

Factors associated with mental disorders in pregnant women covered by primary health care: a population-based study

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Summary Background. Mental disorders during pregnancy can be associated with adverse delivery and neonatal outcomes, as well as a higher risk of postpartum mental disorders.

Objectives. This study was conducted to determine the factors associated with mental disorders in pregnant women.

Material and methods. Using stratified multistage random sampling, 332 participants were selected among pregnant women covered by health centres for prenatal care from April to September 2019 in the west of Iran. After obtaining informed consent from these people, the demographic questionnaire and the Persian version of the Goldberg GHQ-28 questionnaire were completed for them by a trained midwife. The data was analysed in SPSS 22 using descriptive statistics, the *t*-Test and ANOVA.

Results. The mean age and mean gestational age of the 332 pregnant women under study were 29.01 ± 5.44 years and 22.95 ± 8.95 weeks, respectively. About 32.5% ($n = 108$) of the women were suspected of having general mental health disorders. The mean scores of the subscales and general mental health disorders were significantly higher in pregnant women with unwanted pregnancy, marital dissatisfaction, a history of domestic violence and in those between 43–47 years of age ($p < 0.05$). However, the differences between the mean scores of the disorders were not statistically significant in women with a history of abortion and infertility, gestational age and gender, educational levels and occupation.

Conclusions. The results of this study showed that 32.5% of the pregnant women were suspected of having general mental health disorders. Mental health disorders were more common in pregnant women with unwanted pregnancy, marital dissatisfaction, a history of domestic violence in those between 43–47 years of age.

Key words: prenatal care, mental disorders, pregnancy, women.

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Background

Pregnancy is stressful enough to evoke psychiatric disorders and may exacerbate mild or pre-existing mental disorders. Various factors play a role in the development of mental disorders during pregnancy [1, 2]. In some pregnant women, constant worry regarding foetal health, childcare, lifestyle changes or fear of labour pain causes anxiety, sleep disorders and impairment of normal functions [3–5].

Mental disorders during pregnancy are associated with adverse outcomes of labour and the high risk of postpartum mental disorders [6]. The results of some studies show mental disorders in pregnancy cause undesirable outcomes, such as preterm labour, low birth weight and perinatal mortality [7–9]. In addition, anxiety and depression in early pregnancy increase the risk of preeclampsia [10]. Maternal depression in pregnancy is associated with emotional and cognitive impairment after birth [11, 12]. Some anxiety disorders induce intrauterine growth retardation [13]. Children with a history of anxiety during pregnancy are at risk of a variety of neuropsychological conditions, such as attention deficit hyperactivity disorder (ADHD) [13, 14]. Mental disorders are associated with a type of pre-coagulation and low-activated tissue plasminogen activity that may result in placental

insufficiency. Another risk factor for complications in pregnancy is severe nausea and vomiting, which is more common in women with anxiety disorders [15].

The general annual prevalence of mental disorders and the prevalence of depression during pregnancy in the US are 26.2% and 18%, respectively [9, 16]. According to estimates by the World Health Organization, over 25% of people worldwide suffer from one or more mental disorders in their lifetime. According to the updated estimates, mental and neurological diseases will account for 14.4% of all Disability-Adjusted Life Years (DALYs) worldwide and 25.4% of non-communicable diseases, and depression will rank second with respect to percentage of all DALYs worldwide and percentage of all non-communicable diseases in 2030 [1]. In Iran, it was also estimated in 2016 that the burden of mental disorders is 2,306,382 DALYs (women account for 1,191,105 DALYs) [17].

Objectives

This study was conducted to determine the factors associated with mental disorders in pregnant women covered by primary health care in the west of Iran.



Material and methods

This population-based cross-sectional study was conducted on pregnant women covered by health care centres in Kermanshah city in western Iran. The studied population consisted of all pregnant women covered by health care to receive prenatal care (according to the National Guidelines for Prenatal Care in Iran) from April to September 2019.

Stratified random sampling was used to select the health care centres and determine the quota of participants from each health centre. Using a geographical map of Kermanshah, this city was divided into five districts (downtown, northeast, northwest, southeast and southwest). Each district had six health centres. Using their family health record numbers, 73 pregnant women were selected from each district (12 women from each centre) by simple random sampling. After obtaining informed consent, the Persian version of the GHQ-28 was completed (literate women filled in the questionnaire themselves and a trained midwife filled it in for illiterate women). The proposal and the questionnaire were approved by the Ethics Committee and Deputy of Research and Technology of Kermanshah University of Medical Sciences and was registered under the code number 95661.

Using the sample size formula for cross-sectional studies and the results of similar studies [18, 19] (where p and $1 - p$ were 0.316 and 0.684, respectively), and considering d & $\alpha = 0.05$, the sample size was calculated ($n = 332$). Increasing the sample size by about 10%, the final sample size was determined ($n = 365$). Pregnant women with the history of mental disorder and chronic renal, cardiac or pulmonary disease were excluded from the study. Two questionnaires were used to collect data.

Demographic questionnaire

This is a researcher-made instrument for collecting data on the pregnant women's demographic characteristics, including age, height, weight, previous children, gestational age, foetal sex, history of infertility and abortion, educational level, occupation, domestic violence, as well as diabetes and hypertension status. Domestic violence is either physical or verbal. Physical violence includes punching and slapping, and verbal violence includes any violent behaviour that damages a woman's honour, dignity and self-confidence in the form of unfair criticism, humiliation, etc. The face and content validity of the pre-demographic questionnaire was assessed.

GHQ-28

The 28-question form (GHQ-28) was developed by Goldberg and Hiller in 1979 based on the initial 60-question form by factor analysis. This questionnaire includes four subscales of physical symptoms, anxiety and sleep disorders, social dysfunction and severe depression, and each subscale consists of seven items [20]. In the study of Nazifi et al. in Iran, this questionnaire has suitable internal consistency and sufficient validity to measure the level of general health [21].

The GHQ-28 scoring method was 0, 1, 2 and 3. Each person's score on each of the subscales ranged from 0 to 21, and generally from 0 to 84. A score of 6 and higher in each subscale and a total score of 22 and higher indicated that the participant was suspected of having a mental disorder. In each subscale, a score of 0 to 6 indicated that the participant did not have a mental disorder, but the scores 7 to 11, 12 to 16 and 17 to 21 showed that the participant was suspected of having a mild, moderate or severe mental disorder, respectively. As for the general mental health score, the scores 0 to 22 suggested that the participant had no problem; however, the scores 23 to 40, 41 to 60 and 61 to 84 indicated that the participant was suspected of having a mild, moderate, or severe mental disorder, respectively. The SPSS V.22 was used to analyse the data using descriptive statistics (mean and standard deviation, frequency, percentage), as well as the t -Test and ANOVA.

Results

33 of the 365 completed questionnaires were excluded from the study (were not filled out completely), and ultimately, 332 questionnaires were analysed.

The participants were 17–47 years old with a mean age of 29.01 ± 5.44 years. Their mean BMI was 26.23 ± 7.84 (ranging from 17.78 to 35.79). Minimum gestational age was 8 weeks, the maximum being 40 weeks, and the mean gestational age was 22.95 ± 8.95 weeks. As for foetal sex, 41.3% of the fetuses ($n = 137$) were male and 35.3% ($n = 117$) female. In addition, 23.5% of the participants ($n = 8$) had not been told the foetal sex (Table 1).

Table 1. Demographic and pregnancy characteristics of pregnant women

Variable		Number (%)
Age (years)	(means \pm SD)	29.01 ± 5.44
BMI	(means \pm SD)	27.49 ± 7.84
Gravidity	(means \pm SD)	2.01 ± 0.98
Parity	(means \pm SD)	0.88 ± 0.83
Gestational age	(means \pm SD)	22.95 ± 8.95
Gestational age	first trimesters	52 (15.7)
	second trimesters	187 (56.3)
	third trimesters	93 (28)
Age (years) group	17 to 22 y	38 (11.4)
	23 to 27	86 (25.9)
	28 to 32	121 (36.4)
	33 to 37	68 (20.5)
	38 to 42	17 (5.1)
	43 to 47	2 (6)
Gender of foetus	unknown	78 (23.5)
	male	137 (41.3)
	female	117 (35.2)
BMI	skinny	4 (1.2)
	appropriate	125 (37.7)
	overweight	140 (42.2)
	obese	63 (19)
Infertility (history)	no	307 (92.5)
	yes	25 (7.5)
Abortion (history)	no	273 (82.2)
	yes	59 (17.8)
Education (mother)	less than diploma	99 (29.8)
	diploma	122 (36.7)
	associate degree	38 (11.4)
	masters	62 (18.7)
	masters and higher	11 (3.3)
Occupation	unemployed	315 (94.9)
	employed	17 (5.1)
Pregnancy	unwanted	67 (20.2)
	wanted	265 (79.8)
Satisfaction with marital life	no	42 (12.7)
	yes	290 (87.3)
Domestic violence	no	257 (77.4)
	verbal	69 (20.8)
	nonverbal	6 (1.8)
Diabetes	no	303 (91.3)
	gestational diabetes	23 (6.9)
	overt diabetes	6 (1.8)
Hypertension	no	309 (93.1)
	pregnancy induces chronic	11 (3.3)
		12 (3.6)

Table 2. Frequency of various mental disorders in pregnant women

	Normal	Mild	Moderate	Severe	Total
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Somatisation score	238 (71.7)	79 (23.8)	13 (3.9)	2 (.6)	332 (100)
Anxiety and sleep disorders score	237 (71.4)	80 (24.1)	13 (3.9)	2 (.6)	332 (100)
Social function score	109 (32.8)	185 (55.7)	35 (10.5)	3 (.9)	332 (100)
Depression score	286 (86.1)	31 (9.3)	13 (3.9)	2 (.6)	332 (100)
Total score group	224 (67.5)	84 (25.3)	23 (6.9)	1 (.3)	332 (100)

Table 3. Comparison of the mean scores of psychological disorders by types of pregnancy, satisfaction with marital life and the mothers' occupation

Mental disorders	Variable	Mean ± SD	Mean difference	p
Pregnancy type				
Somatisation	unwanted	7.67 ± 3.88	2.95	< 0.001
	wanted	4.71 ± 2.96		
Anxiety	unwanted	7.15 ± 3.95	2.85	< 0.001
	wanted	4.29 ± 3.36		
Social function	unwanted	8.58 ± 3.23	1.38	0.002
	wanted	7.19 ± 2.54		
Depression	unwanted	4.75 ± 4.62	3.13	< 0.001
	wanted	1.62 ± 3.01		
General mental disorder	unwanted	28.16 ± 12.52	10.33	< 0.001
	wanted	17.83 ± 9.21		
Satisfaction with marital life				
Somatisation	yes	4.78 ± 2.98	3.61	< 0.001
	no	8.40 ± 4.27		
Anxiety	yes	4.44 ± 3.27	2.83	0.001
	no	7.28 ± 5.06		
Social function	yes	7.23 ± 2.65	1.64	0.002
	no	8.88 ± 3.10		
Depression	yes	1.70 ± 3.01	3.98	< 0.001
	no	5.69 ± 5.10		
General mental disorder	yes	18.17 ± 9.18	12.08	< 0.001
	no	30.26 ± 14.57		
Mothers' occupation				
Somatisation	unemployed	5.35 ± 3.38	1.23	0.141
	employed	4.11 ± 2.97		
Anxiety	unemployed	4.95 ± 3.70	1.89	0.004
	employed	3.05 ± 2.22		
Social function	unemployed	7.51 ± 2.82	1.10	0.006
	employed	6.41 ± 1.37		
Depression	unemployed	2.34 ± 3.67	2.04	< 0.001
	employed	0.29 ± 0.68		
General mental disorder	unemployed	20.16 ± 10.90	6.28	< 0.001
	employed	13.88 ± 5.21		

The total scores for mental health disorder determined by the GHQ-28 ranged between 2 and 61 in the pregnant women, and their mean total score was 19.68 ± 10.77 . In this study, 32.5% of the pregnant women ($n = 108$) had a mental disorder (Table 2). The scores for the subscale of somatisation disorders ranged between 0 and 18, with a mean score of 5.24 ± 3.38 . This disorder was reported in 28.3% ($n = 94$) of the pregnant women (Table 2). The scores for the subscale of anxiety and sleep disorders ranged from 0 to 21, with a mean score of 4.79 ± 3.66 . This disorder was reported in 28.6% ($n = 95$) of the women (Table 2). The mean score for the social dysfunction subscale was 7.44 ± 2.76 , ranging from 0 to 17. This disorder was reported in 67.2%

($n = 223$) of the women. The mean score for the subscale of depression was 2.2 ± 3.59 , ranging from 0 to 18. This disorder was reported in 13.9% ($n = 46$) of the pregnant women (Table 2).

The results of the *t*-Test indicated that there were no significant differences between the women with a history of infertility and abortion and those without in the mean scores for somatisation disorders, anxiety and sleep disorders, social dysfunction and depression, as well as in the mean total scores for general mental health disorders. However, in women with unwanted pregnancy, the mean scores for somatisation disorders ($p < 0.001$), anxiety and sleep disorders ($p < 0.001$), social dysfunction ($p = 0.002$), depression ($p < 0.001$), as well as the mean

total score for mental health disorder ($p < 0.001$), were significantly higher compared to those with a planned pregnancy. In other words, these disorders were more common in women with unwanted pregnancy. In addition, in women with marital dissatisfaction, the mean scores for somatisation disorders ($p < 0.001$), anxiety and sleep disorders ($p = 0.001$), social dysfunction ($p = 0.002$) and depression ($p < 0.001$), as well as the mean total score for mental health disorder ($p < 0.001$), were significantly higher compared to those without marital satisfaction. In other words, these disorders were more common in women with marital dissatisfaction. The mean scores for the subscales and the mean total for general mental health disorders in unemployed pregnant women were significantly higher, and these disorders were more common compared to employed women (Table 3).

In the one-way ANOVA, the mean scores for the subscales and the mean total score for general mental health disorders were significantly different in pregnant women exposed to domestic violence compared to those who were not. According to the Scheffe test, the mean scores for somatisation disorders ($p = 0.001$), anxiety and sleep disorders ($p < 0.001$), social dysfunction ($p = 0.002$), depression ($p < 0.001$), as well as the mean total score for general mental health disorders ($p < 0.001$), were significantly lower in the group with no domestic violence compared to the group with verbal and nonverbal domestic violence ($p = 0.002$). In addition, the mean scores for somatisation disorders ($p = 0.001$), anxiety and sleep disorders ($p < 0.001$), social dysfunction ($p = 0.04$), depression ($p < 0.001$), as well as general mental health disorders ($p < 0.001$), were significantly lower in women exposed to verbal violence compared to those exposed to nonverbal violence. In other words, these disorders were more common in women exposed to nonverbal violence compared to those exposed to verbal violence or no violence (Table 4).

Table 4. Comparison of mean scores of psychological disorders by domestic violence and maternal age (ANOVA)

Mental disorders	Variable	Mean square	F	Sig.
Domestic violence				
Somatisation score	between groups	408.15	45.16	< 0.001
	within groups	9.03		
Anxiety	between groups	385.00	34.51	< 0.001
	within groups	11.15		
Social function	between groups	85.21	11.89	< 0.001
	within groups	7.16		
Depression	between groups	579.07	61.23	< 0.001
	within groups	9.45		
Total score	between groups	5283.29	62.45	< 0.001
	within groups	84.59		
Mothers' age group				
Somatisation score	between groups	24.63	2.19	.055
	within groups	11.24		
Anxiety	between groups	37.87	2.90	.014
	within groups	13.03		
Social function	between groups	20.38	2.73	.019
	within groups	7.44		
Depression	between groups	48.41	3.91	.002
	within groups	12.35		
Total score	between groups	389.04	3.47	.004
	within groups	111.81		

The results of the ANOVA for the mean score of somatisation disorders showed a significant difference between the

various age groups of the participants. According to the Scheffe test, the mean score in the 43–47 age group was significantly higher than the 17–22 ($p = 0.003$), the 23–27 ($p = 0.002$), the 28–32 ($p = 0.007$), the 33–37 ($p = 0.006$) and the 38–42 ($p = 0.01$) age groups. However, the mean scores for the subscales of anxiety and sleep disorders, social dysfunction, depression and the mean total score for general mental health disorders did not differ significantly in the different age groups. In addition, the differences between the mean scores for these disorders were not significant in the groups of variables of BMI, gestational age (trimester), information concerning foetal sex, mothers' educational level and diabetes and hypertension status (Table 4).

Discussion

According to the results of this study, 32.5% of the pregnant women had general mental health disorders (25.3% mild, 6.9% moderate and 4.5% severe). These results are relatively consistent with those obtained in the study by Zareipour et al., who reported that 31.6% of the participants had general mental health disorders [19]. However, the reported prevalence of general mental health disorders was 43% in the study by Mosalanezad et al., 55.2% in the study by Mardani-Hamoleh and Ebrahimi and 43.6% in the study by Nazari et al., which do not agree with the results of this study [18, 22, 23]. In addition, the prevalence of mental health disorders in the study by Nagandla et al. was 23.6%, which is lower compared to this study [24]. These discrepancies may be due to differences in the tools used to determine general mental health disorders, i.e. the various mental health questionnaires used, as well as the socio-economic mismatch between communities.

In the present study, 28.3% of the pregnant women were suspected of having somatisation disorders, which is relatively consistent with the 24.4% reported by Zareipour et al. However, this was 17.5% in the study by Mardani-Hamoleh and Ebrahimi, which is lower compared to this study [18, 19]. The differences between the prevalence of stressors and the ability to manage them in the various populations may explain this difference.

The results of this study showed that 28.6% of the pregnant women showed symptoms of anxiety and sleep disorders, which disagrees with that in the study by Nagandla et al., with 18.8% prevalence, and with the study by Signal et al., in which anxiety disorder ranged between 20 and 25% in the two studied populations [24, 25]. In addition, the results of this study are relatively discordant with those of the Rezaee and Framarzi study, which estimated a 49.3% prevalence of anxiety and sleep disorders [26]. The study by Zareipour et al. reported a 25.6% prevalence of anxiety disorder, which is relatively consistent with result of this study [19]. The difference between the prevalence of stressors and the ability to manage them in various populations may explain this difference.

A 67.2% prevalence of social dysfunction was reported in the pregnant women in this study, which was higher compared to the 26% prevalence reported by Mardani-Hamoleh and Ebrahimi and the 24% prevalence reported by Zareipour et al. [18, 19]. It was concluded that the prevalence of social dysfunction in the present study is higher than the other studies, and only in the research by Nazari et al. was a higher prevalence (64.3%) reported [23]. The disagreements in the results can be explained by the differences in the sensitivity of the different questionnaires used, as well as the socio-economic differences between the studied populations.

The prevalence of depression among the pregnant women was 13.9% in this study, 6.9% in the study by Nagandla et al., 16% in the study by Mardani-Hamoleh and Ebrahimi, 15–22% in the study by Signal et al., 25.3% in the study by Rezaee et al. and 27.9% in the study by Karacam and Ancel [18, 24–27]. The highest prevalence of depression was reported in the study by Mosalanezad et al. and Zareipour et al. (42% and 42.4%, respectively) [19, 22]. Differences in the results of different studies may be due to the use of different mental health questionnaires.

According to this study, the history of infertility and abortion had no significant effect on the prevalence of any mental disorder among the pregnant women. These two variables have not been investigated in other studies, except for the research by Babanazari and Kafi, which indicated that the mean score of mental health in pregnant women with a history of abortion was higher compared to those without an abortion, although this difference was not statistically significant [28].

In the present study, unwanted pregnancy had a significant effect on the prevalence of general mental health disorders, as well as somatisation disorders, anxiety and sleep disorders, social dysfunction and depression. This finding complies with the results of Zareipour et al., in which the prevalence of mental disorders was twice as high as in those with unwanted pregnancy compared to those with a planned pregnancy [19]. The study by Nagandla et al. reported that unwanted pregnancy affected the prevalence of mental disorders ($p < 0.01$) [24]. Karacam and Ancel reported a moderate correlation between unwanted pregnancy and the total score of anxiety and depression (Pearson's correlation coefficient = 0.592) [27]. Babanazari and Kafi reported a significant relationship between unwanted pregnancy and the mental health of pregnant women and also reported that women with unwanted pregnancy had significantly lower mental health ($p = 0.001$) [28].

In this research, marital dissatisfaction had a significant effect on the prevalence of general mental health disorders, as well as somatisation disorders, anxiety and sleep disorders, social dysfunction and depression. The study by Mosalanezad et al. indicated that there were significant relationships between marital satisfaction and anxiety and depression disorder ($p < 0.05$) [22]. In addition, results of the Pearson's correlation test in the study by Babanazari and Kafi indicated a significant positive relationship between mental health during pregnancy and marital satisfaction ($p = 0.0001$, $r = 0.595$) [30]. Karacam and Ancel also reported that marital or emotional problems before or during pregnancy considerably affected the experience of anxiety and depression [27].

In this study, gestational age had no significant correlation with mental disorders. The study by Nagandla et al. indicated no significant difference in the prevalence of common mental disorders between the second and third trimesters [24]. However, Babanazari and Kafi, reported that anxiety in women in their third trimester was significantly higher compared to the first trimester, and the mental health of pregnant women and its subscales, except for social dysfunction, was significantly lower in the first and third trimesters compared to the second trimester ($p < 0.001$) [28]. In the study by Rezaei and Framarzi, there was a positive correlation between gestational age and symptoms of depression [26]. In the research by Zareipour et al., in terms of gestational age, the highest prevalence rate of mental disorders was observed in the third trimester, and the prevalence rates of mental disorders in the first, second and third trimesters were 34.4, 23.1 and 40.2%, respectively, and increasing [19].

In this study, being exposed to violence in the family had a significant effect on the prevalence of general mental health disorders, as well as somatisation disorders, anxiety and sleep disorders, social dysfunction and depression. In women exposed to nonverbal violence in the family, a higher prevalence of mental disorders and its subscales were observed compared to those exposed to verbal violence and those who had safe families. In addition, women exposed to verbal violence had a higher mean prevalence of general mental health disorders and its subscales compared to those who experienced no violence. The significance coefficient of verbal and nonverbal violence in general mental health disorders was $p < 0.001$. In line with this study, Nagandla et al. reported a correlation between spousal violence and mental disorders [24]. In the study by Karacam and Ancel, a history of being exposed to physical violence was a considerably effective factor contributing to the development of depression and anxiety [27].

This study indicated no significant relationship between the educational levels of the pregnant women and mental disorders. Contrary to the results of this research, in a cross-sectional study by Rezaee and Framarzi, a negative relationship was found between educational levels and symptoms of anxiety and depression. In the study by Zareipour et al., the highest prevalence of disorders (66.7%) was observed in the group of illiterate women compared to literate women [19, 28].

In this study, the prevalence of somatisation disorders in pregnant women aged 43–47 years was significantly higher compared to other age groups. In the study by Signal et al., being young was an independent risk factor for developing symptoms of depression, anxiety, considerable life stresses and abnormal worries [27]. In addition, in the linear regression model used in the study by Rezaee and Framarzi, maternal age, educational level, a history of abortion, gestational age, family income, BMI and pregnancy risk factors predicted a prevalence of 44.7% ($p = 0.006$) for anxiety and 68.1% ($p = 0.003$) for depression [28]. In the study by Zareipour et al., the highest prevalence of suspected mental disorder was 25.2% in 31-year-old and older participants, and the lowest rate was 26.4% in the 21–25 age group [19]. The considerable correlation of somatisation disorders with the 43–47 age group may be attributed to age in addition to pregnancy.

Conclusions

The results of this study indicate that the prevalence of mental disorders is relatively high among pregnant women. Pregnant women with unwanted pregnancies, dissatisfaction with marital status, domestic violence and those in the age groups from 43 to 47 years were more prone to mental disorders.

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