

Changes in Prenatal Depression and Anxiety Levels in Low Risk Pregnancy Among Iranian Women: A Prospective Study

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Abstract

Background There is limited information on the changes in uncomplicated pregnancies. Therefore, in the present study, the changes of depression and anxiety changes in uncomplicated pregnancies during the prenatal period was evaluated.

Method This longitudinal study was performed on 256 pregnant women at the beginning of the first trimester of pregnancy. Inclusion criteria included the absence of pre-pregnancy depression and anxiety and poor pregnancy history. Exclusion criteria were the incidence of pregnancy complications. The level of their depression and anxiety at the time of entering the study were completed by self-report using the DASS questionnaire at 9–10, 11–12, 24–25, and 33–35 weeks of pregnancy.

Results The results of the study indicated the effect of time on the level of perinatal depression and anxiety ($p < 0.001$). These findings showed that the level of depression increased significantly from 9 to 24 weeks of pregnancy and decreased in the 32–34 weeks, but did not reach the level of depression at 9 weeks of pregnancy. Also, the anxiety level increased significantly from the onset of pregnancy to the 24 weeks gestation but did not change during the second and third trimesters. The findings of the study showed that depression and anxiety levels in each of the pregnancy trimesters were related to its level in the previous trimesters.

Conclusion The results of the study showed that the level of depression and anxiety of women in uncomplicated pregnancies also increases. Therefore, psychological health screenings in the second trimester of pregnancy should be performed in these women.

Background

Depression and anxiety are one of the most prevalent experiences of pregnancy and can be associated with some maternal and fetal pregnancy complications. The probability of preeclampsia [1] and eventually weak infant [2–4] and insufficient growth during fetal development [5] are increased due to psychological disorders during pregnancy. A recent report has been presented on the relationship between changes in the brain structure of children and pregnancy anxiety, which can be associated with behavioral problems [6]. In this period, the probability of suicide [7] and disorder in the development of maternal roles also increases. Bonding [8] and postpartum depression [9] are complications reported due to psychological disorders during pregnancy. Pregnancy is a unique period of time with dramatic changes in women's physical and biological conditions. Although these physiological changes are necessary to adapt the body to pregnancy and parturition, it creates special conditions for pregnant women. Morning nausea, headache, increased volume of the abdomen, back pain, Lordosis, movement constraints, and lack of sleep are the most common disorders of pregnancy. In addition, constraints on sexual intercourse due to physical conditions [10] and the possibility of injury to the fetus in particular cases [11], the probability of complications of pregnancy and the limitation of some of the usual behaviors that are inconsistent with the health of the fetus can be factors that affect women's psychological status [12, 13]. Increasing the need for a partner's attention, feeling more vulnerable, and more needing a partner's emotional support are also ecological factors that may make women vulnerable to psychological disorders.

Several predisposing factors for these disorders are known. High-risk pregnancy [14], history of pre-pregnancy psychological disorders [15], stressful events during pregnancy [16], and economic and social factors [17, 18], are known risk factors. The importance of identifying women at risk of depression and anxiety during pregnancy has led screening programs to be included in many prenatal care programs in developed countries [19]. But widespread and comprehensive changes during pregnancy may have a different effect on the psychological health of women during different stages of the prenatal period and it needs to be aware of changes in psychological health during different periods of pregnancy. However, in previous studies, the psychological conditions of pregnant women evaluated during pregnancy; but, there is limited information on the changes in psychological status during low-risk pregnancies [20]. Therefore, the present study was conducted by designing prospective study with the aim of evaluating the changes in psychological symptoms of women with uncomplicated pregnancy.

Methods

This is a longitudinal prospective study that was approved by the Ethics Committee of the Isfahan University of Medical Sciences between April 2017 and January 2018. A total of 310 pregnant women with a spontaneous singleton pregnancy were enrolled in the first trimester of pregnancy in Isfahan-Iran health centers. The inclusion criteria included age from 18 to 35 years old, no history of congenital disorders, recurrent abortion, and infertility, history of complications in previous pregnancies, and absence of systemic diseases in pregnancy, as well as no known psychological disorders before pregnancy. Exclusion criteria were the occurrence of stressful events during pregnancy and the incidence of pregnancy complications. Selection of health centers was performed as stratified random sampling. Selection of research samples was done as simple random sampling. So that, the subjects were randomly selected from pregnant women with gestational age of 9–10 weeks, and the inclusion criteria were evaluated by interviewing and evaluating the pregnancy care case. After obtaining informed written consent from the qualified individuals, demographic characteristics were recorded and the level of depression and anxiety was measured by two subscales of the standard DASS-21-Farsi questionnaire as self-report [21] at 11–12, 24–25 and 33–35 weeks of gestational age. This Likert scale has four options: did not apply to me at all (0) applied to me to some degree, or some of the time (1); applied to me to a considerable degree or a good part of time (2); and applied to me very much or most of the time (3).

It was set up to assess the conditions of individuals over the past week. The incidence of pregnancy complications and stressful events during the study was followed up and recorded, and information related to the psychological symptoms after their occurrence was not included in the data analysis. The criteria for determining the presence of anxiety disorder (mild, moderate, and severe anxiety): anxiety score was higher than 7 and depression disorder was higher than 9. Data analysis was conducted using SPSS version 19, and such statistical methods as multivariable linear regression analysis, RMANOVA, and Cochran's Q.

Results

Of the 310 people invited, 256 accepted to participate in the study. The characteristics of the study units and the level of their psychological indicators are presented in Table 1 in the four time periods. These results indicate that women were mostly "housewives with secondary education and diplomas and their pregnancy was wanted

and planned. Also, the relative frequency of those who had some degree of anxiety and depression was lower at the beginning of the study than in other times.

Table 1
Profiles and the levels of psychological markers of participants

Mean (SD) or Number (%)	
Age	29.39 (4.6)
Educational level	
Less than high school (%)	26 (10.2)
High school & diploma (%)	107 (41.8)
University degree (%)	123 (46.0)
Occupation status (%)	
Employed	26 (9.5)
Pregnancy planning (%)	
Wanted /Planned	157 (61.3)
Wanted /Unplanned	74 (28.9)
Unwanted /Unplanned	25 (9.8)
Anxiety levels	
Time 1	3.1 (3.8)
Time 2	7.6 (6.3)
Time 3	8.1 (8.0)
Time 4	6.3 (6.0)
Depression levels	
Time 1	2.8 (4.3)
Time 2	7.3 (7.1)
Time 3	7.5 (6.7)
Time 4	5.9 (4.5)
Abbreviations: SD: standard deviation	

The use of the Kolmogorov-Smirnov test showed that the data related to the stress, anxiety, and depression levels have no normal distribution. Therefore, for data analysis, their tenth logarithm was used.

The level of depression at the beginning of the first trimester of pregnancy was negatively related to the level of education of women. The results indicated that the level of anxiety at the beginning of the first trimester of

pregnancy had a reverse and significant relationship with the level of education and planned a pregnancy. At the end of the first, second, and third trimester of pregnancy, the level of anxiety and depression had a positive and significant relationship with the level of anxiety in the third trimesters of pregnancy (Table 2 &3). The level of depression in the first trimester was lower than the second and third trimesters of pregnancy. There was no difference from the end of the first trimester to the second trimester. Between the second and third trimesters, depression decreased significantly (Table 4). Comparing the level of anxiety in different stages of the evaluation showed that the level of anxiety in the first trimester was significantly lower than the second and third trimesters. The level of anxiety had no differed from the end of the first trimester (T2) to the second trimester and was significantly higher than the third trimester.

Table 2

The relationship between the level of depression in four evaluation times and other variables studied

	Depression levels											
	Depression T 1			Depression T 2			Depression T 3			Depression T 4		
	Beta	CI 95%		Beta	CI 95%		Beta	CI 95%		Beta	CI 95%	
Age	.07	.02	-.01	.04	.02	-.012	.01	.01	-.01	.07	.02	-.01
Educational levels	-.20*	-.01	-.29	.13	.23	-.05	-.08	.06	-.18	-.01	.09	-.10
Wanted pregnancy	-.13	.05	-.37	.07	.29	-.12	.06	.25	-.10	.01	.17	-.14
Planned pregnancy	-.11	.05	-.23	-.12	.05	-.24	-.02	.11	-.14	-.12	.01	-.20
Depression T 1	-	-	-	.27**	.42	.10	.12	.26	-.01	.14*	.24	.01
Depression T 2	-	-	-	-	-	-	.63***	.83	.54	.18*	.36	.02
Depression T 3	-	-	-	-	-	-	-	-	-	.56***	.74	.41
* p < 0.05, ** p < 0.01, *** p < 0.001												

Table 3

The relationship between the level of anxiety in four evaluation times and other variables studied

	Anxiety levels											
	Anxiety T 1			Anxiety T2			Anxiety T3			Anxiety T4		
	Beta	CI 95%		Beta	CI 95%		Beta	CI 95%		Beta	CI 95%	
Age	.01	.01	-.01	-.08	.01	-.02	-.07	.01	-.02	.07	.02	-.01
Educational levels	-.17*	-.02	-.21	.12	.16	-.02	.10	.15	-.01	.02	.11	-.03
Wanted pregnancy	-.12	.04	-.29	.14	.30	-.03	.13	.28	-.01	-.10	.14	-.10
Planned pregnancy	-.20*	-.03	-.25	-.13	.02	-.20	.02	.12	-.08	.06	.02	-.15
Anxiety T 1	-	-	-	.22**	.35	.06	.13*	.27	.01	.17	.17	-.07
Anxiety T 2	-	-	-	-	-	-	.61***	.88	.60	.57*	.35	.03
Anxiety T 3	-	-	-	-	-	-	-	-	-	.57***	.68	.40

Table 4

Comparison mean of depression and anxiety levels for four evaluations

(I) time	(J) time	Anxiety levels				Depression levels			
		(I-J)	sig	CI 95%	(I-J)	sig	CI 95%		
Time 1	Time 2	-.33	<.001	-.22	-.44	-.42	<.001	-.33	-.50
	Time 3	-.28	<.001	-.16	-.39	-.39	<.001	-.31	-.48
	Time 4	-.23	<.001	-.12	-.34	-.32	<.001	-.24	-.40
Time 2	Time 3	.06	ns	.14	-.02	.02	ns	.07	-.03
	Time 4	.10	.02	.19	.02	.09	.001	.15	.04
Time 3	Time 4	.05	ns	.12	-.03	.08	.002	.13	.03
Abbreviations: ns: non-significant									

The mean anxiety and depression levels increased in the follow-up examinations compared with baseline level ($p < 0.001$). The results of using RMANOVA showed that the effect of time on the level of anxiety and depression in women was significant. However, the effect of women education level and planning status on pregnancy was not significant (Table 5). Using Cochran's test showed that the relative frequency of anxiety (Cochran's Q test = 41.47, DF = 3, $p < 0.001$) and depression (Cochran's Q test = 28.33, DF = 3, $p < 0.001$) during pregnancy was significant. So that during the second and third evaluation periods, the relative frequency of people reporting levels of anxiety and depression was more than the first visit, but their relative frequency decreased in the third trimester, but did not reach the amount of the first visit.

Table 5

Trends in depression and anxiety levels at the four assessing times adjusted for confounders

	Time		Educational level of women		Educational level of husband		Pregnancy planning	
	F ^a	p ^a	F ^a	p ^a	F ^a	p ^a	F ^a	p ^a
Anxiety	8.61	< .001	.98	ns	.35	ns	.97	ns
Depression	8.55	< .001	.86	ns	.80	ns	.68	ns

^a Results based on Repeated Measure Analysis of Variance (RMANOVA)

Discussion

The aim of the present study was to evaluate the psychological changes of women with low-risk pregnancies. The results showed that the level of anxiety and depression increases from the beginning of pregnancy to the second trimester of pregnancy and has an inverse relation with the level of education. The relationship between education level and psychological health has already been reported; however, the increase in the level of depression and its relative frequency in the present study is in contrast with the results of other research carried out on the general population and indicated a slowdown in depression during pregnancy [20, 22]. Hu et al also reported that the frequency of depression decreases during the three trimesters of pregnancy [23]. Comparing the prevalence of depression in her study in the first trimester of pregnancy (14.0%), with the present study suggests that women with low-risk pregnancy start pregnancy with less depression, but with the advancement of pregnancy, the level of depression increases. This incremental trend observed in the level and relative frequency of depression in Iranian women is consistent with the high prevalence of depression reported in pregnant women in the general population of Iran [24]. Previous studies have been reported that the prevalence of depression in pregnant women was 22.8% in the third trimester [25]. With increasing the gestational age, women's need for social support from the family and support for pregnancy delivery systems increases. A study in this field indicates a reverse relationship between the level of depression in women and the belief in the comprehensive support of the pregnancy care systems [24]. In a qualitative study, women with a history of postpartum depression stated that lack of social support from the family and care providers caused them discomfort [26]. However, the research findings indicate that the level of social support for Iranian pregnant women is low [27], many of them were not satisfied with the quality of pregnancy care [28]. Although the increase in the level of depression until the second trimester of pregnancy can be explained by the results of these studies, the decrease in depression level in the third trimester of pregnancy was surprising in the present study. Because women's physical constraints due to the increasing age of pregnancy and the common discomfort of this period are factors that can endanger the psychological health of women [29]. The findings of this study indicate that the level of depression in women studied was less influenced by the physical conditions of pregnancy. However, although the level of depression in women was dependent on their level of education, the level of depression in them was independent of this factor. So that the changes observed were not related to their educational level. The reverse correlation between education level and depression level has already been reported [30]. In the present study, unlike the Chi study, there was no relationship between the conditions of planning for pregnancy. However, the probability of unwanted pregnancy in women with a lower educational

level is higher [31]. Therefore, the relationship between unwanted pregnancy and depression may be overshadowed by the level of education.

Another finding of the study showed an increase in the level of anxiety during the first and second trimesters. Also, the results showed that level of anxiety during the first trimester, such as depression level, had a reverse relationship with the level of education of women. In addition, there was a negative relationship between its level and planning for pregnancy. This finding suggests that non-planning for pregnancy, although not affecting the level of depression, is associated with increased anxiety in pregnant women. But increasing the gestational age independent of this factor is associated with an increasing change of anxiety levels. Also, the findings suggest that, unlike depression, the level of anxiety does not decrease in the second and third trimesters.

The observed association between the level of anxiety and planning for pregnancy confirms the results of Garipey's study, which reported that unplanned pregnancy is associated with an increased risk of anxiety disorder [32]. The relationship between anxiety and maternal education has also been reported in another study [33]. The observed increase in the level of anxiety as well as its prevalence with the progression of pregnancy was also in line with the study of Hu et al., which showed that the anxiety prevalence increased in the second trimester compared to the first trimester. In Zhang's report, the prevalence of pregnancy anxiety increased between the first and second trimester. But in the Zhang study, the prevalence of anxiety was 22.7% in the first trimester of pregnancy [34]. However, the prevalence of anxiety in this study was 2.8%. This finding suggests that women with uncomplicated pregnancy have better conditions for negative psychological symptoms, but an increase in anxiety is experienced in all women, and this incremental change is not influenced by social status, such as education level.

Other findings showed that the level of depression and anxiety in any of trimester of pregnancy depended on the level of these psychological symptoms in the previous trimester. Other studies have shown that pre-pregnancy depression and anxiety are associated with an increase in the probability of these disorders in pregnancy. The results of this study showed that in people with a history of depression and anxiety disorders in pre-pregnancy, the level of anxiety and depression in the early stages of pregnancy can predict the level of these symptoms in the next stages of pregnancy.

The results of this study indicate that the level of depression and anxiety in women with low complications increases with increasing gestational age, but it should be noted that existing economic fluctuations, which can affect the psychological health of people in society, may have affected the results of the current research and are considered as research constraints.

Conclusion

This study showed that the change of anxiety prevalence in uncomplicated pregnancies is similar to that of pregnancy is done on the general population, but changes in depression prevalence and level are different in women with uncomplicated pregnancy. These findings suggest that the level of depression during pregnancy is more affected by non-biological conditions than the biological conditions of pregnancy. Also, regarding the increase in the level of anxiety and depression during the second trimester, it is recommended that screening of psychological disorders be performed during the second trimesters in addition to the first trimester.

Abbreviations

DASS

Depression Anxiety Stress Scales; ANOVA:Analysis of variance; RMANOVA:Repeated Measure Analysis of Variance; SD:Standard deviation; G:group; ns:None significant

Declarations

Ethics approval and consent to participate

All procedures performed in participants were in accordance with the ethical standards of the Isfahan University of Medical Sciences and informed consent was obtained from all participants.

Consent for publication

No applicable.

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Availability of data and materials

Data and material are available on request from the corresponding author.

Competing interests

The authors declare that they have no conflict of interest.

Authors' contributions

AK: Project development, Data collection supervising, acquisition of analysis, interpretation of data and editing the manuscript AD: Project development, Data Collection, Manuscript writing. Also, all authors have read and approved the manuscript.

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