



## Comparing brain-behavioral systems, early maladaptive schemas, and preservative thinking in women with and without pregnancy anxiety in the health center of Ardabil Province, Iran

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### Original Article

#### Abstract

**BACKGROUND:** Anxiety and depression in women during pregnancy could be associated with unfavorable consequences of pregnancy, such as premature and low-weight newborn birth. Current study was conducted aiming to compare brain-behavioral systems, early maladaptive schemas (EMSs), and preservative thinking in women with and without pregnancy anxiety.

**METHODS:** The method of this research was causal-comparative. The population included of the whole pregnant women who had been referred to Urban Health Service Centers of Ardabil Province, Iran, in order to receive pregnancy period cares at first quarter of 2017. 30 pregnant women whose pregnancy anxiety had been diagnosed by mental health experts and the physicians of the center through screening and administering Pregnancy-related Anxiety Scale (PrAS) were selected using cluster random sampling. 30 women without anxiety were matched with the women having pregnancy anxiety in terms of age, times of pregnancy, number of children, education level, and economic status. For data collecting, Huizink et al.'s PrAS, Young Schema Questionnaire (YSQ) of Welburn et al., the behavioral inhibition system/behavioral activation system (BIS/BAS) scale of Carver and White, and Ehling et al.'s Preservative Thinking Questionnaire (PTQ) were used. The obtained data were analyzed by multivariate analysis of variance (MANOVA) using SPSS software.

**RESULTS:** The results of MANOVA showed that there was a significant difference between brain-behavioral systems, EMSs, and preservative thinking in women with and without pregnancy anxiety ( $P < 0.010$ ).

**CONCLUSION:** Since maladaptive schemas, brain-behavioral systems, and preservative thinking are higher in pregnant women with anxiety than pregnant women without anxiety, so counselling, supportive, and training programs are essential for vulnerable mothers.

**KEYWORDS:** Early Maladaptive Schemas; Behavior; Thinking; Anxiety

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### Introduction

Pregnancy anxiety is referred to worries, preoccupations, and fears of person about pregnancy, delivery, newborn health, and

future parenting. Anxiety and depression during pregnancy could be associated with undesirable consequences of pregnancy such as premature and low-weight baby birth.<sup>1</sup> One of the factors which seems to be related to pregnancy anxiety is called early maladaptive schemas (EMSs).<sup>2</sup> This concept usually stems of dissatisfying primary needs, in particular childhood affective needs.<sup>3,4</sup> Briggs and Price

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in a study on childhood concluded that childhood undesirable experience was related strongly with obsessive-compulsive beliefs and symptoms, but this relation was not significant after controlling depression and anxiety and only a weak relationship was observed.<sup>5</sup> Also, Shahamat concluded in his study on schema and anxiety relationship that schemas predicted anxiety symptoms significantly.<sup>6</sup>

The other factor which could be related to pregnancy anxiety is brain-behavioral systems. McNaughton and Gray's framework of animals' learning research and psychedelic drugs' effects have pointed to different biological systems based on separate evolution of reinforcement and punishment mechanisms in the brain of vertebrates.<sup>7</sup> According to McNaughton and Gray, in mammal's brain, behavior control is conducted through three brain-behavioral systems relating to each other.<sup>7</sup> Studies show the relevance of behavioral inhibition system to punishment sensitivity, unfavorable and negative effect, and depression and anxiety symptoms.<sup>8,9</sup> The other variable which could be related to pregnancy anxiety is preservative thoughts. This concept is one of the characteristics of usual human mind and includes of self-attributions derived by events, topics, and behaviors associating a negative concept.<sup>10,11</sup> In this way, Drost *et al.* showed in their study that individual with high preservative thought would experience high levels of depression and anxiety.<sup>10</sup> In another study, Spinhoven *et al.* showed that there was a relationship between high preoccupation and depression and generalized anxiety disorder (GAD).<sup>12</sup>

In general, pregnancy is one of the important periods of life and a vulnerable period in which women are in contact to maladaptive social, mental, and physical conditions, and their affective and physical needs would be increased. So, it provides unique opportunity for anxiety expression. In regard to conducted research, pregnancy

anxiety jeopardizes mental health of baby and mother and it seems that behavioral-brain system leads to anxiety in pregnant women by impacting on their mind state, and also it is possible that maladaptive schemas and preservative thinking increase anxiety by inducing negative concepts in the mind of the mother; so, it is essential to identify the effective factors in predicting anxiety during pregnancy.<sup>12</sup> Therefore, the current study was conducted aiming to investigate the EMSs, brain-behavioral systems, and preservative thoughts in women with pregnancy anxiety.

## Materials and Methods

The method of this research was causal-comparative which was conducted retrospectively. The population included of the whole pregnant women referring to medical health centers of Ardabil Province, Iran, in order to receive pregnancy period cares at the first quarter of 2017. Because minimal number of samples in comparative research is 15,<sup>13</sup> 30 persons of pregnant women whose pregnancy anxiety had been diagnosed by mental health expert and physician of center through screening and administering Pregnancy-related Anxiety Scale (PrAS) were selected using cluster random sampling and 30 women without anxiety were matched with women having pregnancy anxiety in terms of age, times of pregnancy, number of children, education level, and economic status. Inclusion criteria were: lack of known problems like asthma, kidney and cardiovascular disease (CVD), diabetes and lack of known mental disorders such as depression, panic disorder, and sleep disorder. Exclusion criterion was disinclination to collaborate with researchers.

PrAS: This scale was created by Huizink *et al.* and includes 10 items and three sub-scales (fear of disabled child birth, fear of delivery, and worry about own appearance). Each item is scored in a 4-point Likert scale (absolutely true to absolutely false). Chronbach's alpha

coefficient of this study has been reported between 0.75 to 0.85 for total score and subscales, respectively.<sup>14</sup> Huizink *et al.* stated that this scale had a good content and face validity.<sup>14</sup> Basharpour *et al.* have reported the validity of scale as desirable and reported the Chronbach's alpha coefficients of 0.75 to 0.91 for its total score and subscales, respectively.<sup>15</sup> In this study, reliability coefficient of this scale obtained between 0.74 to 0.89 using Chronbach's alpha method.

Young Schema Questionnaire-Short Form (YSQ-SF): This scale has 75 items and has been designed for assessing 15 EMSs.<sup>16</sup> Each of these 75 items is scored in a 6-point Likert scale. Individual score in each schema obtains by the sum of the items related to that schema. High scores are indication of outstanding presence of maladaptive schema.<sup>16</sup> In the study of Welburn *et al.*, all of the 15 subscales of YSQ-SF had enough to very good internal consistency. Chronbach's alpha of all schemas was computed 0.76 to 0.93. Also, validity of the scale was reported as desirable.<sup>17</sup> In the study of Yousefi *et al.*, scale reliability by method of internal consistency was 0.94 using Chronbach's alpha.<sup>18</sup> In the current study, reliability coefficient of this scale was between 0.72 to 0.87 in the subjects.

The behavioral inhibition system/behavioral activation system (BIS/BAS) scale: It has 20 items (7 items for inhibition and 13 items for activation).<sup>19</sup> Activation scale has three subscales including response to reward (5 items), drive (4 items), and recreation and happiness-seeking (4 items). According to corrected theory of reinforcement sensitivity theory (RST) and factor analysis of Heym *et al.*, this scale has 5 subscales including: anxiety-behavioral inhibition system, fear/freeze/flight/fight system, responding to reward of behavioral activation systems, drive of behavioral activation system, and recreation-seeking of behavioral activation system.<sup>19</sup> Each item is scored in a 4-point

Likert scale. Internal consistency of inhibition scale was 0.74 and internal consistencies of activation subscales were 0.73, 0.76, and 0.66, respectively. Psychometric properties of Persian version of this scale was confirmed in Iran. Also, internal consistency of inhibition scale has been reported 0.47 and internal consistency of activation subscales have been reported 0.73, 0.60, and 0.78, respectively.<sup>20</sup>

Preservative Thinking Questionnaire (PTQ): This scale is designed with the aim of evaluating repetitive negative thought (RNT).<sup>21</sup> It is a self-report measure including 15 items that is utilized commonly in patients with depression and other mood disorders. This scale has a good internal consistency, so that Ehring *et al.* confirmed its validity and reported Chronbach's alpha coefficient for total test and subscales between 0.83 to 0.95, respectively.<sup>21</sup> Moreover, validity of the scale has been confirmed in Iran and its reliability coefficient was 0.70.<sup>22</sup> In this study, reliability coefficient of the scale was about 0.87.

In order to administer this study, after doing necessary coordination, one of the health centers was randomly selected among the 17 other centers. After referring to that clinic, samples having pregnancy anxiety and matched group were selected from the whole pregnant women who had been referred for receiving pregnancy cares. After explaining the goals of study, subjects were asked to complete the scales individually in the health center. In order to follow ethical considerations, all the subjects had complete freedom and the goals of study were explained before completing scales. It was assured that obtained data will be analyzed collectively. Data were analyzed using multivariate analysis of variance (MANOVA) and SPSS software (version 16, SPSS Inc., Chicago, IL, USA).

## Results

According to the results of the study, 30 pregnant women having pregnancy anxiety

**Table 1. Mean and standard deviation (SD) of preservative thinking, brain-behavioral systems, and early maladaptive schemas (EMSs)**

Variable	Women with pregnancy anxiety	Women without pregnancy anxiety
	Mean $\pm$ SD	Mean $\pm$ SD
Preservative thinking	39.22 $\pm$ 12.19	21.18 $\pm$ 8.04
Brain-behavioral systems	57.14 $\pm$ 15.16	30.16 $\pm$ 9.18
EMS	280.58 $\pm$ 78.14	197.14 $\pm$ 58.19

EMS: Early maladaptive schema; SD: Standard deviation

and 30 pregnant women without pregnancy anxiety participated in this research. Mean age of the women having pregnancy anxiety was 23.26 years [standard deviation (SD) = 9.46] and this value for the women without pregnancy anxiety was 31.47 years (SD = 2.91). 39.6% of them were in the first birth, 33.7% had one child, 24.2% had two children, and 2.5% had three children. 63.2% were house-keeper and 36.8% were job-holder.

According to table 1, mean and SD of EMSs, brain-behavioral systems, and preservative thinking scores is presented.

**Table 2. Kolmogorov-Smirnov test (K-S test)**

Variable	Statistic	df	P
Preservative thinking	0.11	60	0.060
Brain-behavioral systems	0.08	60	0.200
EMS	0.06	60	0.200

EMS: Early maladaptive schema; df: Degree of freedom

As it is presented in table 2, significance level of normality test was 0.05 for all the variables; so, it could be said that distribution of intended scores is near to normal distribution. Therefore, the first preposition for administrating MANOVA was observed.

In order to examine the preposition of variance-covariance matrix coincidence in the research groups, Box test was conducted.

Investigating the results of Box test showed that it was not significant; so, the assumption of variance-covariance matrix equality was not refused.

**Table 3. Results of BOX test and Levene's test**

Levene's test	16.83	Box test
2.76	2.65	F
0.056	0.054	P

According to above table, F-value (2.65) was not significant in error level; so, null hypothesis was not rejected (Table 3).

For determining the group effect on dependent variables, Wilks' lambda test was used and results are reported in table 4.

According to these results, value of Wilks' lambda was 0.17 that is significant in  $P < 0.050$ . The results of Wilks' lambda showed that there was a significant difference between two groups at least in one of the items (brain-behavioral systems, EMSs, and preservative thinking).

According to these results, there was a significant difference between two groups, having anxiety of pregnancy and normal, in preservative thinking ( $F = 17.56$ ,  $P < 0.010$ ), and preservative thinking score of pregnant women was significantly more than those of non-pregnant women. 23% of preservative thinking variance could be explained by group variable.

**Table 4. Results of multivariate analysis of variance (MANOVA) tests for group effects**

Test name	Value	F	df	df error	P	Eta squared
Pillai's trace	0.820	26.60	9	50	0.001	0.82
Wilks' lambda	0.170	26.60	9	50	0.001	0.82
Hotelling's trace	4.780	26.60	9	50	0.001	0.82
Roy's largest root	4.780	26.60	9	50	0.001	0.82

Df: Degree of freedom



**Table 5. Results of univariate analysis of variance (ANOVA) on the means of brain-behavioral systems, early maladaptive schemas (EMSs), and preservative thinking**

Item	Reference	Sum of squares	df	Mean of squares	F	P
Preservative thinking	Group	2470.41	1	2470.41	17.56	0.001
	Error	8156.83	58	8156.83		
Brain-behavioral systems	Group	9525.60	1	9525.60	62.01	0.001
	Error	8909.80	58	8909.80		
EMS	Group	4403.26	1	4403.26	23.58	0.001
	Error	10829.13	58	10829.13		

Df: Degree of freedom; EMS: Early maladaptive schema

Also, there was a significant difference between two groups in brain-behavioral systems variable ( $F = 62.01$ ,  $P < 0.010$ ), so that score of the brain-behavioral systems in the group having pregnancy anxiety was more than that of the normal group, significantly. Group variable explains 52% of brain-behavioral systems variance. Lastly, there was a significant difference between two groups in EMSs ( $F = 23.58$ ,  $P < 0.010$ ) in which EMS score of the group having anxiety of pregnancy was significantly more than that of normal group. 29% of EMSs could be explained by group variable (Table 5).

## Discussion

This study was conducted with the aim of comparing brain-behavioral systems, EMSs, and preservative thinking in women having pregnancy anxiety and normal group (Table 5). Results showed that there was a significant difference between women with and without anxiety of pregnancy in EMSs. This finding is in accordance with the other findings.<sup>3-5</sup> In explaining the achieved results, it could be said that women having pregnancy anxiety have shaped maladaptive schemas in their minds from childhood; accordingly, they are seeking for satisfying their unmet needs and experience intense anxiety because of disability to responding them.<sup>3</sup> Moreover, they are emotionally unstable, unpredictable, unreliable, and irregular. Threat overestimation, fear of losing control, and hypervigilance toward risk are among important topics of cognitive structure in

anxiety disorders,<sup>4</sup> which seems that are related to maladaptive schemas in women having anxiety of pregnancy. Schemas are the results of damaging experiences which grow during childhood or youth and are the product of the life. Moreover, these schemas are developed and fixed in the early periods of life and are valid representations of unpleasant experiences of childhood, so they lead to negative emotions and inefficient behaviors like pregnancy anxiety.

Findings showed that there was a significant difference in brain-behavioral systems between the women with and without anxiety of pregnancy (Table 5). This finding was along with the other researches.<sup>7-9</sup> For explaining this result, it could be said that behavioral inhibition controls anxiety-like experiences in reaction to anxiety-related signs. Therefore, with declining behavioral inhibition, anxiety decreases. Activation system responds to all conditioned and unconditioned desirable stimulations and evokes the desirable emotion of predicted joy. According to BIS/BAS items, person's anxiety could be predicted. Predictive variables, namely behavioral inhibition and recreation-seeking, have significant and negative relation to health variable, whereas fight-or-flight item has significant and positive relationship with this variable.<sup>7,8</sup> In fact, behavioral inhibition in the women having pregnancy anxiety is more than healthy people and it appears that emotional externalization in these women is fewer than healthy people.<sup>9</sup> Findings of the current study show that increase in fight-or-

flight item relates to health variable. This item is a part of behavioral inhibition and behavioral inhibition is responsible of negative feeling experience such as anxiety, worry, fear, sadness, and sorrow in response to their related signs.

Moreover, findings showed that there was a significant difference in preservative thinking between the women with and without anxiety of pregnancy (Table 5). This finding was associated with the other researches.<sup>10-12</sup> In order to explain this finding, it could be noted that preservative thinking like alternation in perception, may limit the reality invitation and induce anxiety.<sup>10</sup> Therefore, people having preservative thinking experience little and temporary moments without any important outcome, while they have fixed some of these beliefs and opinions in their minds that eventually may threaten their mental health and lead to anxiety.<sup>12</sup> Moreover, preservative thinking is related to anxiety by worrying about control losing and helps to worsening of anxiety signs. This finding affirms that attending to thinking styles and content are essential in the treatment process of this disorder.

One of the limitations of the current study was lack of random sampling in patients who had been referred to health centers of Ardabil County. Economic status, amount of family and social support, and history of cesarean or natural delivery also were not investigated. Therefore, it is essential to consider caution in generalizing the findings. We recommend to midwives and other healthcare professionals to perform training, supportive, and counseling programs in coordination with mental health expert and center physician and thereby provide enhancement for mental health level of mothers. Inability in controlling some bothering variables such as pregnancy month, pregnancy age, and socio-economic status of the family are among some other limitations of the study that needs to more research in the future.

## Conclusion

People having perseverative thinking experience few and instantaneous moments of this type of thinking without any important consequence; while some people have fixed and extended beliefs and opinions in their mind that eventually repeating these negative thoughts could threaten their mental health and lead to anxiety.

## Conflict of Interests

Authors have no conflict of interests.

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