Depression screening and psychological intervention in pregnancy care and their relationship with complications during pregnancy

PhD Thesis

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1. Introduction

Pregnancy is a milestone in women's life: usually it is desired by women to have at least one child to experience the feeling of being a mother and to extend as a family. However, during this time women can have questions, physical and psychological difficulties too, like changing family roles, priorities, morning sickness, sleeping problems etc., thus women can feel overwhelmed and become depressed or stressed out, which can be so intense that psychopathology arise. In these cases, it is important that women should be provided more attention and special treatment. To do so, we need a tool to identify the affected women and a qualified staff to help the women deal with their symptoms.
In Szeged, a fully operational program exists aiming these tasks: perinatal nurses screen out the affected women by using a screening tool and psychologists help them overcome the difficulties. In this summary of thesis, I will describe this program and present the statistical results on the pre- and peripartum complications.

1.1 Psychopathologies during pregnancy

There are some disorders, which arise quite often during pregnancy and after delivery. By their main characteristics they can be sorted into two groups: anxiety disorders and mood disorders. During pregnancy the following anxiety disorders can develop: panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, agora-, social- and specific phobias and posttraumatic stress disorder [1].
Mood disorders are classified as maternity blues, depression and postpartum psychosis [2]. The most serious phenomenon is the postpartum psychosis, which needs immediate medical treatment, mostly hospitalization, as it can have additional symptoms including hallucinations, delusions, apathy, thus can be a threat both to the mother and her child [3]. Maternity blues is quite common and although its symptoms have similar characteristics, maternity blues should not be confused with the more serious, protracted perinatal depression [4]. Depression symptoms include mood worsening, loss of interest, impaired functioning, irritability, significant change in weight or appetite, sleep changes, decreased energy, cognitive impairment and suicidal ideations [5].

1.2 Prevalence and risk factors of antenatal and postnatal depression

Gaynes et al. [6] wrote in their meta-analysis that 8.5-11% of pregnant women experience minor or major depression during pregnancy and 9.7% in the postpartum period. From the depressed women 18% seeks psychological help in the antepartum period and 40% in the postpartum period [7,8].

In Hungary, only a few studies have focused on antenatal and postnatal depression, thus no accurate information is available about its prevalence in the entire population [9]. Bödecs [9] observed that 17.9% of women had depressive symptoms in the antenatal phase in Szombathely. Töreki et al. [10] found that 9.3-17.5% of women showed depressive symptoms at a pathological level in Békéscsaba in 2014. Five years later the rate was 11.87-15.31% [11]. In Szeged, 6-12% of the participating women showed pathological amount of depressive symptoms in 2014 [10], two years later 6.5-10.8% [12].

There are some risk factors which were connected to depression in the antenatal and postnatal period, including non-planned pregnancy [11–15], young age [9,11,12,15,16] or being older than 34 years old [12], being single or widowed [11–13,16], besides antepartum depression was a strong predictor for postpartum depression [17] .

1.3 Perinatal depression related complications, and psychological treatment

Women with perinatal depression were more likely to engage in risk behaviors, like take drugs, smoke or consume alcohol [18]. Depression in the late stage of pregnancy increased the risk of caesarean sections and instrumental vaginal deliveries [19], besides increased risk was observed for preeclampsia [20] and gestational diabetes [21]. Perinatal depression was found to be related to premature birth [22] and, paradoxically, prolonged pregnancy [23], intrauterine growth restriction [24] and low birthweight too [12,25]. Depression can affect the mother-infant bond as well [26] and maternal antepartum depression increased the probability by 4.7 of the descendants being depressed when they were sixteen years old [27].

Various methods have been found to help to cope with depressive symptoms: enhancing problem solving skills, feeling of competence [28], supportive talks and interpersonal therapies [29,30], cognitive behavior approach [31], music therapy [32], and psychoeducation with relaxation techniques [33].

2. Objectives

Our aim was to observe if depressive scores are related to pre- and peripartum complications on the Hungarian sample as well, just like in the literature. Although we did not find any source in the literature that had studied the connection between depressive scores and protracted cervical dilation and protracted descent, we think there might be an association between them, thus we added these outcomes to the list of complications. Besides we wanted to assess pathological rate in our sample, investigate how depressive scores varied during pregnancy and after delivery, and how demographic variables were connected to the depressive scores. We also wanted to study how psychological intervention was related to pre- and peripartum complications, depressive scores and demographic data.

3. Material and Method

3.1 The sample

Those women participated in the screening program, who attended to the pregnancy care of Szeged and its agglomeration. The participation was voluntary, the only excluding criteria was if somebody did not speak the Hungarian language fluently or who was underage. Between April 2011 and May 2017 4593 women participated in the screening program.

I have collected the obstetric data for 2118 women, then excluded 26 women, who had twins, because twin pregnancies had already been associated with some obstetric outcomes like low birthweight [34], gestational diabetes [35] and preterm birth [36]. Besides we excluded 50 women who had procured or spontaneous abortion, or who had stillbirth, thus, in the end 2042 women were in the sample. We carried out the statistical analyses on the data of these women.

3.2 Screening tool

We used the validated [37,38] EPDS (Edinburgh Postnatal Depression Scale) questionnaire [39], which is a short screening tool: it has ten items, which are about the mood status of the previous week. For each question there are four possible answers, which can be scored

from 0 to 3 points. In all, the whole questionnaire can be scored from 0 to 30 points. The 10th question is also mentionable, as it measures suicidal tendency: women have to check how often they think about harming themselves [40].

We used cut-off scores of the Hungarian validation studies for the likelihood of minor and major depression, these are 6/7 and 8/9 points in the antepartum period and 7/8 and 12/13 points in the postpartum phase [37,38]. In all cases, or if a woman showed any suicidal ideation, she was suggested to visit the psychologist of the Obstetric Clinic in Szeged. Consultation with the psychologist was optional, anybody could decide not to do so; what is essential that from now on women know where they can ask for help if they feel the need of it [40].

It is also mentionable that this tool is a screening tool, not a diagnostic one. The terms "depression" or "depressed" are only used for the better understanding. We do not want to imply that these women were diagnosed by us as having a clinical disorder [40].

3.3 The screening procedure

In Hungary, a special group of health care workers is present in pregnancy care: perinatal nurses, who, to our knowledge, cannot be found in other countries. Perinatal nurses meet pregnant women in their first trimester, then follow up the whole pregnancy and even after the child is born [41]. As perinatal nurses have a close relationship with pregnant and postpartum women, they were included in the screening program. They had a training how to fill in and evaluate the questionnaire at the beginning of the screening program and have got consultation sessions ever since.

When women met perinatal nurses for the first time, the nurses explained the aim of the screening, they collected the informed consent, the demographic data and the first EPDS questionnaire. Then three more times, so once in the second trimester, once in the third trimester and once in the postpartum phase, the nurses collected the EPDS questionnaire again. Not all women filled in all four EPDS questionnaires, as some women moved to Szeged in the second or third trimester, or even after childbirth; other women moved away during their pregnancies; some were hospitalized, therefore did not visit the perinatal nurse at that time and so on.

The perinatal nurses evaluated the questionnaires and advised women with pathological scores to contact the psychologist. Then the nurses collected the questionnaires and sent them to the psychologist of the Obstetric Clinic, who then registered the data.

In many cases women had their first perinatal nurse visit after the genetic ultrasound evaluation on the 12th week, thus these women had their first EPDS tests on the 13-14th week. While many of them had other EPDS scores from the second trimester, we categorized EPDS tests from weeks 13 and 14 to be in the first trimester. EPDS tests from week 15 to 30 were listed to the second trimester and data from week 31 or higher were enrolled to the third trimester.

The original study procedure was approved by the Regional Human Biomedical Research Ethics Committee of University of Szeged (100/2010 and 89/2011) and was carried out according to the Declaration of Helsinki and the Oviedo Convention. Since then the Hungarian Ministry of Human Resources [42] suggested perinatal nurses to pay attention to women's psychological state and depressive symptoms as well and use the EPDS questionnaire as a screening tool. In Szeged, the depression screening became part of pregnancy care.

3.4 The psychological intervention

All in all, 188 women participated in psychological intervention as part of the screening program. We collected their obstetric data and after excluding women with twins and women who had procured or spontaneous abortion or stillbirth, we had our intervention group with 150 women. Everybody else was in the non-intervention group [40].

During these interventions we, as health psychologists, studied the depressive symptoms more deeply: their onset, change of intensity, how they affected women's everyday lives, whether women had social support or help, etc. We focused on any problem women had relating their pregnancies and offered as many consultations as needed. If a woman seemed to need other kinds of help, like long therapy with a clinical psychologist or even medication, we helped finding the right professional and provided referral note to the Department of Psychiatry at University of Szeged [40].

With the interventions, our goals were to help women to increase and maintain healthy functioning and reduce depressive and anxiety symptoms. We used supportive techniques, reinforcement, psychoeducation, crisis intervention, reducing anxiety, hopelessness and depressive symptoms, relaxation techniques, assistance in coping with losses, enhancing coping skills and sense of control, relationship counseling and cognitive behavioral elements. We also offered help in enhancing communication skills, for example, how to ask their doctors or nurses for information or help [40].

3.5 Statistical analysis

For statistical analysis we used the IBM SPSS Statistics version 22. The significance level was set to 0.05. We created groups based on the EPDS scores, the different types of pre- and peripartum complications, mode of delivery, attendance at the interventions and demographic data [40].

Using the women's obstetric data, seven complication groups were created: 1) preterm birth (birth before the 36th week), 2) protracted cervical dilation, 3) protracted descent, 4) preeclampsia, 5) gestational diabetes mellitus (GDM), 6) intrauterine growth restriction (IUGR – diagnosis was given by the obstetrician) and 7) low birthweight (under 2500 grams). In the control group were the women, who did not have any of these complications Mode of delivery was divided into two groups: cesarean section and vaginal birth. Considering the intervention, the following way to create groups was made: women who attended the interventions constituted the intervention group and everybody else was in the non-intervention group [40].

To enhance the power of the analyses, we supplemented the missing data of the EPDS scores of the 2042 women, which is a statistically permissible method. To do so we calculated the median value of the EPDS scores for all measuring occasions separately for the above mentioned complication groups, and 8) women who had at least two of the above-mentioned complications and 9) women who had none of the above-mentioned complications [40]. We supplemented 183 women's data in the first trimester, 405 and 647 women's data in the second and third trimester, and 904 women's data in the postpartum phase.

We used Friedman's test to analyze if EPDS mean ranks stay stable or change over time, as pregnancy proceeds and after the child is born; Mann-Whitney U tests with Bonferroni corrections to explore if EPDS mean ranks were connected to the above mentioned pre- and peripartum complications; and Mann-Whitney U test to see if there was any connection between the EPDS mean ranks and mode of delivery [40].

We used Kruskal-Wallis test with pairwise comparisons to analyze whether there was any difference in the EPDS mean ranks between women who started the intervention in different trimesters or did not attend at all [40]**.**

We used Pearson's Chi-square tests to analyze whether there was any connection between intervention and the following pre- and peripartum complications: preeclampsia, GDM, IUGR, preterm birth, low birthweight, protracted cervical dilation and protracted descent.

We used the same method to determine whether there was a relationship between mode of delivery and intervention [40]**.**

Pearson Correlation was used to analyze whether there was a relationship between EPDS scores of all measuring occasions. Using Mann-Whitney U tests and Kruskal-Wallis test with Bonferroni correction we determined whether EPDS mean ranks were connected to demographic variable such as age, marital status, number of children and planning of pregnancy. We used Pearson Chi-square tests to analyze whether intervention was connected to marital status, parity and planned pregnancy.

We used the non-supplemented EPDS scores for three analyses. In the first one we wanted to explore pathological rate. To do so we created "depressive" and "non-depressive" groups based on women's EPDS scores and the cut-off scores. Then we conducted the Frequencies analysis on these groups in all trimesters and in the postpartum phase [40]**.** We also explored how many women had pathological scores at least once during the whole antepartum phase. Then, in the third analysis we used Wilcoxon signed-rank test to explore if the EPDS mean ranks changed after the consultations compared to the before-intervention state [40]**.**

4. Results

4.1 Sample characteristics

The responding women's age were 18-44 years, the mean age of the sample was 30.43 (SD = 4.840). From the responding women 1527 (82.4%) were in a relationship, engaged or married; 1048 women (56.3%) were primiparas and 218 women (11.8%) did not plan their pregnancy (Table 1).

Table 1: Demographic data of the sample of women whose obstetric data were collected.

		N	Range	Mean	SD
Age		1992	18-44	30.43	4.840
		N		%	
Marital status	In a relationship / engaged / married	1527		82.4	
	Single / divorced / widowed	327		17.6	
Number of children	None	1048		56.3	
	At least one	812		43.7	
Pregnancy	Planned	1623		88.2	
	Unplanned	218		11.8	

We analyzed the demographic characteristics separately for the intervention and non-intervention groups, too. In the nonintervention group, the responding women's ages ranged from 18 to 44 years (mean = 30.46 SD = 4.797). In this group, 1428 women (83%) were in a relationship, engaged or married; 963 women (55.8%) did not have any children yet, and 184 women (10.8%) had not planned their pregnancy. In the intervention group, the responding women's ages ranged from 18 to 43 years (mean = 30.11 SD = 5.386). In this group, 99 women (74.4%) were in a relationship, engaged or married; 85 women (63.4%) did not have any children yet, and 34 women (25.4%) had not planned their pregnancy. To sum up, women in the intervention group were less likely to be in a relationship, more likely to be having their first child, and almost two-and-a-half times more likely to be having an unplanned pregnancy (Table 2).

Table 2: Demographic data of women in the intervention and non-intervention groups

		N	Range	Mean	SD
Intervention group age		140	18-43	30.11	5.386
Non-intervention group age		1852	18-44	30.46	4.797
		Intervention group		Non-intervention group	
		N	%	N	%
Marital status	In a relationship / engaged / married	99	74.4	1428	83.0
	Single / divorced / widowed	34	25.6	293	17.0
Number of children	None	85	63.4	963	55.8
	At least one	49	36.6	763	44.2
Pregnancy	Planned	100	74.6	1523	89.2
	Unplanned	34	25.4	184	10.8

The EPDS questionnaires were obtained around week 10.59 in the first trimester, week 22.44 and 34.43 in the second and third trimester and week 4.81 after childbirth.

4.2 Assessment of depressive scores and pathologic rate

According to our results both the EPDS mean ranks and the pathologic rate lowered as pregnancy went on (from 2.93 to 2.38 points and 16.8% to 7.7%). According to the Pearson Correlation the EPDS scores of all trimesters and the postpartum phase correlated significantly, positively with each other, with weak and moderate correlation (all $p < 0.001$, $0.261 < r < 0.464$). In the non-intervention group the tendency was the same, namely all EPDS scores correlated with each other significantly, positively, with weak and moderate correlation (all $p < 0.001$, $0.246 < r < 0.482$); but in the intervention group only the second and third trimester's EPDS scores correlated with each other significantly, $r(150) = 0.240$, $p = 0.003$, all other $p > 0.105$.

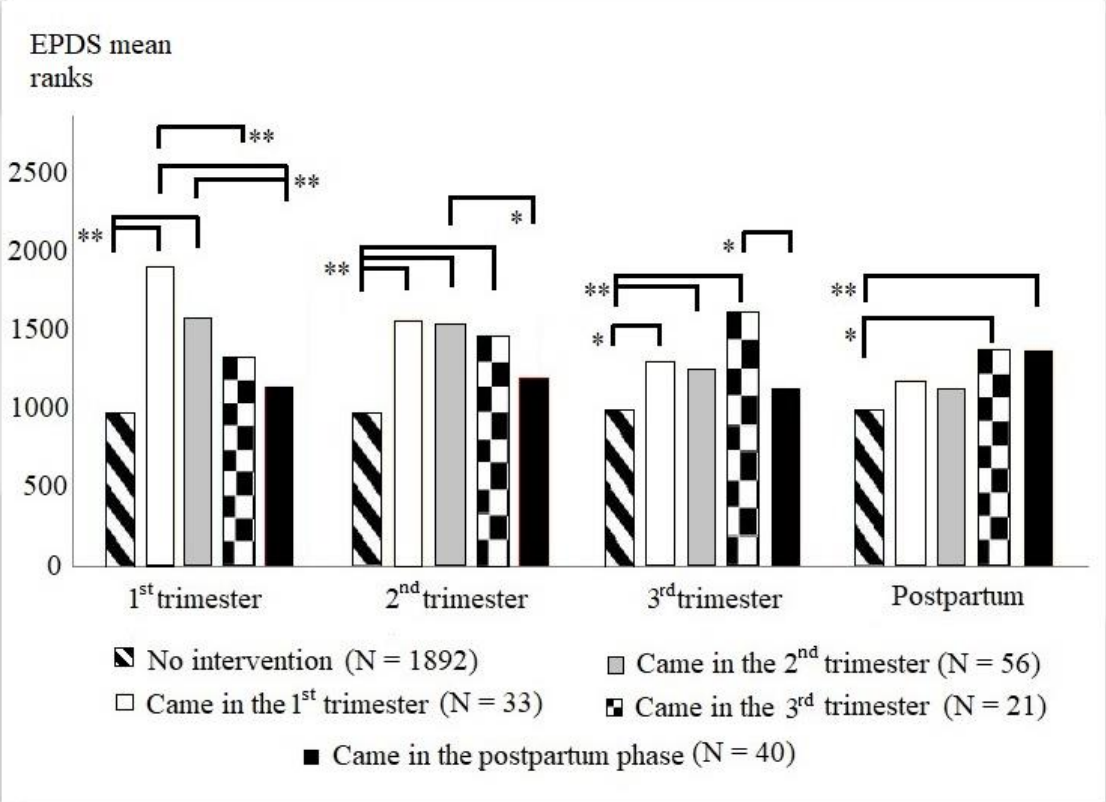
4.4 Intervention participation rate and EPDS scores

From the sample 1561 (76.44%) women did not need intervention, but 37 of them came anyway, because they felt they needed to. According to the EPDS scores, 481 (23.56%) women were offered consultation, but only 113 (23.5%) of them attended.

According to the Wilcoxon signed-rank test the EPDS mean ranks significantly decreased after the consultations compared to the before-intervention state, from 38.75 to 25.57, $Z = -6.518$, $p < 0.001$.

The Kruskal-Wallis test revealed that there were significant differences in the EPDS mean ranks in all four measuring occasions between women who started the intervention in different trimesters or did not attend it at all (all $p < 0.001$). In all cases the women had the lowest mean ranks who did not come to the intervention. The pairwise comparisons are presented in Figure 1.

Figure 1: Pairwise comparisons (with Bonferroni correction) of the EPDS mean ranks of women who started to attend the interventions in different trimesters or did not attend at all.



** means $p < 0.001$

* means $p < 0.05$

4.5 Pre- and perinatal complications, EPDS scores and intervention

The Mann-Whitney U tests with Bonferroni corrections showed that some of the pre- and peripartum complications are connected to the EPDS mean ranks (Table 3).

Table 3: The connections between EPDS mean ranks and pre- and peripartum complications

	EPDS mean ranks			
	1st trimester	2nd trimester	3rd trimester	Postpartum phase
Protracted cervical dilation (N = 129)	833.07	834.74	825.2	**806.54**
No complication (N = 1523)	825.94	825.8	841.79	**1062.14**
p	0.870	0.835	0.693	**0.000***
Protracted descent (N = 48)	856.44	**913.44**	**1044.55**	**1047.61**
No complication (N = 1523)	783.78	**781.98**	**777.85**	**777.75**
p	0.271	**0.043[t]**	**0.000***	**0.000***
Preeclampsia (N = 52)	817.08	837.52	698.97	**1004.47**
No complication (N = 1523)	787.01	786.31	791.04	**780.61**
p	0.636	0.414	0.135	**0.000***
IUGR (N = 27)	797.91	**972.20**	**942.65**	846.83
No complication (N = 1523)	775.10	**772.01**	**772.54**	774.24
p	0.791	**0.018 [t]**	**0.042 [t]**	0.366
Low birthweight (N = 94)	861.01	**972.78**	**900.84**	**891.33**
No complication (N = 1523)	805.79	**798.89**	**803.33**	**803.92**
p	0.262	**0.000***	**0.040 [t]**	**0.057 [t]**
Premature birth (N = 143)	835.40	812.82	891.23	843.04
No complication (N = 1523)	833.32	835.44	828.08	832.60
p	0.960	0.583	0.118	0.788
GDM (N = 181)	829.24	861.46	823.73	804.85
No complication (N = 1523)	855.24	851.44	855.92	858.16
p	0.501	0.791	0.386	0.136

The relationship is significant if $p \leq 0.007$ (Bonferroni correction).

* means significant

[t] means tendency relationship.

The Pearson's Chi-square tests revealed no significant differences between the intervention and non-intervention groups in the above mentioned pre- and peripartum complications (all $p > 0.150$).

4.7 Mode of delivery, EPDS scores and intervention

The Mann-Whitney U test showed, that the women, who had a cesarean section had significantly higher mean ranks in the postpartum period compared to women who had vaginal birth, $U = 467991$, $p = 0.007$. The Pearson's Chi-square test revealed that the women who began the intervention during their pregnancies were significantly less likely to have a cesarean section compared to women who did not participate in the intervention (30.9% vs 40.69%), $\chi^2(1) = 4.137$, $p = 0.042$. Besides women who had cesarean section were significantly more likely to ask for psychological consultation than the women who had vaginal birth (2.9% vs 1.5%), $\chi^2(1) = 4.576$, $p = 0.032$.

4.9 Demographic variables, EPDS scores and intervention

The Mann-Whitney U tests revealed that unplanned pregnancy, single marital status, primiparity and younger age (<21 years) are significantly associated with higher EPDS mean ranks in most of the measuring occasions. Those women, who were single and who had unplanned pregnancy, were more likely to attend the intervention.

5. Discussion

Our **first objective** was to assess the relationship between pre- and peripartum complications, demographic data and EPDS scores. Tendency relationships are also important to mention, because - although they are not significant associations – they imply which connections should be further studied with stronger study settings. Our results were the following:

- significantly higher EPDS mean ranks were associated with
    - cesarean section (in the postpartum phase)
    - protracted dilation (in the postpartum phase)
    - protracted descent (in the third trimester and postpartum phase)
    - low birthweight (in the second trimester)

- tendency relationships were found between higher EPDS mean ranks and
    - IUGR (in the second and third trimester)
    - low birthweight (in the third trimester and postpartum period)
    - protracted descent (in the second trimester)
- no relationship was found between higher EPDS mean ranks and
    - premature birth
    - GDM.

With demographic data the following results were found:

- significantly higher EPDS mean ranks were associated with
    - unplanned pregnancy (in all trimesters)
    - being single, divorced or widowed (in the first and second trimester)
    - having the first child (in the postpartum phase)
    - being younger than 21 years old or older than 35 years old (in all trimesters)
- tendency relationship was found between higher EPDS mean rank and
    - unplanned pregnancy (in the postpartum phase)

Our **second objective** was to assess the pathological rate in our South-Hungarian sample and explore how EPDS scores varied during the pre- and postpartum phase. According to our results the first trimester seemed to be the most problematic phase with the highest pathological rate; after this time the pathological rate decreased in all the measuring occasions, which result differs from the ones in the literature. The pathological rate in the postpartum phase is lower compared to the results of previous studies [6, 12], even when compared to the results of Békéscsaba [11], where depression screening is also part of pregnancy care. We think that the screening program is in the background of these diversions. First, lots of women who needed and asked for help got adequate psychological support. Besides the screening program went on for years, which might have sensitized people to depressive symptoms in the healthcare system and in women's milieu too, thus women could have got more support from everywhere.

We also found that EPDS scores are quite stable: antenatal and postnatal depressive scores correlated with each other positively, with weak or moderate correlation. These findings, namely the stability of depressive scores over time, and their association to pre- and peripartum complications and mode of delivery, emphasize the importance of the pre- and postpartum depression screening program. As from now on we can identify women with

higher EPDS scores, who are more likely to have some of the aforementioned complications.

Our **third objective** was to explore how psychological intervention was related to pre- and peripartum complications, mode of delivery, EPDS scores and demographic data. According to our findings the after-intervention scores were significantly lower compared to the before-intervention scores, which implied the suitability of the used approaches. Besides we found, that the EPDS scores of women who came to the interventions, were the highest when they started the psychological sessions. According to our explanation this might mean that women could cope with their difficulties for a while, but when problems got overwhelming, some women wanted to seek for support. From our sample only 23.5% of women, to whom the intervention was offered, asked for support. This shed light on the importance of (psycho)education: it is essential to educate people to ask for professional help without feeling ashamed, when they are experiencing overwhelming hard times in their lives.

When demographic data were in focus: the women came to the interventions more likely, who were single, divorced or widowed, or who carried unplanned pregnancy. As these women tend to have higher depressive scores, in our explanation it is understandable that they are more likely to ask for help.

When pre- and peripartum complications were in focus, no significant difference was found between the intervention and non-intervention groups. This can be promising, because women in the intervention group had higher depressive scores, thus more complications could be expected in this group based on the EPDS score and pre- and peripartum complications findings. Besides, women who attended interventions during the antenatal phase were less likely to have cesarean section compared to women in the non-intervention group, which might imply that psychological support can be a protective factor against this operative delivery.

These findings emphasize the importance of the psychological intervention, as part of the pre- and postpartum depression screening program, to provide professional assistance to anybody who feels the need for support when having problems during this certain period of her life.

7. New statements of the study

Our study results showed significant relationships between pre- and peripartum complications, mode of delivery and EPDS scores on the Hungarian sample; besides the results implied the effectiveness of psychological interventions in reducing depressive scores and the rate of cesarean sections. All these emphasize the importance of the pre- and postpartum depression screening procedure and providing psychological support to women who need it.

It would be desirable this screening program should become a routine procedure in Hungary. This way we could conduct more and more detailed studies to find more specific relationships between depressive scores, psychological interventions and pre- and peripartum data. Besides, this way psychological support could become more available for every pregnant and postpartum woman who struggles with various difficulties during this time.

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