

**Magdalena Z. Podolska, Mikołaj  
Majkowicz, Mariola Bidzan, Piotr  
Pankiewicz, Olimpia  
Sipak-Szmigiel, Jacek Podolski**

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**Increased neuroticism aggravates the  
risk of depressive symptoms  
pregnant women**

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MAGDALENA Z. PODOLSKA\*

NZOZ Meditest, Department of Medical Diagnostics, Szczecin

Department of Feto-Maternal Medicine, Pomeranian Medical University, Szczecin

MIKOŁAJ MAJKOWICZ

Department of Quality of Life Research, Medical University of Gdańsk

MARIOLA BIDZAN

Department of Clinical Psychology and Neuropsychology, Institute of Psychology, University of Gdańsk

PIOTR PANKIEWICZ

Chair and Clinic of Psychotic and Neurotic Disorders, Medical University of Gdańsk

OLIMPIA SIPAK-SZMIGIEL

Department of Feto-Maternal Medicine, Pomeranian Medical University, Szczecin

JACEK PODOLSKI

NZOZ Meditest, Department of Medical Diagnostics, Szczecin

## **INCREASED NEUROTICISM AGGRAVATES THE RISK OF DEPRESSIVE SYMPTOMS PREGNANT WOMEN**

### **Abstract**

The objective of this paper was to present personality traits and the role of personality factors in the pathogenesis of depression, as well as in predicting the incidence of depressive symptoms amongst women in pregnancy. The study involved 134 pregnant women (gestational age between 32 and 40 weeks, 50 ones with perinatal depression symptoms, and 84 controls). Increased neuroticism was revealed a factor aggravating the risk of depressive

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\* Correspondence adress: [magdalena.podolska@meditest.pl](mailto:magdalena.podolska@meditest.pl)

symptoms during pregnancy (OR=1.23). Pregnant women suffering from prenatal depression differed in their self-assessment of real psychological needs but not with respect to ideal (expected) self-image. These differences demonstrated their lack of self-acceptance. In conclusion, some personality traits (such as neuroticism, introversion, a lower score of openness, agreeableness and conscientiousness) and self-assessment of real psychological needs are important psychological factors in the pathogenesis of depression, as well as in the prediction of the incidence of depressive symptoms amongst women in pregnancy.

### 1. THEORETICAL PART

As many as 25-30% of pregnant women are affected by depressive disorders (Steiner and Yonkers, 1999; Podolska et al., 2010; Podolska et al., 2009 a). Depression not only influences the mental health of future mothers, but also the course of pregnancy, labour, development of the newborn, and the status of partnership relations in the family (Buist et al., 2006; Kossowska-Patrycka and Walęcka-Matyja, 2007; Leigh and Milgrom, 2008; Milgrom et al., 2008). Thus, it is critical to detect depressive symptoms in pregnant women early, so that effective therapeutic treatment may be applied (Evans et al., 2001; Podolska et al., 2010; Podolska et al., 2009 b).

Special questionnaire tools, including the Edinburgh Postpartum Depression Scale (EPDS), are used to detect the symptoms of perinatal depression in the clinical setting (Cox et al., 1987; Cox and Holden, 2003; Thopl et al., 2004; Jardi et al., 2006). Moreover, the identification of risk factors and individual predispositions to the development of depression in pregnancy is equally important, as it allows for the implementation of effective prophylaxis or psychological and diagnostic supervision. A number of risk factors predisposing to the development of fully symptomatic pre- and postnatal depression have been identified in past years (Austin and Lumley, 2003; Austin, 2004; Verkerk et al., 2005; Bunevicius et al., 2009; Gibson et al., 2009; Podolska et al., 2009 a, b, c, d; Surkan et al., 2009). Knowing these risk factors, therapists may try to eliminate them or reduce their intensity (O'Hara et al., 2000; Hayes et al., 2001; Field et al., 2008). However, the multifactorial nature of perinatal depression hinders the detection of predictive factors in the clinical setting using routine screening tools.

Personality traits are some of the factors that have not been thoroughly examined, although their impact on the incidence of pre- and postnatal depression is certainly significant. Personality factors are not assessed in routine depression screening with the aforementioned questionnaire tools, and this may result in the lower sensitivity and the positive predictive value of the test (Austin and Lumley, 2003; Verkerk et al., 2005; Podolska et al., 2010; Podolska et al., 2009 a, c, d). Consequently, it is crucial to determine all high-risk personality traits predisposing to perinatal depression and those that may be useful as additional diagnostic markers enhancing the efficacy of depression screening programs.

The objective of this paper is to present personality traits and the influence of personality factors in the pathogenesis of depression, as well as the prediction of the incidence of depressive symptoms in pregnant women.

## 2. METHODS

### 2.1. SAMPLE

The study involved 134 pregnant women (18 to 45 years of age, mean  $28.1 \pm 0.7$ ) admitted to the Department of Feto-Maternal Medicine, Pomeranian Medical University in Szczecin in 2006-2007 whose gestational age ranged between 32 and 40 weeks. The authors were granted the permission of the Pomeranian Medical University Commission for Bioethics to conduct the study, and received the informed consent of all the patients participating in the program.

### 2.2. STUDY DESIGN

Apart from a detailed clinical assessment of the patients conducted by the doctors within the routine obstetric/gynaecological history, EPDS questionnaires were used as a screening test for perinatal depression symptoms. The critical score indicating depression symptoms was  $>12$  points on a scale of 30 (Cox et al., 1987; Cox and Holden, 2003). With the use of the EPDS questionnaire, women were assigned to either the study group (SG) – 50 pregnant women with perinatal depression symptoms, or the control group (CG) – 84 pregnant women without perinatal depressive symptoms. Apart

from the EPDS questionnaire, the patients were asked to fill in a demographic questionnaire including data on education, marital status and place of residence, as well as two questionnaires assessing personality traits: the Costa and McCrae Personality Inventory (NEO-FFI) (McCrae and Costa, 1987; Costa and McCrae, 1992; Zawadzki et al., 1998) and the Adjective Check List (ACL) developed by Gough and Hilbrun (Matkowski, 1984; Juros and Oleś, 1993). Continuous variables were presented as arithmetic means and their standard deviations (SD). Arithmetic means between SG and CG groups were compared with the non-parametric Mann-Whitney U test. The risk of depressive symptoms based on the personality dimensions tested with the NEO-FFI was expressed as an odds ratios (OR) and their 95% confidence intervals (CI). Calculations were performed using the Statistica 6.0PL (StatSoft®, Poland) package, with statistical significance defined as  $p \leq 0.05$ .

### 2.3. TOOLS

The Polish version of the NEO-FFI by Zawadzki et al. (1998) is a self-report questionnaire based on 60 declarations. It was used to evaluate five personality factors: neuroticism (NEU), extraversion (EX), openness to experience (OPE), agreeableness (AGR) and conscientiousness (CON). The patients filled in the Polish version of the ACL test by Juros and Oleś (1993) twice: they circled adjectives, which they thought best described their personality and answered the question: “What am I like?” (real self) and “What would I like to be like?” (ideal self). The change in personality structure was assessed in two out of five categories of scales included in the ACL. The first category includes 15 scales of psychological needs: Achievement – Ach, Dominance – Dom, Endurance – End, Order – Ord, Intraception – Int, Nurturance – Nur, Affiliation – Aff, Heterosexuality – Het, Exhibition – Exh, Autonomy – Aut, Aggression – Agg, Change – Cha, Succorance – Suc, Abasement – Aba and Deference – Def. Another ACL category is comprised of 9 topical scales pertaining to selected personality traits including the following: Counselling Readiness – Crs, Self-Control – Sch, Self-Confidence – Sef, Personal Adjustment – Pad, Ideal Self – Iss, Creative Personality – Cps, Military Leader – Mls, Masculine – Mas, and Feminine – Fem. ACL results were analyzed by means of software deve-

loped by the Computing Centre of the Catholic University of Lublin. The results provided the basis for the assessment of real self and ideal self in patients presenting antenatal depression symptoms and in those of the control group (pregnant women without symptoms of depression).

### 3. RESULTS

While analyzing individual personality factors in the group of pregnant women presenting with symptoms of depression, significant intensity of neuroticism was observed as compared to controls without depression. The patients with antenatal depression symptoms demonstrated a higher degree of introversion as compared to controls, who demonstrated a higher score of extraversion with significantly more frequency. Moreover, pregnant patients presenting with symptoms of depression demonstrated a lower score of openness, agreeableness, and conscientiousness in comparison to pregnant women without depression (Table 1).

Neuroticism was a factor significantly increasing the risk of the manifestation of antenatal depression symptoms in pregnant women. The factors reducing the risk for the manifestation of symptoms of antenatal depression included extraversion, a higher score of openness to experience, agreeableness, and conscientiousness (Table 1).

Table 1. Comparison of the group of pregnant women presenting with symptoms of depression (SG,  $n=50$ ) and the control group without depressive symptoms (CG,  $n=84$ ) in terms of five personality dimensions measured with the NEO-FFI test (mean $\pm$ SD) along with the risk (OR, 95% CI) of the manifestation of symptoms of depression in pregnant women based on personality factors measured with the NEO-FFI.

Dimension	SG	CG	<i>p</i> value	OR (95% CI)
Neuroticism	38.65 $\pm$ 7.52	28.81 $\pm$ 6.54	0.0001	1.23 (1.14-1.33)
Extraversion	37.86 $\pm$ 7.39	42.59 $\pm$ 5.81	0.001	0.90 (0.84-0.95)
Openness	36.59 $\pm$ 6.43	39.26 $\pm$ 5.07	0.05	0.92 (0.86-0.98)
Agreeableness	41.76 $\pm$ 4.37	43.59 $\pm$ 4.21	0.05	0.90 (0.83-0.99)
Conscientiousness	44.79 $\pm$ 6.42	47.96 $\pm$ 5.65	0.001	0.91 (0.85-0.98)

The results of the self image analysis in the area of the real self and ideal self in the study and control groups revealed that pregnant women manifesting symptoms of perinatal depression demonstrated significantly lower scores with respect to their needs when describing the real self on the scale of psychological needs: Achievement, Dominance, Endurance, Affiliation, Exhibition, and Autonomy. However, their scores in Succorance and Abasement were significantly higher. With regard to the topical scales, pregnant women in the study group scored significantly lower in Self-Confidence, Personal Adjustment, Ideal Self, and Creative Personality. Within the same category of the ACL test, pregnant women with symptoms of depression scored higher only in Personal Adjustment (Table 2).

The analysis of the patients in terms of ideal self proved that pregnant women manifesting symptoms of depression had significantly higher values as compared to the control group only in the need scales: Affiliation and Heterosexuality (Table 2).

Table 2. Real self-image (Real Self) and ideal self-image (Ideal Self) in the area of psychological needs and topical scales (mean±SD) in pregnant women with symptoms of depression (SG,  $n=50$ ) in comparison to pregnant women without depression (CG,  $n=84$ ).

ACL scales	Real Self			Ideal Self		
	SG	CG	<i>p</i> value	SG	CG	<i>p</i> value
Need scales						
Achievement, Ach	45.18±6.41	48.25±6.76	0.05	51.60±7.08	51.56±6.89	ns
Dominance, Dom	45.88±7.36	50.36±6.58	0.001	55.52±4.75	55.34±6.67	ns
Endurance, End	47.30±8.89	51.29±7.88	0.05	53.44±7.32	52.39±6.42	ns
Order, Ord	49.96±8.45	52.21±8.15	ns	55.44±7.47	54.25±7.60	ns
Intrasection, Int	40.32±6.68	43.02±7.20	ns	41.80±5.93	42.98±6.93	ns
Nurturance, Nur	43.30±7.77	44.69±6.62	ns	41.24±5.95	39.91±5.35	ns
Affiliation, Aff	36.82±8.66	43.14±9.96	0.05	41.30±7.05	37.92±8.19	0.01
Heterosexuality, Het	43.94±9.90	45.55±6.73	ns	45.50±7.69	42.67±6.55	0.05
Exhibition, Exh	49.70±7.23	52.50±6.30	0.05	55.06±4.73	54.13±5.46	ns
Autonomy, Aut	48.22±5.70	49.69±4.52	0.05	53.30±5.35	53.86±5.99	ns
Aggression, Agg	51.80±7.54	51.24±6.16	ns	52.92±5.19	52.20±5.56	ns

Change, Cha	44.32±6.37	43.98±6.98	ns	43.64±5.62	43.95±5.53	ns
Succorance, Suc	54.40±5.82	49.06±5.93	0.001	40.18±7.26	39.59±7.38	ns
Abasement, Aba	53.40±7.98	48.71±6.56	0.01	40.78±5.27	41.02±6.09	ns
Deference, Def	49.56±6.57	49.77±5.81	ns	44.42±5.13	43.75±5.20	ns
Topical Scales						
Counselling Readiness, Crs	48.74±7.26	45.27±7.03	0.01	48.46±6.62	50.47±6.35	ns
Self-control, Scn	49.68±6.65	49.86±5.96	ns	47.46±5.38	46.77±5.02	ns
Self-confidence, Scf	44.48±9.28	50.25±8.08	0.001	58.08±7.30	57.58±9.53	ns
Personal Adjustment, Pad	39.76±6.54	44.20±5.60	0.001	44.54±5.40	44.72±5.99	ns

ns – statistically nonsignificant

#### 4. DISCUSSION

This is the first paper presenting a comprehensive description of the personality profiles of pregnant women with symptoms of depression assessed by the use of the NEO-FFI and ACL questionnaires.

The results demonstrate that personality traits measured with the NEO-FFI inventory are associated with the risk of the manifestation of antenatal depression symptoms. The score in neuroticism is a particularly useful predictor. Pregnant women scoring higher in neuroticism are at higher risk for depressive symptoms. Verkerk et al. (2005) demonstrated a similar correlation in women presenting with symptoms of postpartum depression.

Neuroticism is a personality factor reflecting emotional adaptability versus emotional instability; that is, a tendency to experience negative emotions, such as fear, confusion, displeasure, anger, guilt or susceptibility to psychological stress (McCrae and Costa, 1987; Zawadzki et al., 1998). The perinatal period, and especially pregnancy and imminent labour, are undoubtedly difficult and stressful events. In the face of impending birth, women with an increased degree of neuroticism are at higher risk for inadequate adaptation, eventually resulting in the development of depressive symptoms (Verkerk et al., 2005; Podolska et al., 2010; Podolska et al., 2009a).

The results also indicate the significant role of other personality traits measured by the NEO-FFI, which might prove to be beneficial in coping with stress, especially in pregnancy. The risk of symptoms of pregnancy-related depression is significantly lower in women with dominant extraversion-re-

lated traits, characterized by a high degree of activity, energy and ability to experience positive emotions. Episodes of depression are also less probable among women with greater openness to experience, which is a personality trait describing an individual's tendency to search for and evaluate life experiences positively, to tolerate new things, and reveal cognitive curiosity. Moreover, those pregnant women who exhibit higher levels of agreeableness are more immune to the stress of pregnancy and the risk of depression. Agreeableness is a dimension describing, at its positive extreme, a good attitude towards people, an interpersonal orientation manifested by altruism experienced in feelings, thoughts and activities. Conscientiousness is also a factor reducing the risk of the development of depression in pregnancy.

Studies on self-image in pregnant women have been rather scant to date. The study conducted by Kornas-Biela (1993) demonstrated that pregnant women manifest such substantial changes in their self-image that their environment should take them into account. With regard to the need scales, high scores in Succorance and Agreeableness and lower scores in Change, Openness to Experiments and Affiliation deserve particular attention, and their meeting or failure to meet them influences the specific functioning of pregnant women. Moreover, this specificity is related to the quality of the marital relationship, which in turn affects the manner in which women experience their pregnancy (Kornas-Biela, 1993; Miller, 2002; Rich-Edwards et al., 2006; Bilszta et al., 2008; Milgrom et al., 2008; Yong-Ku et al., 2008; Podolska et al., 2010; Podolska et al., 2009 b).

Our study on personality profiles of pregnant women with depressive symptoms demonstrated that significant differences (as compared to the control group) occur primarily in the real self. As regards pregnant women without depressive symptoms, differences were observed with respect to: 1) the number of positive and negative adjectives used to describe personality, 2) need scales (Achievement, Dominance, Endurance, Affiliation, Exhibition, Autonomy, Succorance, Abasement, and Deference), and 3) topical scales, i.e. Change, Self-Confidence, Personal Adjustment and Creative Personality. It seems that the appearance of perinatal depression symptoms considerably disturbs personality processes. At the current stage of research, it is possible, however, that certain personality traits discriminating the self-image predispose a number of women to the development of depression in pregnancy. It is also likely that pregnant women with depressive symptoms

describe their personality in a different manner only in pregnancy, which demonstrates the significance of their special, pregnancy-related, psychological and biological situation (Akhtar-Danesh and Landeen, 2007; Podolska et al., 2010; Podolska et al., 2009 c). To outline the direction of correlations between mood disturbances and the self-image in pregnant women with depressive symptoms, it is necessary to extend the studies and conduct assessment of the personality profile with respect to the real self and ideal self again after delivery in the patients studied, as well as in women who do not present with depressive symptoms until after delivery.

## 5. CONCLUSIONS

In conclusion, we have found that a higher degree of neuroticism is a distinct vulnerability factor which certainly increases the risk of depressive symptoms in pregnancy. This personality trait may be crucial for the assessment of the risk of depression in pregnancy and may potentially be used as an additional marker in the screening of perinatal depression. It has also been observed that women suffering from antenatal depression disorders are different in self-assessment as regards a number of their needs, but not with respect to the ideal (expected) self. These numerous and significant differences between the ideal and real self in pregnant women with antenatal depression disorders demonstrate their lack of self-acceptance, which requires individualized psychological intervention.

This study confirmed the role of personality traits in the pathogenesis of depression and prediction of depressive symptoms in pregnant women. Therefore our results have serious practical implications. One should realize both perspectives and necessity for screening for perinatal depression, among others by means of tools that were used in this study. Properly performed screening is of vital importance since the early detection and management of perinatal depression may attenuate its negative consequences for mother and her child (Nylen et al., 2006). The consequences of perinatal depression manifest, among others, by poor relationship and „infecting” a child with negative feelings (Cohn i in., 1990; Field, 1998). Our results could be utilized during planning of psychological intervention. Early psychological counseling should be provided not only to these patients who were diagnosed with depression but to every pregnant woman, even before

potential diagnosis. The results of previous studies and clinical observations suggest that the availability of professional support (which is required by patients according to our study) and access to psychological education (where understanding the background of depression and its symptoms is of vital importance) offer marked relief to many women. Individuals with more severe depressive symptoms require complex pharmacotherapy and psychotherapy. The treatment should be oriented on utilizing the potential of depressive patients, such as readiness to personality changes, along with the improvement of such traits as self-confidence, personal adjustment, or ideal self-image. Our study revealed that the scores of these aforementioned traits were lower when compared to women without depression. The intervention should begin with lowering the standards set by the women who simultaneously plays several roles in life. Such approach may lead to improved management of many aspects of life, and is reflected by higher self-confidence, along with better adjustment, and more positive self-image (real self and ideal self). Besides biological and psychological intervention, kangaroo mother care (KMC) should be advised to depression patients, since skin-to-skin contact may lessen maternal depression. In a study of mothers with preterm infants, KMC intervention decreased both the incidence and severity of postpartum depression (de Alencar et al., 2009).

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