affect depression and post-abortion stresses.^[37,38]

The results of this study and the study by Bellieni and Buonocore^[36] were different; this may be due to the cause of abortion. In the study conducted by Biggs *et al.*, it was reported that 30% of women suffered post-stress symptoms because of experiences of sexual, physical, or emotional abuse or violence. In their study, 20% attributed their symptoms to non-violent issues, and about 19% said they were due to signs and symptoms of pregnancy.^[38] However, in the present study, almost all abortions were either spontaneous, had obstetric indications, or had forensic authorization. Our results showed that there was a significant relationship between the variable of unwantedness and the number of live births with stress levels. Multiple psychological changes occur in 30% of women who have experienced an abortion, and Major Depressive Disorder (MDD) may be observed in 5-10 percent of them. Psychological changes and major depression are also reported in wanted pregnancies.^[39,40] However, some researchers reported that abortion itself might not have many psychological impacts, but factors such as domestic violence in pregnancy and the willingness to get pregnant are effective in this regard.^[37,38] These results are not in line with those of our study. In our study, physical problems of abortion, economic issues and the cost of treatment, changes in QOL, and reduced marital relationship may have provided the basis for the mothers' stress.

One of the strengths of the present study was that it highlighted the importance of the subject. Moreover, we have shown that the majority of mothers who had experienced abortion (regardless of the type of abortion) have post-traumatic stress and the medical team, especially midwives and other health professionals, should be sensitive

to identifying and counseling the women at-risk, and, if necessary, refer them to specialized counseling centers. The most important limitations of the study were the extent of family support for mothers after abortion and differences in families, which can both affect the severity of post-traumatic stress. This problem was out of the researchers' control.

Conclusion

The majority of women in all three groups of abortion had average stress level. The intra-group analysis in this study showed that there was a significant difference between mean PTSD scores immediately after abortion and after 1 month of follow-up in all the 3 types of abortions that gradually diminished with the passage of time. The average severity of stress in spontaneous abortion was lower than the other two types of induced abortion.

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Conflicts of interest

Nothing to declare.

References

- Dugas C, Slane VH. Miscarriage. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2019.
- Erfani A. Induced abortion in Tehran, Iran: Estimated rates and correlates. International perspectives on sexual and reproductive health. *Int Perspect Sex Reprod Health* 2011;37:134-42.
- Motavalli R, Alizadeh L, Namadi Vosoughi M, Shahbazzadegan S. Evaluation of the prevalence, reasons and consequences of induced abortion in women of ardebil in 2011. *J Ardabil Univ Med Sci* 2012;12:384-91.
- Mahmoudiani S, Ahmadi A, Javadi A. The prevalence and influential factors of abortion in the women in the rural areas of fars province, Iran (2015). *IJN* 2018;31:51-61.
- Godrati F, Saadatmand N, Dinpazhoh M, Akbarzadeh M. Epidemiological study of legal abortion due to fetal defects in the files referred to Fars province forensic medicine centers from

- 2007 to 2013. *Shiraz E-Med J* 2016;17:e40023.
6. Ghodrati F, Saadatmand N, Gholamzadeh S, Akbarzadeh M. The seven-year epidemiological study of legal abortion caused by heart disease, blood disorders, diabetes and hypertension as referred to forensic medicine centers in Fars province. *Fam Med Prim Care Rev* 2019;21:23-9.
 7. Stulp G, Barrett L. Wealth, fertility and adaptive behaviour in industrial populations. *Philos Trans R Soc Lond B Biol Sci* 2016;371:20150153.
 8. Masoumi SZ, Garousian M, Khani S, Oliaei SR, Shayan A. Comparison of quality of life, sexual satisfaction and marital satisfaction between fertile and infertile couples. *Int J Fertil Steril* 2016;10:290-6.
 9. Hutti MH, Armstrong DS, Myers JA, Hall LA. Grief intensity, psychological well-being, and the intimate partner relationship in the subsequent pregnancy after a perinatal loss. *J Obstet Gynecol Neonatal Nurs* 2015;44:42-50.
 10. Lundell IW, Öhman SG, Frans Ö, Helström L, Högberg U, Nyberg S, *et al.* Posttraumatic stress among women after induced abortion: A Swedish multi-centre cohort study. *BMC Womens Health* 2013;13:52.
 11. Haghparast E, Faramarzi M, Hassanzadeh R. Psychiatric symptoms and pregnancy distress in subsequent pregnancy after spontaneous abortion history. *Pak J Med Sci* 2016;32:1097-101.
 12. Gravensteen IK, Helgadóttir LB, Jacobsen EM, Rådestad I, Sandset PM, Ekeberg O. Women's experiences in relation to stillbirth and risk factors for long-term post-traumatic stress symptoms: A retrospective study. *BMJ Open* 2013;3:e003323.
 13. Cheung CS, Chan CH, Ng EH. Stress and anxiety-depression levels following first-trimester miscarriage: A comparison between women who conceived naturally and women who conceived with assisted reproduction. *BJOG* 2013;120:1090-7. doi: 10.1111/1471-0528.12251.
 14. Hajnasiri H, Behbodimoghddam Z, Ghasemzadeh S, Ranjkesh F, Geranmayeh M. The study of the consultation effect on depression and anxiety after legal abortion. *IJPN* 2016;4:64-72.
 15. Gholamzadeh S, Godrati F, Saadatmand N, Akbarzadeh M. The obstetrics and gynecology and genetic counseling of mother with legal abortion had been referred to in Fars province center since 2007-2013. *Shiraz E-Med J* 2016;17:e35271.
 16. Fergusson DM, Horwood LJ, Ridder EM. Abortion in young women and subsequent mental health. *J Child Psychol Psychiatry* 2006;47:16-24.
 17. Kero A, Högberg U, Lalos A. Wellbeing and mental growth—long-term effects of legal abortion. *Soc Sci Med* 2004;58:2559-69.
 18. Biggs MA, Rowland B, McCulloch CE, Foster DG. Does abortion increase women's risk for post-traumatic stress? Findings from a prospective longitudinal cohort study. *BMJ Open* 2016;6:e009698.
 19. Cowchock FS, Lasker J, Toedter L, Skumanich S, Koenig H. Religious beliefs affect grieving after pregnancy loss. *J Relig Health* 2010;49:485-97.
 20. Raghbi M, Shirabadi A, Moallemi S, Narimani M. Demographic characteristics and post-traumatic stress disorder in prison inmates of Zahedan, Iran. *Mil Caring Sci* 2016;3:10-7.
 21. Keane TM, Caddell JM, Taylor KL. Mississippi scale for combat-related posttraumatic stress disorder: Three studies in reliability and validity. *J Consult Clin Psychol* 1988;56:85-90.
 22. Goodarzi M. Evaluating validity and reliability of Mississippi Post Traumatic stress disorder scale. *Iran J Psychol* 2003;7:153-78.
 23. Modares M, Molayee SM, Keyan FR, Afraseyabi S. [Prevalence of traumatic stress disorder after childbirth and related factors] [Article in Persian]. *Hayat* 2010;16:66-76.
 24. Abedian Z, Soltani N, Mokhber N, Esmaily HA. Comparing post-traumatic stress disorder (PTSD) in primiparous and multiparous women with preeclampsia. *J Midwifery and Reprod Health* 2013;1:13-8.
 25. Maggioni C, Margola D, Filippi F. PTSD, risk factors, and expectations Among woman having a baby: A two-wave longitudinal study. *J Psychosom Obstet Gynecol* 2006;27:81-90.
 26. Cigoli V, Gilli G, Saita E. Relational factors in psychopathological responses to childbirth. *J Psychosom Obstet Gynecol* 2006;27:91-7.
 27. Söderquist J, Wijma B, Wijma K. The longitudinal course of post-traumatic stress after childbirth. *J Psychol Obstet Gynecol* 2006;27:113-9.
 28. Engelhard IM, van Rij M, Boullart I, Ekhart TH, Spaanderman ME, van den Hout MA, *et al.* Posttraumatic stress disorder after pre-eclampsia: An exploratory study. *Gen Hosp Psychiatry* 2002;24:260-4.
 29. Wisner KL, Sit DK, Reynolds S, Altemus M, Bogen JL. Psychiatric disorders. In: Gabbe SG, Niebyl JR, Simpson JL, editors. *Obstetrics: Normal and Problem Pregnancies*. 5th ed. York: Churchill Livingstone; 2007. p. 1261-2.
 30. Wallin Lundell I, Sundström Poromaa I, Ekselius L, Georgsson S, Frans Ö, Helström L, *et al.* Neuroticism-related personality traits are associated with posttraumatic stress after abortion: Findings from a Swedish multi-center cohort study. *BMC Womens Health* 2017;17:96.
 31. Wallin Lundell I, Georgsson Ohman S, Frans O, Helstrom L, Hogberg U, Nyberg S, *et al.* Posttraumatic stress among women after induced abortion: A Swedish multi-centre cohort study. *BMC Womens Health* 2013;13:52.
 32. Wallin Lundell I, Sundström Poromaa I, Frans Ö, Helström L, Högberg U, Moby L, *et al.* The prevalence of posttraumatic stress among women requesting induced abortion. *Eur J Contracept Reprod Health Care* 2013;18:480-8.
 33. Modares M, Molayee S, Keyan F, Afraseyabi S. Prevalence of traumatic stress disorder after childbirth and related factors. [Article in Persian] *Hayat* 2010;16:66-76.
 34. Alekseeva N, Horton R, Geller F, McGee J, Minagar A. Psychiatric disorders and pregnancy. *Neurol Disord Pregnancy* 2011;135-58. doi: 10.1016/B978-0-12-384911-3.00008-7.
 35. Schwandt HM, Creanga AA, Danso KA, Adanu RM, Agbenyega T, Hindin MJ. A comparison of women with induced abortion, spontaneous abortion and ectopic pregnancy in Ghana. *Contraception* 2011;84:87-93.
 36. Bellieni CV, Buonocore G. Abortion and subsequent mental health: Review of the literature. *Psychiatry Clin Neurosci* 2013;67:301-10.
 37. Steinberg JR, Tschann JM, Furgerson D, Harper CC. Psychosocial factors and pre-abortion psychological health: The significance of stigma. *Soc Sci Med* 2016;150:67-75.
 38. Biggs MA, Gould H, Foster DG. Understanding why women seek abortions in the US. *BMC Womens Health* 2013;13:29.
 39. Curley M, Johnston C. The characteristics and severity of psychological distress after abortion among university students. *J Behav Health Serv Res* 2013;40:279-93.
 40. Steinberg JR, McCulloch CE, Adler NE. Abortion and mental health: Findings from The national comorbidity survey-replication. *Obstet Gynecol* 2014;123:263-70.