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ORIGINAL ARTICLE

Depression and anxiety in women during physiological pregnancy

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Abstract

The quality of prenatal care for women during pregnancy, in terms of monitoring somatic development, is generally high. The study aims to evaluate the psychosocial situation (well being) of pregnant women during a physiological pregnancy. The care of psychosocial issues of pregnant women is not systematic and often does not occur at all. Prenatal depression and anxiety are associated with an increased risk of depression even after delivery. To accomplish the goal, the authors chose both the modified Freybergh scale - the Sabbatsberg anxiety – frustration Self-Rating Scale (SDS) and a questionnaire created by the authors of this study. A total of 324 women from various regions were randomly approached, of which 277 were selected for the final evaluation. The scale contains seven categories, each with ten questions. Pregnant women repeatedly took the self-assessment over the duration of their pregnancy. The result is a summary point evaluation. The seven individual groups of questions focused on the evaluation of stress, fear, depression, regression, feelings of guilt, frustration, and aggression. The scale of answers to individual questions offered five options. The questionnaire itself had 14 monitored items and evaluated the difference in symptoms in women with and without psychological distress. The degree of psychological distress was processed using descriptive statistics. Furthermore, it was classified into four equal groups (175 points each), identified as none, mild, moderate and high deprivation. The adjusted effect of the monitored parameters on the psychological distress score was studied using a mixed model. The results of the study draw attention to psychological distress in pregnant women with physiological pregnancies. It is vital to monitor symptoms of psychological distress during physiological pregnancies. In addition, preventive prenatal programs to reduce or prevent psychological distress during pregnancies must be implemented and widely available.

INTRODUCTION

Care for women during pregnancy, relative to the prenatal development of the child, is high level. However, the care for the psychological well-being of pregnant women is lagging. Prenatal depression and anxiety are associated with an increased risk of depression after birth (Premji *et al.* 2022).

If a pregnant woman has a large number of depressive symptoms in late pregnancy, there is a high probability that depression during the postnatal period may last for months or years (Sobotková, 2019).

Several authors have described the negative impact of psychological distress on the course of pregnancy and the postnatal period (Ucar & Pinar 2020). Anxiety and depression, as well as hospital stressors, can negatively affect gestation during hospitalization and after discharge. Anxiety during pregnancy can also have a significant negative impact on maternal care [Tomas & Markova 2014]. In response to the appearance of psychological distress, several publications emphasize the use of preventive programs before and during pregnancy.

Certain factors influence the development of prenatal depression more frequently than others. These risk factors must be clearly defined to prevent psychological distress during pregnancy and its negative consequences for both the mother and the child. These factors include adverse life events, stress, a history of mental or chronic illness, unplanned pregnancies, complications (including hospitalization during pregnancy), sleep disorders, and especially previous prenatal fetal loss. In addition, several other situations can influence the development of psychological distress, such as insufficient participation in prenatal courses, body mass index, COVID-19 infection, sexual problems, and the home/social environment in which the woman lives.

Depression is more common in younger and adolescent women (26%). Dysfunctional partnerships and difficult social situations of partners and family are also important factors [Henderson & Redshaw 2013; Lindberg 2023]. There are many ways to diagnose and assess mental disorders in pregnant women; most focus on revealing psychological distress.

1. Beck Depression Scale (BDI-II) 29
The Beck Depression Scale is a commonly used expressiveness self-assessment scale, which is a nonspecific diagnostic method; however, the scale has not been fully validated in pregnant women or during the postnatal period [Beck *et al.* 1996]. The final assessments are scored on designated questions.

2. Freybergh scale - Sabbatsberg anxiety – frustration self-rating scale (SDS) (since 1977)
The scale contains seven categories, each with ten questions. The scale is repeated during each trimester. This results in summary point evaluations [Fedor-Freybergh 1977; Fedor-Freybergh 2013].

3. Edinburgh Postnatal Depression Scale (EPD)
The most commonly used questionnaire for depression in pregnancy is the Edinburgh Postnatal Depression Scale (EPDS), which was developed in Scotland at health centres in Livingston and Edinburgh. Its task is to assess whether pregnant women suffer from prenatal depression. This questionnaire has been widely validated and used in 23 countries. It has a significant level of sensitivity (86%) and specificity (78%) in identifying people who are at risk of or potentially suffering from prenatal depression. The questionnaire is internationally validated and available in many languages. The highest score for the questionnaire is 30; however, less than 10 points indicates a possible depression of varying severity. However, to establish an existing diagnosis of depression, a careful evaluation must be performed [Barassi & Grealish 2022; Cox *et al.* 1987; Mark *et al.* 2021; Ozgen *et al.* 2022].

4. Generalized anxiety disorder (GAD) is an anxiety disorder characterized by excessive, uncontrollable worry and anxiety. The GAD investigation uses an official methodology, ie, the Mini International Neuropsychiatric Interview Plus or the Seven-Item Generalized Anxiety Disorder Scale, which includes concerns about several things, ie, anxiety, worry or physical symptoms that severely interfere with daily life and are not caused by another disorder. The evaluations also look for the following physical symptoms (less than 3 is significant): nervousness, restlessness, tension, irritability, easy fatigue, difficulty concentrating, irritability, hypersensitivity, muscle tension, sleep disturbances or other physical anxiety symptoms. This study describes the development and validation of an intervention to assess the presence and severity of GAD in clinical practice using GAD-7, one of the few GAD measures that is also explicitly associated with the DSM-IV criteria. A score <10 on GAD-7 represents a reasonable threshold to identify GAD cases. The cut-off points 5, 10, and 15 on GAD-7 can be interpreted as mild, moderate, and severe levels of anxiety. GAD-7 may be particularly helpful for assessing the severity of symptoms and tracking changes over time, although its ability to track changes has not yet been tested in treatment trials [Mark *et al.* 2021; Hildingsson & Rubertsson 2022; Spitzer *et al.* 2006].

5. The CES-D scale: A depression scale for self-reporting for research in the general population available from: https://nida.nih.gov/sites/default/files/Mental_HealthV.pdf [Radloff, 1977].

MATERIALS AND METHODS

For the initial assessment of anxiety and depression/psychological distress, we used the modified Freybergh scale - Sabbatsberg anxiety – frustration self-rated scale (see Table 1). We conducted a pilot study and, based on

the results, we sent a modified questionnaire to pregnant women. The questionnaire was sent electronically, with an identification number and precise instructions. A random selection of 324 pregnant women from three regions was targeted. A total of 277 women were included in the final assessment. The number of women from individual areas was as follows: 94 Czech women (72 from the South Bohemian region and 22 with a non-South Bohemian residence), 104 Slovak women, and 79 Polish women. Of the original 324 women contacted, 47 either did not respond or completed only one trimester. The questionnaire used in the first, second, and third trimesters had the same formulation. Because all newborns had Apgar scores of 8–10 points after birth, it was not used further in our analyzes. In each trimester, the women responded to seven categories of questions, each with ten questions (see https://nida.nih.gov/sites/default/files/Mental_HealthV.pdf), that is, the women responded to 70 questions about their mental health. The seven categories of questions focused on stress, fear, depression, regression, feelings of guilt, frustration, and aggression. Each question had five possible responses, i.e., never, rarely, or exceptionally, sometimes, or occasionally, often, and always. The responses were quantified from zero to ten points, where higher scores corresponded to more frequent occurrences of the negative phenomenon. The overall assessment of psychological distress was created as a simple sum of points from all 70 questions. The questions were translated from the original languages (German, English, and Slovak) into Czech and Polish.

While processing the results, an error was found in the translation of one of the questions in the Aggression category (AG; no. 49: Would it be best if the partner did not exist?). Therefore, this question was excluded from the evaluation. To maintain comparability of the scales, the score for the AG category was transformed so that its theoretical maximum was 100 points, the same as the other categories.

Demographic data included information on maternal parity, number of pregnancies, abortions, education of participants, marital status, and co-habitation status.

The second part of the study was supplemented by a questionnaire that the authors created. The questionnaire had fourteen items. The questions focused on participation in prenatal courses, anamnestic data concerning fetal losses and fetal abnormalities, participation of fathers/partners in dealing with psychological distress, the social situation of participants and their families, including place of residence (rural versus urban), frequency of hospitalization during pregnancy, obesity and chronic disease, sleep disorders, COVID 19 infection, sexual problems, breech pregnancy, and for HIF-related pregnancies (ie hypoxia-inducible factor). The questionnaire was sent to 78 women in Czechia. Of the 71 women, 56 experienced psychological distress and 22 were not. Depression was evaluated in 10 respondents using the EPDS scale and in cooperation with a psychiatrist; In 10 respondents, a communicative form was used to determine their GAD score.

The Ethics Committee approved both questionnaires, and the participants agreed with the content of the questionnaires. Participation was voluntary and all data was processed anonymously.

The degree of psychological distress was processed using descriptive statistics (mean, standard deviation) and was further classified into four equally sized groups of 175 points (a possible 700 points (for the questionnaire mentioned above), which was then divided by 4); the results were presented using frequencies. The association of psychological distress with selected demographic and socioeconomic characteristics and the development of the score during pregnancy were evaluated using contingency tables and a mixed regression model in the IBM SPSS Statistics 28.0 program. The chosen significance level was $\alpha = 0.05$.

RESULTS AND DISCUSSION

Outcomes

The total psychological distress score could theoretically reach 700 points. The highest recorded score was 481 points (69% of the maximum), the lowest score was 19 points (3% of the maximum). The score was divided into four categories of equal size (175 points each) to make it easier and clearer. The categories were called 'no', 'mild', 'moderate,' and 'high' psychological distress. The development of the representation of the psychological distress categories is shown in Figure 1. It is evident that most women in all trimesters fell into the second lowest category, ie, mild psychological distress, and only a negligible proportion of women were rated moderate psychological distress.

If we neglect the division by trimesters, then 9.0% of mothers suffered moderate psychological distress at least once during their pregnancy. Most of the participants (69.3%) were in the category of mild psychological distress at least once (without ever being in the category of moderate distress). Approximately a fifth of the participants (21.7%) were in the category of nonpsychological distress during all trimesters. Therefore, 78.3% of the participants had at least one (or more) trimester in the mild or moderate psychological distress category. No participants were in the high psychological distress category.

Depression was evaluated in 10 participants using the EPDS scale, in cooperation with a psychiatrist, and in 10 respondents, a communication form was used to determine GAD scores. The values corresponded to a moderate degree of psychological distress.

Table 2 shows the three items with the lowest rating in all seven domains based on average scores. The order of the statements in the table is given by the average score in the first trimester, always starting with the lowest score. Generally, the ratings are very stable; only in three areas were four statements selected; the

Tab. 1. Modified Freybergh scale - Sabbatsberg anxiety – frustration self-rating scale

No.	Category	Question	Never	Rarely, exceptionally	Sometimes, occasionally	Often	Always
1	SG	I am satisfied with my existence.					
2	F	I remain calm and composed when my partner looks at a strange woman.					
3	A	I'm enjoying life to the fullest.					
4	SG	I have the feeling that my surroundings place significant demands on me.					
5	D	I have complete control of my emotions.					
6	R	I want to become a child again so I have less to worry about.					
7	AG	I respect my parents.					
8	SG	I feel that I have a positive/good effect on those around me.					
9	F	I am happy with my sex life.					
10	A	I am convinced that I can manage the situation even if my partner falls ill for a long time.					
11	S	My relationship with my family members is positive.					
12	D	I feel confident in contact with my surroundings.					
13	R	I want to relive my childhood.					
14	AG	I manage to stay calm even when things are stressful.					
15	SG	I'm happy with myself.					
16	F	In case of a mental crisis, I can turn to my family.					
17	A	My sleep is of good quality.					
18	S	I am optimistic about the future development.					
19	D	I feel that those around me understand my current behaviour.					
20	R	At the moment, I am satisfied.					
21	AG	I am cautious in my dealings with those around me.					
22	SG	I would say that I am trouble-free.					
23	F	My family is interested in my feelings and feelings.					
24	A	I act in such a way that I do not hurt anyone around me (mentally or physically).					
25	S	I have moments when I long to be alone.					
26	D	I feel like people around me are interested in me.					
27	R	I feel safe.					
28	AG	I have fond memories of my childhood.					
29	SG	My parents are proud of me.					
30	F	I can get along just fine with the money.					
31	A	Feelings of fear and anxiety avoid me.					
32	S	Stomach aches and headaches avoid me.					
33	D	Thoughts of suicide are entirely alien to me.					
34	R	I'm confident.					
35	AG	I meet with understanding in my family.					

No.	Category	Question	Never	Rarely, exceptionally	Sometimes, occasionally	Often	Always
36	SG	I feel like I'm nice enough to my partner.					
37	F	My partner pays enough attention to me.					
38	A	My partner loves me.					
39	S	I feel full of energy.					
40	D	I suffer from a loss of appetite.					
41	R	I feel like I'm ready for pregnancy.					
42	AG	My (dis)satisfaction depends on my partner's behaviour.					
43	SG	I'm looking forward to my baby.					
44	F	I feel sleep deprivation.					
45	A	I feel that parents will want to help me care for my child.					
46	S	I watch my weight during pregnancy.					
47	D	I am convinced that I will be able to handle pregnancy and childbirth.					
48	R	I feel ready to become a mother.					
49	S	I take steps so that I don't have to lose too much weight after giving birth.					
50	SG	I feel like I'm following my diet correctly during pregnancy.					
51	F	I feel that pregnancy is complicating my career.					
52	A	I am mentally prepared for childbirth.					
53	S	I believe that the course of my pregnancy will be smooth.					
54	D	I sleep well, without problems.					
55	R	I like to go out during pregnancy.					
56	AG	I am disturbed by thinking I might hurt my partner's feelings.					
57	SG	I realize that during pregnancy, my relationship with my partner may change.					
58	F	I believe that in the future, I will be able to have sexual relationships.					
59	A	I am prepared to care for my child so that no harm comes to them.					
60	S	I am looking forward to taking care of my child.					
61	D	I am looking forward to life after giving birth; I hope it changes for the better.					
62	R	I look at childbirth and the time after birth with uncertainty.					
63	AG	I feel like my pregnancy fills my life with love.					
64	SG	I feel like I enjoyed life to the fullest before I got pregnant.					
65	F	I am convinced that whatever happens after giving birth, I can deal with it.					
66	A	I believe that no misfortune will happen to my partner.					
67	S	I feel good about my pregnancy.					

No.	Category	Question	Never	Rarely, exceptionally	Sometimes, occasionally	Often	Always
68	D	I get up in the morning feeling good and looking forward to the new day.					
69	R	I can face crisis situations.					
70	AG	The quality of my life is influenced by what is happening around me.					

situation is that they were not among the worst three in the given trimester; average values are in parentheses.

The five statements with the lowest rating globally (ie the highest average scores) and those that contribute the most to feelings of psychological distress are 'My quality of life is influenced by what happens around me' (AG), 'It happens that I face crises' (R), 'My (dis)satisfaction depends on my partner's behavior' (AG), 'I have the feeling that my surroundings place a lot of demands on me' (S) and 'I feel sleep deprived' (F).

The five consistently highest-rated statements (lowest average score), the ones that contribute the least to feelings of psychological distress, are 'I respect my parents' (AG), 'I am looking forward to my baby' (SG), 'My partner loves me' (A), 'I am looking forward to taking care of my baby' (S), and 'In case of a mental health crisis, I can turn to my family' (F).

The largest changes in the ratings during the three trimesters were recorded for the items 'My sleep is good quality', 'I sleep well, without problems' and 'I feel lack of sleep': logically, sleep deteriorates as pregnancy progresses. Furthermore, 'I feel full of energy', where there is a decrease in score (= better feelings) in the second trimester, a noticeable deterioration in 'I am satisfied with my sex life', and 'I suffer from loss of appetite.' The most stable long-term evaluations during the three trimesters (the smallest fluctuations over time) were 'I feel like I have enjoyed life before pregnancy to the fullest,' 'I am convinced that I can handle the situation even if my partner falls ill for a long time,' 'I have no feelings of fear and anxiety,' 'It happens that I face crises,' and 'I feel that I follow my diet correctly during pregnancy.'

The greatest discrepancy among the respondents in the evaluation of individual items (measured by standard deviation) was in 'thoughts of suicide are completely alien to me', where the standard deviation reached 4.7 points (in all trimesters). Second, 'I watch my weight during pregnancy' with a standard deviation of 3.2 points (again in all trimesters). On the other hand, the highest consensus among the respondents was in the evaluation 'I feel like I am nice enough to my partner' (standard deviation of 1.9 points) and 'I am confident' (SD 2.0 points). In all items, the variability was very stable; it did not change significantly during the trimesters.

As mentioned above (see Table 3), respondents showed psychological distress in three of four categories, that is, none, mild and moderate. These three categories differed in which of the seven areas was perceived as the most burdensome for that category.

In the category of no psychological distress (0-175 pt), the highest average scores were repeatedly in the areas of aggression and regression. The lowest scores were in the areas of fear and Frustration areas; the same was true for the category of mild psychological distress (176–350 points). In both categories, there were no significant changes during the trimesters.

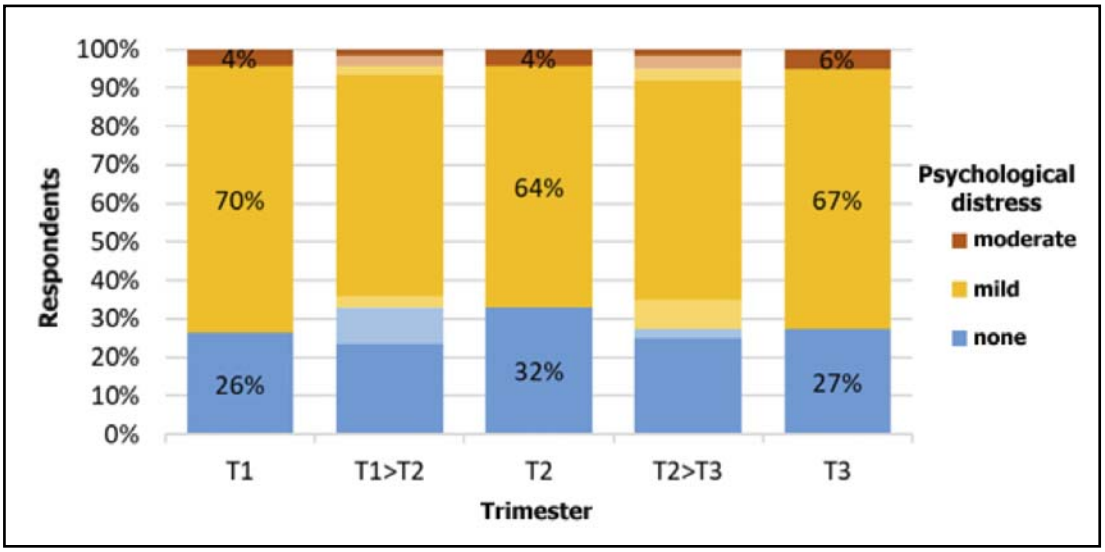

Fig. 1. The proportion of categories of psychological distress and their development during pregnancy

Tab. 2. Items that have the greatest negative impact on psychological distress in all seven domains in all three trimesters (average score)

Area	Question	T1	T2	T3
A/Fear	I have no feelings of fear and anxiety	4.0	4.0	4.0
	I am convinced that I can handle the situation even if my partner is ill for a long time	3.5	3.4	3.5
	I am mentally prepared for childbirth	3.4	(3.1)	(3.0)
	My sleep is good	(3.1)	3.2	4.2
AG/ Aggression	My quality of life is influenced by what happens around me	6.5	6.5	6.5
	My (dis)satisfaction depends on my partner's behavior	4.8	4.9	5.2
	I am disturbed by the thought that I might hurt my partner's feelings	4.6	4.7	4.9
D/ Depression	Thoughts of suicide are completely alien to me	4.2	4.3	4.1
	I suffer from loss of appetite	4.1	(3.4)	(3.3)
	I can fully control my emotions	3.9	3.8	3.8
	I sleep well, with no problems	(3.6)	4.1	4.6
F/ Frustration	I'm feeling sleep-deprived	4.8	4.7	5.5
	I feel like pregnancy is complicating my career	3.1	3.1	3.0
	When my partner looks at a strange woman, I remain calm and composed	2.6	(2.5)	(2.7)
	I'm happy with my sex life	(2.6)	3.2	3.4
R/ Regression	It happens that I face crises	5.8	5.7	5.8
	I'd like to relive my childhood	4.7	4.7	4.8
	I look at the period of childbirth and after childbirth with uncertainty	4.5	4.4	4.6
S/Stress	I have the feeling that my surroundings place significant demands on me	4.9	4.8	4.7
	I watch my weight during pregnancy	4.6	4.6	4.4
	I have moments when I long to be alone	4.4	4.2	4.4
SG/Guilt	I realize that during pregnancy, my relationship with my partner changes	4.4	4.0	3.9
	I'd say I'm trouble-free	4.0	3.7	3.9
	I feel like I'm following my diet correctly during pregnancy	3.6	3.5	3.5

On the other hand, in the category of moderate psychological distress (351–525 pts), there was an increase in Fear and Aggression scores during pregnancy. In contrast, the Depression and Regression scores decreased. Frustration peaked in the second trimester, much like Guilt. The highest stress scores were recorded, both in the first and second trimesters, although there was also a gradual decrease.

In the category of no psychological distress, respondents agreed most often about fear, while they differed the most in depression (in all trimesters). On the other hand, in the category of mild psychological distress, the assessment of the respondents differed most in fear and was most in agreement with respect to regression.

Respondents in the moderate psychological distress category showed very different evaluations in the second trimester - the greatest agreement was in the domains of depression and regression, and the greatest variability was in fear and guilt.

In a sample of 78 Czech women, four cases showed a relationship between psychological distress and a selected risk situation. In three cases, hospitalization during pregnancy ($p = 0.033$), participation of fathers in dealing with psychological distress ($p = 0.004$) and COVID-19 ($p = 0.033$), the phenomenon was more common in women with psychological distress. Participation in prenatal courses was significantly more frequent in women who did not experience psychological distress ($p < 0.001$). In our cohort, 81% of women who attended prenatal courses did not have symptoms of psychological distress.

Large differences in psychological distress were reflected when comparing the places of residence: no psychological distress was reported in 91% of Polish, 73% of Slovak, 68% of South Bohemian, and 91% of Czech women from regions other than South Bohemia.

The results of a detailed analysis of the adjusted effect of maternal characteristics on psychological distress scores are presented in Table 4. It is obvious that psychological distress changed over time - in the second trimester, its score decreased by nine points, but in the third trimester, it returned to its original level. Furthermore, the differences between the areas of residence of the compared mothers were confirmed:

Tab. 3. Average rating of items in individual categories of psychological distress

Psychological Distress Category	Area	T1	T2	T3	T1	T2	T3
		Mean			SD		
None	A / Fear	13.2	14.1	12.7	5.4	6.4	5.9
	AG / Aggression	22.8	24.8	24.8	6.7	8.0	8.6
	D/ Depression	18.6	17.6	18.0	9.0	8.5	9.6
	F / Frustration	12.7	14.3	14.0	6.5	7.0	7.8
	R / Return	21.5	21.8	22.4	7.5	7.6	7.5
	S / Stress	22.0	20.0	21.8	8.2	6.7	8.2
	SG / Guilt	16.9	16.1	15.4	8.0	7.8	7.2
Mild	A / Fear	30.0	30.7	30.8	9.9	10.2	10.5
	AG / Aggression	39.5	40.4	39.6	9.2	8.9	8.7
	D/ Depression	36.7	36.6	37.1	10.0	9.4	9.2
	F / Frustration	29.9	31.1	32.3	9.8	9.5	9.6
	R / Return	39.3	38.7	38.9	8.6	8.1	8.3
	S / Stress	36.9	37.0	36.2	8.7	8.7	9.5
	SG / Guilt	32.0	31.6	31.7	9.3	8.2	9.3
Moderate	A / Fear	54.2	57.8	58.4	10.5	13.9	13.2
	AG / Aggression	50.2	53.1	56.7	13.2	10.7	11.0
	D/ Depression	59.2	57.4	51.2	7.8	7.1	10.4
	F / Frustration	51.3	55.8	52.1	9.9	11.0	11.1
	R / Return	60.7	56.4	54.4	8.4	7.5	9.2
	S / Stress	62.7	59.1	58.3	10.9	12.0	11.6
	SG / Guilt	49.6	53.9	50.4	9.9	15.7	11.7

Note: T1 - first trimester; T2 - second trimester; t3 - third trimester

the lowest level of psychological distress was recorded in Slovak and Czech women from the South Bohemian Region. On the other hand, Poles and other Czechs showed significantly higher psychological distress (that is, worse scores). Other parameters did not show a significant effect on psychological distress scores. Living with a partner or father of the child led to a decrease in scores (by an average of 46 points), but this effect was not statistically significant ($p = 0.063$).

The analysis of each of the seven domain scores using mixed modeling yielded very similar results, which was also true for the total scores. The same time course (a decrease in the second trimester) was recorded for all dimensions except Aggression and Guilt. The scores in the Fear and Regression dimensions were worse for Polish and Czech women (except for South Bohemia). Scores on the dimensions of frustration, stress, and guilt were worse in Czechs (except for South Bohemia) compared to the other three groups. In the domains of aggression and depression, the score was significantly lower in Slovak women, while depression was highest in Polish women. Living with a partner or the child's father was a protective factor in the domains of frustration and guilt.

Discussion

Obrochta *et al.* [2020] defines depression, anxiety, and stress syndrome as psychological distress. This corresponds to other literary citations. Our discussion mostly uses this definition. It should be noted that stress refers not only to fear, but also to parenting. This fact is highlighted by Wilska *et al.*. [2021], who also evaluated fear of parenthood. Mothers were worried about whether they would be able to handle the care of a newborn, the psychological burden resulting from parenthood, maternal abilities, self-confidence, planning for the child's needs, worries about their relationship with their partner, and financial concerns. In our cohort, we found that 72% of the participants suffered some form of psychological distress during pregnancy. This number is several times higher than some data from the literature, which state that psychological distress is 22-25%.

Hildingsson and Rubertsson [2022] reported 32%, Bright *et al.* [2019] 15–25%, and Obrochta *et al.* [2020] 21%. Jihed *et al.* [2022] used the CES-D scale and reported an incidence of 76%. The authors explain this difference based on the various methodologies to assess psychological distress. The authors of this

Tab. 4. Regression analysis parameters (mixed model) - Estimation of psychological distress scores

Parameter	Estimate	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Intercept	221.5	<0.001	186.9	256.0
Trimester 1. [1]	–2.891	0.338	–8.818	3.036
Trimester 2. [1]	–9.099	0.003	–15.03	–3.166
Poland [2]	25.11	0.034	1.913	48.30
Slovakia [2]	–15.55	0.161	–37.35	6.238
Czech Republic outside South Bohemia Region [2]	92.09	<0.001	59.26	124.9
Primipara [3]	–8.489	0.547	–36.19	19.21
First pregnancy [4]	17.54	0.237	–11.60	46.68
Miscarriage [5]	11.14	0.522	–23.11	45.39
Elementary Education [6]	–10.95	0.438	–38.70	16.80
Highschool graduate [6]	0.671	0.942	–17.49	18.83
Single/Divorced [7]	–10.95	0.284	–31.03	9.127
Living with the partner/father of the child [8]	–45.66	0.063	–93.84	2.522

Notes of the reference group: 1. Third trimester; 2. Czech Republic, South Bohemia Region; 3. Multipara; 4. More than 1 pregnancy; 5. No abortion; 6. University education; 7. Married; 8. Does not live with a partner or the child's father.

article included any symptoms, even the smallest, as signs of psychological distress.

Psychological distress does not only affect women. Finnbogadóttir and Persson [2019] reported that out of 532 perspective fathers, 9.8% had severe depression, resulting mainly from fear of losing their jobs or poor health, etc., and as a result recommend that both parents participate in preventive programs.

In relation to the appearance of psychological distress, there are several studies that emphasize preventive programs before and during pregnancy. In our cohort, the incidence of psychological distress was higher in women who did not participate in preventive programs.

Anamnestic data

One of the very significant factors that influence psychological distress during pregnancy was the factor of prenatal losses. High post-traumatic psychological distress after prenatal loss was found and applied to both parents. We recommend intensive social and psychological support in the prenatal period of subsequent pregnancies.

Premji *et al.* [2022] emphasized the necessity of screening during pregnancy and after childbirth for psychological distress in women who had experienced a prenatal loss.

Mainali *et al.* [2023] followed 1,458 pregnant Scandinavian women with previous prenatal loss. During subsequent pregnancies, a higher frequency of anxiety and depression symptoms was found compared to mothers without this history.

Ozgen *et al.* [2022] drew attention to the higher incidence of psychological distress, feelings of guilt, and prenatal grief in women who have suffered a loss in early pregnancy.

Slot *et al.* [2022] drew attention to psychological distress in women with repeated loss in pregnancy.

Çankaya and İbrahimoğlu [2022] investigated how psychological well-being was affected by psychological distress and acceptance in pregnant women with and without the risk of miscarriage. They found that women at risk were negatively affected by psychological distress.

Keskin *et al.* [2022] drew attention to the negative impact of psychological distress on women who have had a pregnancy with a fetal complication.

Sun *et al.* [2022] found high rates of post-traumatic stress disorder in parents in cases involving fetal abnormalities. This was found to affect both parents. The authors recommend intensive social and psychological support in the prenatal period of the next pregnancy.

Caldwell *et al.* [2024] and Riddle *et al.* [2023] both drew attention to psychological distress after prenatal loss.

Turkish nursing students were found to have a great fear of childbirth based on negative experiences during their internships. It is important to address these negative experiences so that they do not transfer to their future practice and lives [2022].

On the other hand, there was no higher incidence of psychological distress associated with breech pregnancies. The prevalence of psychological distress in women with a breech fetus was not higher compared to pregnancies with a normal head position [Schauer, 2023].

In 142 women who underwent IVF treatment, there was no relationship between psychological distress symptoms and IVF [Maroufizadeh *et al.* 2019].

Other anamnestic influences that may affect the onset of psychological distress.

Zhang *et al.* [2023] focused on the relationship between a woman's stress and her physiological BMI and premature rupture of membranes (PROM). They reported that stress in these women in the second trimester was associated with a higher risk of PROM.
Erbil [2022] observed the relationship between psychological distress during pregnancy vs. self-compassion and fear of childbirth. He showed that with greater self-compassion, the incidence of psychological distress decreases.

Poor sleep quality is a common problem in pregnant women. Anxiety and increased age were identified as factors determining sleep quality during pregnancy. These findings support the need for research on sleep quality in women during the prenatal period [Sahin & Eren 2022].

Keramat *et al.* [2021] studied the relationship between psychological distress and sexual distress (SD) and genital self-image (GSI). A relationship was found between psychological distress and sexual distress, but a relationship was not found between psychological distress and genital self-image.

Özçelik Eroğlu *et al.* [2022] found that vaginismus does not affect psychological distress during pregnancy.

Caldwell *et al.* [2024] explored associations between prenatal psychological adjustment (less grief and distress) and adult attachment, shame, and social connectedness, in women pregnant after loss. There are three patterns of affection, that is, secure, avoidant, and anxious. Insecure adult relationships, shame, remorse, and isolation after prenatal loss put women at risk of adverse psychological consequences that can affect child and family outcomes. Twenty-nine women completed measurements assessing attachment, shame, remorse, social inclusion, prenatal grief, and psychological pain. Difficulties with adaptation to a stressful situation were identified in 74%, general sadness in 74%, and despair in 65%. Minimal attachment to a partner corresponded to greater difficulty in coping with the situation and higher levels of despair. More often than not, self-blame led to subsequent sadness, despair, and difficulty coping with stressful situations. Social inclusion corresponded to lower rates of grief and significantly mediated the relationship between prenatal grief and all three patterns of affection. Focusing on social inclusion can be a helpful way for prenatal clinics to support pregnant women during their subsequent pregnancies.

The influence of sociodemographic factors on the development of psychological distress is very often mentioned in the scientific literature. Caldwell *et al.* [2024] dealt with attachment of adult women in the context of prenatal loss and stressed the need to support social inclusion of these women.

In our cohort, 39% of the women were rural vs 61% of urban settings, which corresponds to other studies. A study showed that women in rural Western Australia who have been diagnosed with depression were more vulnerable to stressful life events [Catanzariti *et al.* 2022]. Răchită *et al.* [2022] followed 2,215 women using a stress-focused questionnaire. They found that women in cities are more vulnerable than women in rural areas. Therefore, the authors recommend intensive monitoring of pregnancy, not only from the somatic point of view, but also from the psychosocial point of view.

Freitas-Jesus *et al.* [2022] addressed women infected with COVID-19 during pregnancy, about their feelings, their relationships, and the influence of social media. They say that pregnant women were resistant to believing the diagnosis. They described fear of serious symptoms or death, concerns about the fetus, sorrow from being isolated, and worries about stigma. The connection to the health team through telemedicine or support during hospitalization produced a feeling of security. The authors also emphasize that infected pregnant women need emotional support.

Huang *et al.* [2022], state that Chinese pregnant women are suffering from high levels of pregnancy-related anxiety. Better family function and perceived social support reduce the occurrence of pregnancy-related anxiety, as well as by the mediating effects of resilience.

Asselmann *et al.* [2020] used the "Big Five" system to investigate the personal characteristics of women with psychological distress. They found that less emotionally stable, less conscientious, and less extraverted women and women with lower perceived social support appear to be at increased risk for psychopathological symptoms in the peripartum period and could therefore particularly benefit from targeted prevention.

Jihed *et al.* [2022] looked at the prevalence of major depressive disorder (MDD) in pregnant Tunisian working women. Data collection tools had sociodemographic content and questions about childbirth, family relationships, and the workplace. Using the CES-D depression scale, 76% of women were found to have major depression. The results were influenced by family budget, chronic disease, and job category. Therefore, they recommended early prevention and detection of social risk factors.

Yilmaz [2019] states that prenatal distress was affected at the level of statistical significance by employment status, income status, and history of stillbirth. Nausea, vomiting, and insomnia during pregnancy were determined as significant variables that increase the level of prenatal distress.

Frigerio and Molteni [2022] investigated the effects of the intensity and directionality of antenatal maternal depressive and anxiety symptoms on infant negative affectivity and crying, also taking into account potential confounders. The role of socioeconomic status (SES) as a possible moderating factor of the association between maternal antenatal distress and adverse outcomes of infants was also explored. They used the Edinburgh

Postnatal Depression Scale and the State-Trait Anxiety Inventory to assess depressive and anxiety symptoms, respectively, during the third trimester of pregnancy and three months after delivery. The results showed an association between anxiety intensity and depression. Depression, unlike anxiety, was not related to the negative affectivity of maternal symptoms.

Resilience and stress during pregnancy are the subject of an article by Alves *et al.* [2021]. They found that individual responses to stressful situations, for example, resilience, were individual. Social context can play a protective role or contribute to poor response. Low resilience usually worsens the course of pregnancy. Therefore, it is important to assess stress during pregnancy and look for social vulnerabilities.

In pregnant women, CRP, IL 6, saliva cortisol, and alpha-amylase levels were measured. Higher levels of cortisol and CRP were found. The findings, although correlated, seem to suggest altered biological stress signals in expectant mothers [Nazzari *et al.* 2020].

The importance of preventive activities as a preventive measure of psychological distress in pregnant women is repeatedly mentioned in the literature. This contribution is evidenced by the wide range of literature. Bašková *et al.* [2023] evaluated prenatal education in 584 pregnant women using the EPDS scale. Satisfaction with prenatal education had a negative association with EPDS scores. The authors emphasize the importance of prenatal education as a prevention of psychological depression. De Mello *et al.* [2021] examined generalized anxiety disorder (GAD) and symptoms of depression. Evaluation was carried out using the Mini International Neuropsychiatric Interview plus. Women with mild symptoms had 9 times higher GAD scores, women with moderate symptoms had 21 times higher GAD scores, and women with severe symptoms had 53 times higher GAD scores. Women who had no symptoms of psychological distress had normal GAD values. Based on this, the authors recommend increased prenatal prevention.

Gorman *et al.* [2021] evaluated the effectiveness of interventions to reduce psychological distress, stress, and anxiety during pregnancy and after delivery. However, the interventions were found to be ineffective. To increase effectiveness, the authors recommend increasing provider training, especially in methodology.

Hassanzadeh *et al.* [2020] emphasize the importance of prenatal courses in the prevention of psychological distress.

Souto *et al.* [2022] emphasize the importance of midwives in prevention programs. A scoping review was conducted to evaluate intervention programs aimed at preventing fear of midwife-assisted childbirth. Based on the results, the authors note the crucial role of midwives in the prevention of tokophobia. As the results show, the most common intervention was counseling and psychoeducation.

Finnish authors [2023] found that the following factors play an important role in the development of tokophobia in pregnant women: unplanned cesarean section, vacuum extractor delivery, perineal rupture or episiotomy, and bundle branch dystocia. These potential sources of fear should be discussed in prenatal courses.

Flor-Alemany *et al.* [2022] note the importance of exercise and a healthy diet as a way to influence depression in pregnant women. A healthy diet was found to reduce the incidence of depression more than exercise. This finding should be included in prenatal courses.

In prenatal courses, some authors recommend the use of coping strategies. Artieta-Pinedo *et al.* [2023] studied the influence of coping strategies on reducing psychological distress in 282 women. Although the results were generally positive, they remained inconclusive. The authors recommended that this topic be studied more extensively.

Sunay *et al.* [2021] observe the effect of coping styles on students with tokophobia. A negative relationship between self-esteem and an optimistic coping style was found in students with tokophobia. A positive relationship with the coping style was seen between helpless coping and submissive styles. The most important determinant of tokophobia was a confident coping style. They found that as self-esteem increases, helpless and submissive coping styles decrease. The authors further found that increasing self-esteem reduced the incidence of depression.

Hildingsson and Rubertsson [2022] evaluated the results of a questionnaire given to 242 women mid-pregnancy and again two months after giving birth. The questionnaire included the Edinburgh Postnatal Depression Scale. Tokophobia was reported by 32% of women and long-term postpartum depression was reported by 12% of women.

The use of the Internet in prenatal courses was studied by Bright *et al.* [2019]. The authors suggest the use of online interpersonal psychotherapy for women in psychological distress. An evaluation was carried out at the beginning of pregnancy, at three and eight months, and again three months after birth. Symptoms of depression would be monitored. Respondents positively evaluated interpersonal psychotherapy online [Beerli *et al.* 2022]. They were equally positive about using online interpersonal psychotherapy to reduce prenatal psychological distress. The authors tried this approach but were not satisfied with the results. The authors also carried out an online prevention program, but as before, they were not satisfied with its potential to reduce psychological anxiety.

Fatori *et al.* [2023] used a smartphone app to prevent and treat depression in pregnant women. Therapy was successful in 80% of the cases. However, they noted that the entire system needs to be constantly improved. However, ultimately, the authors did not support the use of the system.

Afiat *et al.* [2022] reported the use of aromatherapy as a therapeutic approach to treating pregnant women

with psychological depression, nausea, and vomiting. The authors used inhalation of rose fragrance and compared it to metoclopramide (an antiemetic). Rose aromatherapy had more positive effects on anxiety and depression than metoclopramide.

Jabbari *et al.* [2020] reported that studying or reading the Holy Quran reduces stress during pregnancy.

Baltacı *et al.* [59] explored the effect of lullabies on reducing depression and anxiety during pregnancy. They found that after repeated listening, participants showed lower levels of psychological distress.

Barassi and Grealish [2024] did a systemic literature review (using five databases) to examine the validity of EPDS to detect depression in pregnant women in adolescents. They reported that the EPDS scale was comparable to or better than most prenatal depression screening tools and had the potential to be used in adolescent women.

Marijuana use has been found to affect symptoms of depression and anxiety in ongoing pregnancies. Women who used marijuana had higher scores on both the GAD and EPDS scales. A link between marijuana use and psychological distress has been demonstrated [Mark *et al.* 2021].

Psychological distress syndrome affects not only mothers, but also fathers and the entire family, as reported by Ghaffari *et al.* [2022]. In their study, they emphasized the necessity of participation of the spouse in the prevention of psychological distress during pregnancy.

In a crisis, men described their expectations as adaptation, communication, and positive lifestyle changes; anxious women emphasized attention and love, stable status, participation in childbirth, and fidelity [Faramarzi *et al.* 2023].

Sun *et al.* [2022] drew attention to factors that influence parental stress post-traumatic disorder in situations where the fetus has abnormalities.

Finnbogadóttir and Persson [2019] discuss the cause of depression in fathers-to-be; thirty-two expectant fathers were found to have a high risk of depression, mainly due to fear of unemployment, financial distress, poor health, poor sexual satisfaction, frequent smoking and alcohol consumption. However, the most significant outcome was a low sense of coherence (SOC) score related to a higher risk of depression. An increased interest in family is recommended for both partners in the prenatal period.

Bekkhus *et al.* [2022] looked at maternal and paternal anxiety during pregnancy and its direct effect on the mental health of the child. Based on an analysis of siblings, they concluded that anxiety did not have a direct effect on siblings' behaviors, as maternal and paternal anxiety were found to affect child behavior.

There are several methods that can reduce psychological distress; most take the form of preventive antenatal programs.

Tašková [2021] gives an overview of psychopharmaceuticals that can be used in the treatment of psychological distress in pregnant women.

Nasrollahi *et al.* [2022] found that women with early fetal loss experienced a statistically significant reduction in psychological distress using the mindfulness-based stress reduction (MBSR) method.

A study by Cang *et al.* [2022] investigated the effect of the Bushen-Shuagan method (BSSG) on results in 100 women with recurrent prenatal loss. They found that the BSSG method reduced the frequency of psychological distress and improved psychological distress in subsequent pregnancies.

The methods used for objectification are presented in the literature. Vlenterie *et al.* [2021] administered a questionnaire focused on feelings of depression to 652 pregnant women. They also assessed cortisol levels in saliva. They found that cortisol levels were not associated with psychological distress.

Riddle *et al.* [2023] conducted a study to examine the relationship between anxiety symptoms and sleep by monitoring the physiological response to stress (things such as heart rate). Heart activity and cortisol levels in saliva were also monitored. A total of 54 women were evaluated (25 women with anxiety and 29 without anxiety). Women with anxiety showed a significantly slower return to physiological heart rates. Cortisol levels were the same in both groups. Increased stress has been associated with poor sleep quality. Moderate anxiety, depressed mood, and grief were found in all women who had had a miscarriage.

Nazzari *et al.* [2020] measured levels of IL6, CRP, saliva cortisol, and alpha-amylase as markers of maternal stress. They found that higher levels of cortisol and CRP were independently associated with lower scores of infant cognitive development. Although correlative, the findings seem to suggest a role for monitoring biological stress signals in expectant mothers.

Ksinan Jiskrova *et al.* [2022] monitored sleep problems in children exposed to maternal prenatal stress. The authors conclude that prenatal exposure to stress can predispose people to the development of sleep problems later in life.

Marečková *et al.* [2022] studied the amygdala, which develops during early embryonic development and can be very sensitive to stress. The authors concluded that stress in the first half of pregnancy can subsequently predict the development of depression in young adulthood.

Čermáková *et al.* [2022] studied the link between early life socioeconomic deprivation (ELSD) and mental disorders in young adulthood in 122 women relative to changes in the hippocampus. The authors found that higher ELSD was associated with greater depressive symptoms, greater anxiety about traits, and lower global connectivity of the right hippocampus. The authors further stated that early preventive strategies targeted at children of socioeconomically deprived

families can produce long-lasting benefits for the mental health of the population.

Marečková *et al.* [2019] used magnetic resonance imaging to examine 93 young adults for whom data on the prenatal stress of their mother were known. They measured the total volume of grey matter and the volume of cortical areas. The authors found that prenatal stress was related to altered mood in adulthood and can negatively affect the mental health of offspring.

In recent years, the COVID-19 pandemic has been shown to have had an impact on the development of psychological distress; our study confirmed this.

Several authors have drawn attention to the dangerous impact of the pandemic.

Akgor *et al.* [2021] reported that the COVID-19 pandemic triggered psychological distress in at-risk populations such as pregnant women. The authors recommended that in the event of a future pandemic, routine prenatal care should seriously address this issue.

Davis *et al.* [2023] detected an increased frequency of psychological distress during the COVID-19 pandemic.

Taubman-Ben-Ari *et al.* [2022] reported a high frequency of psychological distress syndrome during the COVID-19 pandemic. Characteristics such as resilience, optimism, and self-compassion contributed to the reduction of the syndrome.

Rabinowitz *et al.* [2023] observed that during COVID-19, symptoms of depression and anxiety increased in the early and middle stages of pregnancy, followed by a slight decrease in depression and anxiety syndromes. However, the authors reported that stress levels did not decrease.

Muñoz-Vela *et al.* [2023] found that COVID-19 led to increased fear and anxiety among pregnant women. Fear was related to factors such as unplanned pregnancies and lack of partner support, while anxiety was related to factors such as maternal age and prenatal care.

Luong *et al.* [2021] noted that good eating habits and health literacy were protective and could reduce prenatal anxiety associated with fear of the COVID-19 pandemic.

The prevalence of pregnancy-related psychological distress in Saudi Arabia increased three times. However, women who had COVID-19 were found to have less stress. Low financial income and age had the greatest negative impact on anxiety [Abahussain *et al.* 2022].

Moyer *et al.* [2020] studied 2,740 pregnant women to see how the COVID-19 pandemic affected their mental health. The authors identified a number of factors that increased stress during the pandemic. They reported that women who agreed with more COVID stressors in their questionnaire had larger changes in their "pre- to post-COVID pregnancy-related anxiety".

Usui *et al.* [2023] looked at the relationships between prenatal psychological distress, fear of childbirth, and symptoms of obsessive-compulsive disorder during the COVID-19 pandemic in Japan. They found that prenatal depression predicted obsessive-compulsive disorders.

Lou *et al.* [2022] evaluated 17 global studies involving 15,050 pregnant women who had experienced COVID-19. The results show that the greatest negative impact on psychological distress lies in a decrease in general support, financial difficulties, inadequate education, unemployment, or chronic disease before pregnancy.

Mikolajkow and Mayszczak [2023] point out that in a monitored group of pregnant women who had suffered from COVID-19, they found increased stress and mental health disorders. They also found that prenatal stress had consequences in newborns.

Zilver *et al.* [2021] studied 1,466 pregnant women but did not find increased anxiety and depression in women during COVID-19 compared to before COVID-19.

Kilinç *et al.* [2022] found no COVID-19 anxiety in pregnant women.

CONCLUSIONS

The results of our study show the need to monitor the psychological well-being of pregnant women with physiological pregnancies. The authors recommend following psychological well-being during pregnancy at the same level as somatic development. Our extensive review of the relevant literature showed the importance of programs to prevent psychological distress during pregnancy.

DATA AVAILABILITY

The statistical data and other data in the tables and figures used to support the findings of this study are available from the corresponding author upon request.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest with respect to the publication of this article.

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