

# Psychological Consequences of Miscarriage, Ectopic Pregnancy, and Ongoing Normal Pregnancy: The Results of a Pilot Study

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ARTICLE INFO	ABSTRACT
<i>Article type:</i> Short Communications	Despite the high prevalence of early pregnancy loss, little is known about the subsequent psychological consequences. The purpose of this pilot study was to find an appropriate sample size for conducting a large study to compare psychological consequences of early pregnancy loss compared with ongoing pregnancy. The study was carried out at a public hospital and the health centers of Torbat Heydariyeh, Iran in 2020. It included 90 women with miscarriage (N=30), ectopic pregnancy (N=30), and ongoing normal pregnancy (N=30). Cohen Perceived Stress Scale, Center for Epidemiologic Studies Depression Scale, Spielberger State-Trait Anxiety Inventory, and Posttraumatic Stress Diagnostic Scale were used. Based on the results, there was no statistical difference between the groups for the perceived stress levels, the status of depression, and post-traumatic disorder in the groups ( $P>0.05$ ). Diagnosis of state anxiety was present in 53.3% of the ectopic pregnancy and 33.3% of miscarriage groups, but only in 20.0% of the ongoing pregnancy group ( $P=0.025$ ). For trait anxiety, these proportions were 33.3%, 13.3%, and 6.7% in the ectopic pregnancy, miscarriage, and ongoing pregnancy groups respectively ( $P=0.019$ ). In conclusion, women who experienced miscarriage or ectopic pregnancy reported more anxiety compared to women with ongoing pregnancy. Large-scale studies are needed to substantiate these findings.
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## Introduction

Early pregnancy loss (EPL) is a common pregnancy complication that occurs in % 10 of identified pregnancies (1). Miscarriage, the most common reason for EPL, occurs annually with a prevalence of 23 million in the world, which means 44 pregnancy losses every minute (2, 3). Ectopic pregnancy has a lower incidence compared to miscarriage and is reported at about 1% in the first trimester of pregnancy (4). While the rate of mortality from EP has decreased over the last three decades, it still accounts for 2.7% of all pregnancy-related deaths (5).

In response to EPL, women may question their reproductive abilities, lose self-confidence, and experience grief, blues, guilt, anxiety, and even depression (6, 7). Many couples who have had a history of pregnancy loss express it as the worst event of their life (8). Although the mechanism of the EPL is still unknown, some women attribute it to their behavior, which may lead them to experience guilty sensations, and depression (9). Furthermore, in a study, %11.4 women with miscarriages considered suicide as a result of the loss, and %1.8 of them had real attempts to commit suicide (10). In this regard,

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some studies which evaluate the primary psychological consequences of miscarriage reported that EPL can lead to anxiety (%32) and depression (%16-41) (9, 11-12). Limited research has also considered EPL as a traumatic event and evaluated the subsequent stress disorder. In these studies, the prevalence of probable PTSD was reported to be between 28% and %33.3 (8, 13).

Some adverse pregnancy outcomes are common in pregnancies with this psychological disorder, including alcohol consumption, low birth weight, poor perinatal care, and smoking (14, 15). It is also worthwhile to mention that many women plan for pregnancy during the 12 months after baby loss, so, subsequent pregnancy could be influenced by the adverse effect on their psychological status (13).

Thus, an understanding of women's emotional reactions to pregnancy loss is very important to provide appropriate support to those that need it, thereby minimizing psychological morbidity. The primary aim of this study was to compare PTSD, anxiety, and depression in women following EPL compared with a group of women with ongoing pregnancies. The second aim was to explore the feasibility and sample size required for a larger study to assess risk factors, which could be used to target screening or treatment of psychiatric morbidity in this context.

## Materials and Methods

This survey was conducted in Torbat Heydariyeh, a city in the east of Iran, from March to December 2020. The medical ethical committee of Torbat Heydariyeh University of Medical Sciences approved the study protocol (IR.THUMS.1396.13). The study included 90 women, 30 women in each group aged 18 years or older who were diagnosed with miscarriage (N=30) and ectopic pregnancy (N=30), as well as 30 pregnant women with an ongoing pregnancy (16). The women with miscarriages and ectopic pregnancies were recruited from the maternity ward of a public hospital, and the participants for the ongoing pregnancy group were selected from public health centers.

Inclusion criteria in an ongoing pregnancy were as follows: 1) a healthy single fetus, 2) a gestational age of fewer than 20 weeks, and 3) a healthy pregnancy without any complications.

In addition, women with a history of infertility and women with current heterotopic pregnancies and induced abortions were not included in the study.

A demographic and obstetric information form was completed through interviews and registration of the medical documents. Self-administered questionnaires including the Cohen Perceived Stress Scale, Center for Epidemiologic Studies Depression (CES-D) Scale, Spielberger State-Trait Anxiety Inventory, and Posttraumatic Stress Diagnostic Scale (PDS) were applied to women for psychological assessment in miscarriage and ectopic pregnancy groups one month after treatment. All instruments in the ongoing pregnancy group were completed one month after confirmation of a viable pregnancy based on ultrasound during a routine antenatal check-up.

**Demographic Information Form:** This form consisted of 35 questions in two sections: demographic and obstetric characteristics.

Demographic characteristics included age, educational level, employment status, and income status.

Obstetric characteristics also included parity, gravity, gestational age, and wanting to get pregnant from the perspective of women and their husbands. Furthermore, the severity of vaginal bleeding, type of treatment, and perceived pain at the time of hospitalization were assessed in women with miscarriages and ectopic pregnancies.

**Cohen Perceived Stress Scale (PSS):** Stress was assessed through the Cohen 10-item Perceived Stress Scale (PSS). It is not a diagnostic tool but a method of assessing the severity of perceived stress in a certain way within the past month. Each item is scored on a five-point scale (from 0=never to 4=very often), with the minimum and maximum overall scores varying from 0 to 40. There are no score cut-offs for this scale, and higher scores demonstrate a high level of stress (17).

The psychometrics of this scale for the Iranian population was confirmed by Maroufizadeh et al. (2014) (18) with Cronbach's alpha's of 0.842.

**Spielberger State-Trait Anxiety Inventory:** Anxiety was measured using Spielberger State-Trait Anxiety Inventory (STAI). The STAI is a validated scale that consists of 40 items with a 4-point Likert scale. The twenty items assess the

trait measure, and the other items assess the state measure. The overall scores for both scales vary from 20 to 80. Higher STAI scores indicate a higher state of anxiety. The 75th percentiles of the two distributions were used as thresholds to detect clinically significant anxiety symptoms. In the present sample, this was 51 for the State scale and 54 for the Trait scale (19). The Persian version of this scale was validated by Panahi et al. (1993) (20) with Cronbach's alpha's of >0.7.

Center for Epidemiologic Studies Depression (CES-D) Scale: Depressive symptoms were assessed with the Center for Epidemiologic Studies Depression (CES-D) Scale. It is a 20-item self-report instrument. All items on this scale are rated on a 0 to 3-point response scale with a total score ranging from 0 to 60. A cut-off of 16 is generally used as an indicator of clinically significant elevations in antenatal depression. The reliability and validity of this scale are well established in diverse populations (21). The validity and reliability of the Persian version of this tool have been confirmed in various studies (22-23) with Cronbach's alpha's of >0.7.

Posttraumatic Stress Diagnostic Scale (PDS): The Posttraumatic Stress Diagnostic Scale (PDS) was used to screen for posttraumatic stress. It is a 17-item self-assessment rating scale. The scale consists of 3 sub-dimensions including Re-experiencing, Avoidance, and hyper Arousal which are scored on a 4-point scale from "not at all" to "5 or more times per week/very much". A score of 1 or more for one of the re-experiencing inquiries, 3 of the avoidance inquiries, and 2 of the arousal inquiries is required to diagnose PTSD (24). The validity of the Iranian version of this scale is well documented by Mirzamani et al. (2006) (25) with Cronbach's alpha's of 0.84.

After a detailed explanation of the study, written informed consent was obtained from all participants. It took about 20 minutes for the participants to complete the questionnaires.

All analyses were carried out using the IBM SPSS Statistics version 20 software (SPSS Chicago, IL). Statistical significance was defined as  $p < 0.05$ . The Kolmogorov-Smirnov test was

used to check whether the data had a normal distribution. One-Way ANOVA, Kruskal-Wallis, Chi-squared test, and Fisher's exact test were performed to determine the difference between the groups in level of stress and the status of depression, anxiety, and post-traumatic stress disorder.

## Results

In total, 90 women were included in this study. Table 1 displays the basic characteristics of the participants in three groups. The mean age of participants was 28.81 (SD = 6.59) years. The majority of participants were housewives (87.8%) and had primary and high-school educations (67.8%). Three groups were similar in terms of these characteristics ( $P > 0.05$ ). However, gestational age was lower in the ectopic pregnancy group ( $P = 0.001$ ). Furthermore, more than a third of participants in the miscarriage (36.7%) and ectopic pregnancy groups (46.7%) declare that the missed pregnancy was unwanted. While this rate was 13.3% in the ongoing pregnancy group ( $P = 0.018$ ).

In addition, 46.7% of participants in the ectopic pregnancy group and 30% in the miscarriage group declared that their partner also did not want to become pregnant. This rate was 10% in women with ongoing pregnancies ( $P = 0.007$ ).

The majority of miscarriages (78.3%) were treated with abortion medication, whereas 69.3% of ectopic pregnancies were managed surgically (30.8% with salpingotomy and 38.5% with salpingectomy).

According to the result of the Kruskal-Wallis test and as shown in Figure 1, there was no difference in perceived stress levels in the three groups ( $p = 0.176$ ).

In the ectopic pregnancy group, 16(53.3%) of women experienced state anxiety. This was comparable to 10(33.3%) and 6(20.0) in the miscarriage and ongoing groups, respectively ( $P = 0.025$ ).

**Table 1.** Demographic characteristics of participants

Variables	Ongoing pregnancy		Miscarriage		Ectopic pregnancy		Test Results
	Mean±SD	Median [IQR]	Mean±SD	Median [IQR]	Mean±SD	Median [IQR]	
<b>Mean age (years)</b>	28.33±7.19	---	27.33±7.25	----	30.86±4.65	-----	F*=2.477 P=0.090
<b>Mean gestation at diagnosis (weeks)</b>	16.90±1.99	----	12.89±4.02	----	9.13±2.71	-----	F*=49.23 P=0.001
<b>Gravity</b>	2.06±1.17	2(2)	2.53±1.13	2(1)	2.79±1.26	3(2)	Mean Rank**=15.50 P=0.031
<b>Parity</b>	0.96±0.99	1(2)	1.20±1.03	1(2)	1.44±1.12	1(1)	Mean Rank**=15 P=0.206
Variables	N (%)		N (%)		N (%)		
<b>Education level</b>							
Primary and High-school	22(73.3)		24(80.0)		15(50.0)		Pearson Chi-square**=10.46 P=0.033
University or higher degree	8(26.7)		6(20.0)		15(50.0)		
<b>Employment Status</b>							
Employed	3(10.0)		2(6.7)		6(20.0)		Pearson Chi-square***=5.66 P=0.260
Housekeeper	27(90.0)		28(93.3)		24(80.0)		
<b>Family income</b>							
Low-level	5(16.7)		8(29.6)		6(20.0)		Pearson Chi-square***=8.03 P=0.475
Middle-level	25(83.3)		19(70.4)		24(80.0)		
<b>Wanted pregnancy from the mother's point of view</b>							
Yes	26(86.7)		19(63.3)		16(53.3)		Pearson Chi-square***=8.03 P=0.018
No	4(13.3)		11(36.7)		14(46.7)		
<b>Wanted pregnancy from the father's point of view</b>							
Yes	27(90.0)		21(70.0)		16(53.3)		Pearson Chi-square***=9.84 P=0.007
No	3(10.0)		9(30.0)		14(46.7)		

\*One-Way ANOVA

\*\* Kruskal-Wallis

\*\*\*Chi-Square

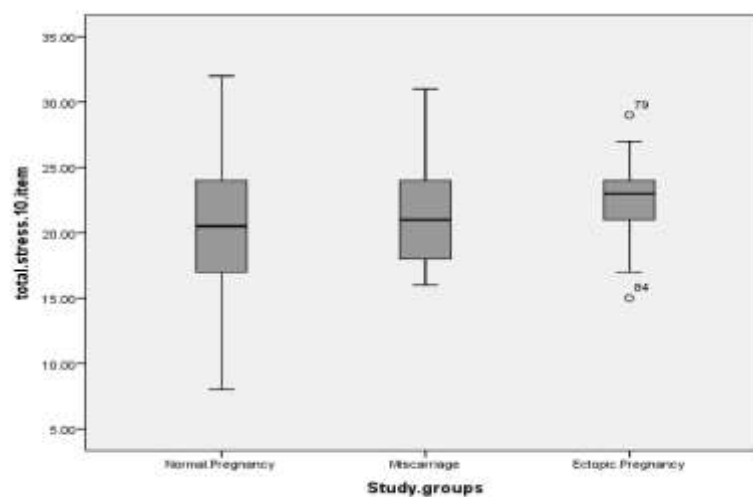
For trait anxiety, these proportions were 4(13.3%), 10(33.3 %), and 2(6.7%) in miscarriage, ectopic pregnancy, and ongoing groups, respectively (P=0.019) (Table 2).

As shown in table 2, more than two-thirds of participants fulfilled the screening criteria for depression. However, this difference was not statistically significant in the three groups (P=0.089) (Table 2).

In the first month, 5(16.7%) of women with ongoing pregnancies met the criteria for PTSD. In the miscarriage group, 26.7% of participants, and in the ectopic pregnancy group, approximately one-third (36.7%) met the criteria for PTSD. However, there was no significant difference between the groups (p=0.216) (Table 2).

**Table 2.** The proportion of participants meeting the criteria for anxiety, depression, and PTSD

Variables	Ongoing pregnancy	Miscarriage	Ectopic pregnancy	Chi-square test results
<b>State. Anxiety</b>	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>	Pearson Chi-square=7.37 P=0.025
No	24(80.0)	20(66.7)	14(46.7)	
Yes	6(20.0)	10(33.3)	16(53.3)	
<b>Trait anxiety</b>				Pearson Chi-square=7.90
No	28(93.3)	20(66.7)	26(86.7)	
Yes	2(6.7)	10(33.3)	4(13.3)	
<b>Depression</b>				Pearson Chi-Square=4.84 P=0.089
No	11(36.7)	4(13.3)	6(20.0)	
Yes	19(63.3)	26(86.7)	24(80.0)	
<b>PTSD</b>				Pearson Chi-Square=3.068 P=0.216
No	25(83.3)	22(73.3)	19(63.3)	
Yes	5(16.7)	8(26.7)	11(36.7)	



**Figure 1.** Stress levels in three study groups

Another main objective of this study was to find an appropriate sample size for conducting a large study to compare post-traumatic stress disorder as the main outcome in women with miscarriage and ectopic pregnancy compared with women with ongoing pregnancy. Based on this pilot study, we have estimated that a total of 957(319 in each group) women need to complete the study to demonstrate a PTSD prevalence of 16.7%, 26.7%, and 36.7% on ongoing, miscarriage, and ectopic pregnancy, respectively (power 0.80 and  $\alpha$  0.05).

### Discussion

One of the objectives of this study was to find an appropriate sample size for conducting a large study to compare post-traumatic stress disorder as the main outcome in women with miscarriage and ectopic pregnancy compared with ongoing pregnant women. The results of this study suggest that comparing the prevalence of PTSD, anxiety, and depression in women with EPL with a group of women with



ongoing pregnancies is feasible in an appropriate sample size.

Another aim was to compare the psychological consequences of EPL compared with ongoing pregnancies. Based on the results, despite the insignificant difference, we were surprised by the prevalence of depression in three groups that more than half of all participants met the criteria for depression. Similarly, Farren et al. (2016) did not report a difference in the prevalence of depression in women with ectopic pregnancy, miscarriage, and normal pregnancy (9). These results were confirmed by another study (26). However, it is reported that EPL can put women at a higher risk of anxiety and depression, and even suicide in other studies (10, 27). The results showed that even most women with an ongoing pregnancy in the first trimester suffer from depression. Although this is in line with previous research reporting that pregnant women during the first trimester of pregnancy are at higher risk of anxiety, and depression, symptoms compared to the rest of the pregnancy (28-30). These results may change in a large scale.

On the other hand, the results show that women with ectopic pregnancy suffer from state anxiety more than women with miscarriage and ongoing pregnancy, while women with miscarriage suffer more from trait anxiety. Based on the results of a review, anxiety symptoms begin immediately after a miscarriage and continue for 4–6 months (31). Similarly, in the study of Farren et al. (2016), the proportion of women with EPL who met the criteria for anxiety was higher than those with normal pregnancies (9). It is also found that women with a history of pregnancy loss are at increased risk of anxiety and depression during the next pregnancy (32, 33).

In addition, whereas the level of stress among women who experienced an ectopic pregnancy was high, this disparity was not statistically significant in comparison with the two other groups, which is probably due to the sample size. No study compared the stress levels of these groups using this tool.

On the other hand, one month after identifying an ectopic pregnancy, women met the criteria for PTSD at a high level (36.7), followed by women with miscarriages (26.7). Although these

rates were considerable, they were not statistically significant compared to the ongoing pregnancy group (16.7), which suggests that a larger sample size would be required to substantiate these findings.

Other studies have shown that at least one in four women who experience EPL meets the criteria for the disorder (9, 13). In another study, the lifetime risk of PTSD after the perinatal loss was identified as 29%. This disorder may start within one month of a traumatic event, but sometimes symptoms may not appear until years after the event (34). PTSD symptoms may appear during a subsequent pregnancy and cause a negative impact on pregnancy outcomes (32, 33). If left untreated during the perinatal period, it can lead to complications such as breastfeeding difficulties, poor quality of care, and a lack of bonding between mother and child (35).

Another intriguing finding in the study was that women who had miscarriages or ectopic pregnancies, as well as their spouses, significantly stated that the lost pregnancy was unwanted. This finding may show the defensive mechanism of parents to justify the pregnancy loss as an unwanted to mitigate the pain of a baby loss. Besides, some research has shown that there is a relationship between unwanted pregnancy and a higher level of depression (30). Given the mentioned points, clinicians and health providers should be sensitive to the psychological risks of losing a pregnancy. Of course, it should be noted that these complications may occur in a normal pregnancy.

One of the strengths of this study is the use of a control group with an ongoing pregnancy. Importantly, although several studies have evaluated the psychological consequences of pregnancy loss, few studies employ a control group without pregnancy loss. In addition, there are some limitations to the current study. Firstly, it is a pilot study with a small number of participants. Another limitation is the use of self-report tools rather than clinical interviews to screen for psychological disorders in the participants. It seems that in order to prevent possible selection bias for the ongoing group, it is suggested to use a random selection method in future main studies.

Further, larger studies are recommended to investigate psychological disorders in women with miscarriage, ectopic pregnancies, and even uncomplicated pregnancies.

## Conclusion

The results of this study showed women who have experienced EPL have a higher risk for anxiety disorders than women with ongoing pregnancies. The prevalence of depression and post-traumatic stress disorder was high in all three groups, but there was no significant difference. With consideration of these results, it seems that there is a need for more psychological support for women during the first trimester of pregnancy, especially those who experienced EPL. A comprehensive policy for screening these women should be designed and implemented in health systems.

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## Conflicts of interest

The authors declared no conflicts of interest.

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