

# The Effect of Life Style Based Education on the Fathers' Anxiety and Depression During Pregnancy and Postpartum Periods: A Randomized Controlled Trial

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**Abstract** Due to the harmful effects of prenatal and postnatal anxiety and depression on fathers, the aim of this study was to determine the impact of lifestyle-based training on paternal depression and anxiety (primary outcomes) during the prenatal and postnatal periods. This single-blind randomized controlled clinical trial was conducted on 126 spouses of pregnant women with gestational ages of 24–28 weeks. They were followed up until 6 weeks after childbirth. Using the block randomization method and stratified based on the number of children, the eligible samples were divided into two groups (one receiving two weekly group lifestyle-based training session (lasting 60–90 min) and a control group). *Edinburgh Postnatal Depression Scale* and *Spielberger's State-Trait Anxiety Inventory* were filled out by the participants before the intervention, 8 weeks after it, and 6 weeks after childbirth. The general linear model was used to analyze data. Out of 126 fathers, one individual from the intervention group left the study because he was not willing to cooperate. Compared with the control group, there was a significant decrease in depression (adjusted difference:  $-1.6$ ; 95% CI  $-2.8$  to  $-0.5$ ), state anxiety ( $-5.7$ ;  $-8.6$  to  $-2.9$ ) and

trait anxiety ( $-5.0$ ;  $-7.8$  to  $-2.2$ ) scores at 8 weeks after intervention as well as postnatal depression ( $-3.3$ ;  $-5.0$  to  $-1.5$ ); postnatal state anxiety ( $-7.5$ ;  $-11.6$  to  $-3.4$ ), and postnatal trait anxiety ( $-8.3$ ;  $-12.2$  to  $-4.4$ ) in the intervention group. The research results indicated the positive impact of training on prenatal and postnatal depression and anxiety in fathers. Given the easy implementation of training interventions during pregnancy, it is suggested that such interventions be paid more attention.

**Keywords** Anxiety · Depression · Lifestyle · Prenatal and postnatal periods

## Introduction

Depression is a widespread psychological disorder characterized by depressed mood, loss of interest and joy, feeling of guilt or low self-value, sleep or appetite disorder, low energy, and poor concentration (Dorland 1980). Pregnancy and childbirth would intensify the symptoms of depression not only in women, but also in men to the same extent, insofar as depression and anxiety are the most widespread psychological disorder in men during prenatal and postnatal periods (Ghafari et al. 2005). Pregnant women's spouses are prone to prenatal depression in comparison with the pre-pregnancy period. Paternal depression should not be neglected while spouses are pregnant. The prevalence of depression symptoms among fathers expecting babies is almost 10% (Gawlik et al. 2014; Paulson and Bazemore 2010). The socio-psychological risk factors of this disorder include unwanted pregnancy, poor social support, poor self-confidence, marital dissatisfaction, and conflict between work and family life (Koh et al. 2014). Although maternal depression during pregnancy has been taken into

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account as an important health problem to a great extent, paternal depression, making fathers experience a transition and considerable stress in the prenatal and postnatal periods in relation to maternal depression (Paulson and Bazemore 2010), has not been studied enough.

Paternal depression caused by childbirth is a serious health problem, not a rare phenomenon (Schumacher et al. 2008). The prevalence of postnatal depression among fathers was reported to be 7.8% in Germany (Gawlik et al. 2014); however, it was reported to be 11.7% in Iran (Kamalifard et al. 2014). It has a direct and significant relationship with the perceived stress, whereas it is negatively and significantly correlated with the perceived social support (Kamalifard et al. 2014). Since it may have a strong relationship with postnatal maternal depression, it influences familial health and well-being directly (Goodman 2004). Postnatal paternal depression increases the problems of interaction between father and child (Sethna et al. 2015), the problems of psychological-social development and behavioral disorders among children especially boys Ramchandani et al. 2005; Ramchandani, et al. 2008 )attention disorder in children (Van Batenburg-Eddes et al. 2013), couples' welfare disorder (Luoma et al. 2013), and also next psychological disorders in children in a way which is not influenced by maternal depression (Ramchandani et al. 2008). The impact of paternal depression on children's behavioral problems can be explained by both the impact on familial environment and in relation to maternal depression (Gutierrez-Galve et al. 2015). Paternal depression has a relationship with the increased risk of mood problems in children and turmoil in spousal relationships (Ramchandani et al. 2011). Given the potential and harmful effects of this disorder on child, which is called postnatal paternal depression, it has been advised to evaluate paternal depression after birth and the relevant risk factors (Ramchandani et al. 2008).

Anxiety is an unpleasant mental state emerging as perturbation, discomfort, thrill, stress and panic (Dorland 1980). It is the most prevalent psychological problem among couples in the postnatal period (Wynter et al. 2013). Men who have recently become fathers are prone to psychological disorders which can influence mothers, embryos and infants' health. Therefore, postnatal paternal anxiety increases, especially among men who have become fathers for the first time; however, it is nothing very serious, and it decreased during 6 weeks with information and awareness in this regard (Tohotoa et al. 2012). The study aimed to investigate the prevalence of anxiety in fathers, has not been done in Iran and Bukan.

Lifestyle refers to the health-related knowledge, attitudes, and behaviors in an individual or group of individuals (John 2001). Health-promoting behaviors such as physical activity have a substantial impact on improving

the quality of life (Bennett et al. 2013). Lifestyle behaviors such as good nutrition habits and frequent physical activity are correlated to fewer depressive symptoms (Hua et al. 2015). Healthcare providers should pay more attention to raising public awareness, stress management, training communicative skills, and supporting fathers in the postnatal period. Considering the high prevalence of paternal psychological disorders in the prenatal and postnatal periods and given the importance of prenatal and postnatal depression and anxiety in pregnant women's spouses along with insufficient attention paid to this health problem and the necessity of preventive measures, the current study was conducted. It was intended to determine the impact of lifestyle-based training on paternal depression and anxiety in the prenatal and postnatal periods.

## Materials and Methods

### Study and Participants

This is a single blind (outcomes assessor was blinded) randomized controlled clinical trial with two parallel arms conducted on 126 spouses of pregnant women with gestational ages of 24–28 weeks. The subjects were followed up until 6 weeks after childbirth. The primary outcomes of this study were paternal depression and anxiety in the prenatal and postnatal periods.

The inclusion criteria were the spouses of pregnant women with gestational ages of 24–28 weeks, single and uncomplicated pregnancy, the first or second pregnancy, being registered at health centers in Bukan city-Iran, having an education equal to secondary school at least, not participating in other similar studies, willingness to participate in this study, having a telephone number for follow-up, and willingness to take part in training classes and telephone counselling. The exclusion criteria were the spouses of pregnant women with the risk of preterm labor, depression history and hospitalization records for mental problems, addiction or the habitual use of alcohol and drugs by husband and wife, history of infertility and the use of assisted reproductive techniques in either man or woman, wife's participation in childbirth preparation classes (physiological childbirth), history of a close relative's death, divorce, and other serious emotional problems during the last month.

Using G-power (version 3.1.2) and based on the depression variable, the size of sample was calculated. According to Edmondson et al. (2010) (Edmondson et al. 2010) and considering  $m_1 = 6.64$  and  $sd_1 = sd_2 = 4.40$  and the presumption of 30% decrease in depression as a result of intervention ( $m_2 = 4.6$ ,  $\alpha = 0.05$ , and  $\beta = 0.2$ ), the sample size was calculated to include 59 participants. Given 5%

reduction, the final of sample size was 62 participants in each group.

### Sampling

Sampling started after obtaining permission from the Ethics Committee of Research and Technology Deputy of Tabriz University of Medical Sciences on November 19, 2014 under the number 93124 and registering it in the IRCT website under the code IRCT201410113706N23. The research setting was Bukan city-Iran included 12 health centers. The researcher investigated all the spouses of pregnant women with respect to the inclusion criteria by visiting these health centers and using the convenience sampling method. If the participants were qualified, they were asked for written consents. Then they were included in the study to fill out individual and social questionnaires, Edinburgh Postnatal Depression Scale and Spielberger's State-Trait Anxiety Inventory.

### Randomization

Using the computerized random number table and the block randomization method, the eligible participants were divided into two groups, one of which received lifestyle-based training and the other one was the control group, with block sizes of 4 and 6 and the allocation ratio of 1:1. The participants were stratified according to pregnancy number (the first or second pregnancy). Random allocation was performed by a person uninvolved in sampling and data collection. The type of intervention was written on a sheet and placed into sealed uniform envelopes with successive numbers.

### Intervention

The content of prenatal lifestyle-based training included sleep health, nutrition, physical and sports activity, self-image and sexual problems. The training materials were presented by a male psychologist at the health center office during two weekly training sessions (lasting 60–90 min between 24 and 28 weeks). All fathers of the intervention group were provided with a training booklet in the session. In the intervals between and after sessions, and during postpartum period, 10-minute telephone counseling sessions were provided for the participants once a week by the researchers as a reminder of the important trained materials.

The number of participants was at least 5 and at most 15 in each session, and at the end of sessions, 30 min were allocated to answer the questioned asked by subjects. The research assistant (the male psychologist) provided the participants with a telephone number to answer their questions.

The posttest questionnaires (Edinburgh Postnatal Depression Scale and Spielberger's State-Trait Anxiety Inventory) were distributed among the participants at the health center office 8 weeks after the intervention and 6 weeks after the childbirth and were filled out by them.

### Data Collection Tools

The data collection tools included the socio-demographic and midwifery questionnaire, Edinburgh Postnatal Depression Scale and Spielberger's State-Trait Anxiety Inventory which were filled out before the intervention, 8 weeks after it, and 6 weeks after childbirth.

The socio-demographic and midwifery questionnaire included items about age, spouses and spouses' education, spouses and spouses' occupations, the number of pregnancies and childbirths, history of abortion, type of pregnancy and childbirth, gestational age, date of childbirth, and the support provided by wife and family.

Edinburgh Postnatal Depression Scale was developed by Cox et al. in 1987 and revised in 1994 (Cox et al. 1987). It was validated by Montazari et al. (2007) in Iran (Montazari et al. 2007), and the Cronbach's alpha was reported to be 0.86. This scale has 10 four-choice items, some of which were sorted from low to high (1, 2, and 4), whereas some others were sorted from high to low. Each item has a score ranging from zero to 3 and a total score between zero and thirty. The participant selected the response which he felt during the last week. The questioners filling out by participants before the intervention between 24 and 28 weeks of pregnancy of their wives and 8 weeks after intervention. A score above 12 indicates the depression.

Spielberger's State-Trait Anxiety Inventory (STAI) includes 40 self-report items. The state scale has 20 items scored with (1) very low, (2) low, (3) high, and (4) very high according to Likert scale. Similarly, the trait scale is scored with (1) seldom, (2) sometimes, (3) often, and (4) always. Each of the state and trait forms was considered to have at least 20 and at most 80 scores. This questionnaire was validated in Iran (Mahram 1994), and the Cronbach's alpha was reported to be 0.91.

### Data Analyses

SPSS 21 was used to analyze data. The normality of quantitative data was confirmed with the K-S test. The chi-squared, chi-squared for trend test, the Fisher's exact, and the independent *t* tests were used to investigate the homology of the study groups. The independent *t*-test was used to compare the average scores of depression, state anxiety, and trait anxiety of participants before the intervention between 24 and 28 weeks of pregnancy of their wives. ANCOVA was used to compare the scores of depression,

state anxiety, and trait anxiety 8 weeks after the intervention (32–36 weeks of pregnancy) and 6 weeks after childbirth with controlling the baseline scores. In all the steps,  $P < 0.05$  was considered as significant, and the analyses were done as intention to treat. The confounder factors were controlled through defining inclusion and exclusion criteria as well as data analysis by adjusting the baseline scores of anxiety and depression.

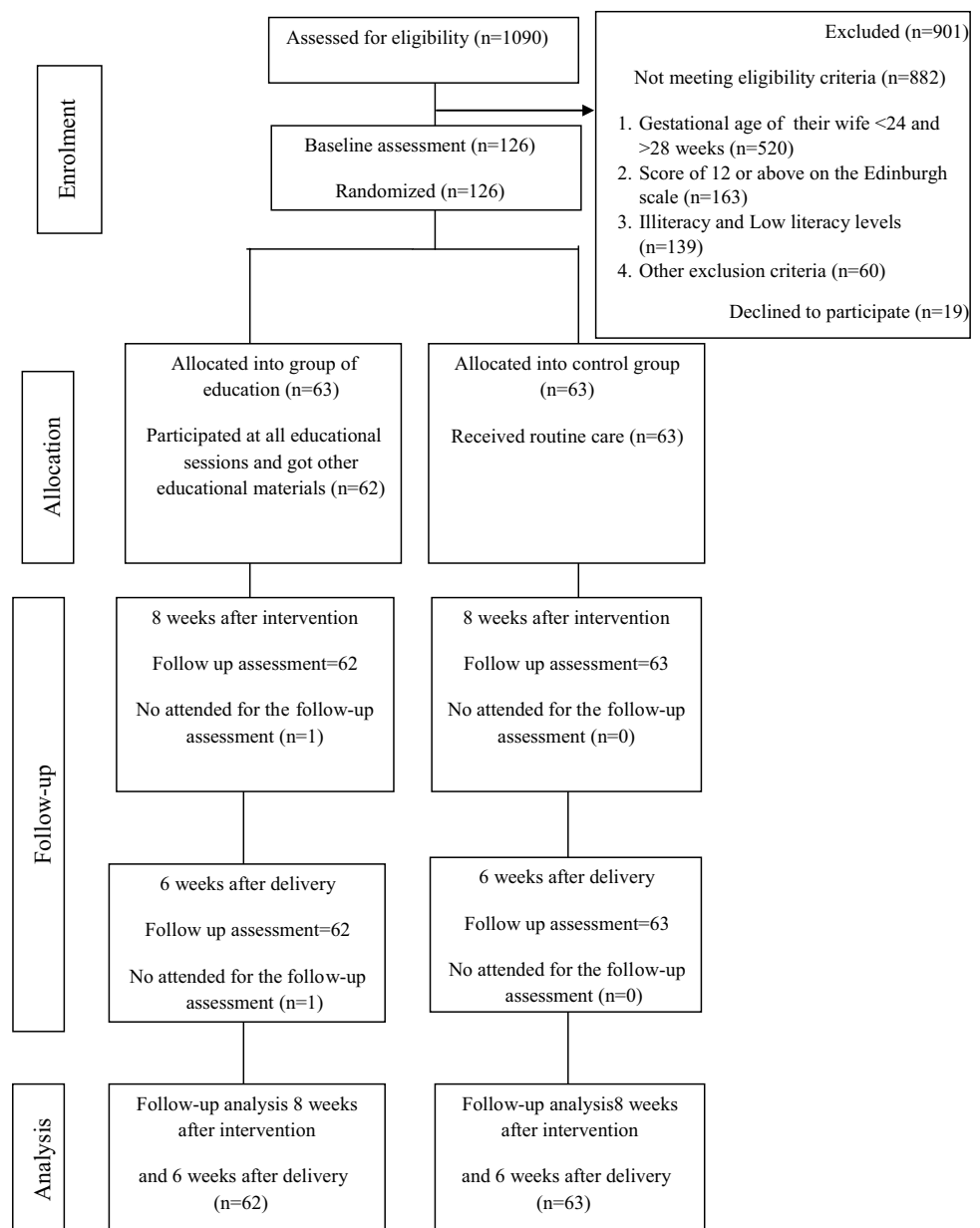
## Results

Sampling was done from 5 of January to 24 February, 2015. Among 1090 spouses of pregnant spouses, 208

subjects were eligible. Finally, 126 participants were willing to participate in the study. They were randomly divided into two groups having 63 participants each. One individual from the intervention group left the study from the first training session because he was not willing to cooperate; however, 125 participants stayed until the end (Fig. 1).

Considering the demographics, there was no statistically significant difference between the two groups ( $p < 0.05$ ) (Table 1). The average age (standard deviation) of participants was 31.9 (5.3). Almost one-third of men had a high-school and diploma education level (38%). The majority of them were self-employed (85.7%). The income level of one-fourth of men was sufficient (26.2%). The majority of pregnancies were wanted (88.1%). The majority of

**Fig. 1** Flowchart of the study



**Table 1** Socio-demographic characteristics of participants by study groups

Characteristics	Education for husband (n=63)	No education (n=63)	P-value
Age (years), mean (SD)	31.6 (4.6)	32.1 (6.0)	0.622*
Education (years)			0.266†
Secondary (6–8)	17 (27.0)	22 (35.0)	
High school (9–11)	4 (6.3)	9 (14.2)	
Diploma (12)	22 (35.0)	16 (25.4)	
University (13+)	20 (31.7)	16 (25.4)	
Economic status			0.698†
Favorable	17 (27.0)	16 (25.4)	
Partly favorable	35 (55.5)	39 (61.9)	
Unfavorable	11 (17.5)	8 (12.7)	
Gravid (wife), mean (SD)	1.52 (0.5)	1.62 (0.7)	0.669*
Wanted pregnancy	55 (87.3)	56 (88.9)	0.500§
Wife support			0.739 †
Low	1 (1.6)	0 (0)	
Moderate	36 (57.1)	34 (54.0)	
High	26 (41.3)	29 (46.0)	
Family support			0.886 †
Low	8 (12.7)	6 (9.5)	
Moderate	38 (60.3)	36 (57.1)	
High	17 (27.0)	21 (33.4)	

Data are presented as number (percent) unless otherwise stated

\*independent samples *t* test

§Fisher's exact test

†Chi square test for trend

men were pleased with the child's gender (98.4%), and few

participants (0.8%) reported that they were supported insufficiently by their spouses.

The average scores (standard deviation) of depression before intervention were 5.0 (3.8) and 4.4 (3.4) in the intervention and the control groups, respectively, so there was no statistically significant difference between the two groups before intervention ( $p=0.327$ ). The average scores (standard deviation) of depression 8 weeks after the intervention were 2.7 (3.4) and 4.3 (3.8) in the intervention group and the control group, respectively, so there was a statistically significant difference between groups while controlling the baseline scores and the number of children ( $p=0.004$ ), the average score of depression showed a significant decrease in the intervention group in comparison with the control group (adjusted difference:  $-1.6$ ; 95% CI  $-2.8$  to  $-0.5$ ). The average scores of depression 6 weeks after childbirth were 3.3 (4.3) and 6.6 (5.4) in the intervention and control group, respectively, so there was a statistically significant difference between groups while controlling the baseline scores and the number of children ( $p=0.001$ ), the average score of depression after childbirth in the intervention group showed a significant decrease in comparison with the control group (adjusted difference:  $-3.3$ ; 95% CI  $-5.0$  to  $-1.5$ ) (Table 2).

The average scores (SD) of state anxiety before the intervention were 35.0 (9.7) and 33.9 (9.3) in the intervention group and the control group, so there was no statistically significant difference between groups before the intervention ( $p=0.496$ ). The average scores (SD) of state anxiety 8 weeks after the intervention were 30.1 (7.7) and 35.8 (10.5) in the intervention and the control groups, respectively, so there was a statistically significant difference between the two groups while controlling the baseline score and the number of children ( $p<0.001$ ), the average score of state anxiety showed a significant difference in the intervention

**Table 2** Comparison of depression, state and trait anxiety scores by study groups

Outcomes	Intervention (n=62) Mean (SD)	Control (n=63) Mean (SD)	Comparison among the groups Intervention Vs. control MD (95% CI)*
Depression (0–30)			
Baseline	5.0 (3.8)	4.4 (3.4)	0.6 (−0.6 to 1.9)
8 weeks after Intervention	2.7 (3.4)	4.3 (3.8)	−1.6 (−2.8 to −0.5)
6 weeks after childbirth	3.3 (4.3)	6.6 (5.4)	−3.3 (−5.0 to −1.5)
State anxiety (20–80)			
Baseline	35.0 (9.7)	33.9 (9.3)	1.1 (−2.1 to 4.5)
8 weeks after Intervention	30.1 (7.7)	35.8 (10.5)	−5.7 (−8.6 to −2.9)
6 weeks after childbirth	31.0 (10.1)	38.5 (12.7)	−7.5 (−11.6 to −3.4)
Trait anxiety (20–80)			
Baseline	39.7 (9.3)	37.0 (9.1)	2.7 (−1.6 to 6.5)
8 weeks after Intervention	30.7 (7.6)	35.8 (9.7)	−5.0 (−7.8 to −2.2)
6 weeks after childbirth	30.5 (10.0)	38.8 (11.8)	−8.3 (−12.2 to −4.4)

\* Mean Difference (Confidence Interval 95%)



group in comparison with the control group ( $-5.7$ ;  $-8.6$  to  $-2.9$ ) (Table 2). The average scores (SD) of state anxiety 6 weeks after childbirth were 31.0 (10.1) and 38.5 (12.7) in the intervention and the control groups, respectively, so there was a statistically significant difference between the two groups while controlling the baseline scores and the number of children ( $p < 0.001$ ), the average score of state anxiety showed a significant decrease in the intervention group in comparison with the control group ( $-7.5$ ;  $-11.6$  to  $-3.4$ ) (Table 2).

The average scores (SD) of trait anxiety before the intervention were 36.3 (7.5) and 35.4 (8.0) in the intervention group and the control group, respectively. There was no statistically significant difference between groups before the intervention ( $p = 0.554$ ). The average scores (SD) of the trait anxiety 8 weeks after the intervention were 30.7 (7.6) and 35.8 (9.7) in the intervention and the control groups, respectively. There was a statistically significant difference between groups after the intervention while controlling the score before the intervention and the number of children ( $p = 0.001$ ), the average score of trait anxiety showed a significant decrease in the intervention group in comparison with the control group ( $-5.0$ ;  $-7.8$  to  $-2.2$ ) (Table 2). The average scores (SD) of trait anxiety 6 weeks after childbirth were 30.5 (10.0) and 38.8 (11.8) in the intervention group and the control group, respectively, so there was a statistically significant difference between the two groups while controlling scores before the intervention and the number of childbirths ( $p < 0.001$ ), the average score of trait anxiety showed a significant decrease in the intervention group in comparison with the control group ( $-8.3$ ;  $-12.2$  to  $-4.4$ ) (Table 2).

## Discussion

The research findings indicated that providing lifestyle-based training to fathers decreased their depression and anxiety in the prenatal and postnatal periods.

There was no similar study but according to the studies investigating the impact of preventive measures on the mental health, especially in the prenatal and postnatal periods, similar results were obtained. In a review study conducted by Martinsen et al. the physical activity in the prevention and treatment of depression and anxiety was mildly to moderately effective and could replace the common therapy of depression and anxiety (Martinsen 1990, 2008). In another review study, Carek et al. indicated that physical activity resulted in the improvement of physical health, life satisfaction, cognitive performance, and mental health and was mildly to moderately effective in the treatment of depression and anxiety (Carek et al. 2011). In another study, Doré and et al. reported that physical activity

improved mental health, decreased the scores of anxiety and depression, improved the self-image and increased self-confidence (Doré et al. 2016). No study was found about the impact of health sleep education on fathers mental health, but according to a study conducted by Kempler et al. training sleep health in the last 3 months of pregnancy decreased the score of postnatal depression (Kempler et al. 2012).

The results of the above mentioned studies were consistent with the present study, indicating the role of training and supporting the spouses of pregnant women in the prenatal and postnatal period. Therefore, it seems that more attention must be paid to fathers emotional problems in all interventions designed to prevent mental and emotional problems during pregnancy and after childbirth and because the involvement of fathers is required for the successful matching of both women and fathers with parenthood) Deave et al 2008.

The advantages of this study includes innovation and compliance with all the principles of clinical trials such as randomized allocation and concealment of allocation. The limitations of this study included the few number of training sessions because the fathers were so busy, although telephone counseling was carried on with fathers between training sessions. The other limitation of this study was that all fathers with current depression scores (below or above 12) were entered to the study.

Given the fact that fathers were also prone to psychological disorders such as depression and anxiety in the prenatal and postnatal periods, and since such problems were not taken into account enough, it is suggested that more studies be conducted in order to investigate the preventive measures, especially the impacts of preventive programs on fathers' depression and anxiety. It is advised to consider more sessions to train fathers in the prenatal and postnatal periods in the future studies. Also, conducting of qualitative studies such as for exploring of fathers' experiments regarding factors that contribute to paternal anxiety and depression was recommended.

## Conclusion

This study indicated that providing fathers with lifestyle-based training decreased the scores of their depression and anxiety in the prenatal and postnatal periods. Given the cheapness and easiness of implementing training intervention, especially on the improvement of health-related behaviors, high satisfaction of mothers and their spouses with involving fathers in the program, increasing men's awareness of prenatal problems and considering multiple impacts of men's anxiety and depression on family's health in the prenatal and postnatal period, such interventions

should be considered as a part of prenatal and postnatal cares.

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