Obstetric and psychosocial risk factors for depressive symptoms during pregnancy

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ABSTRACT

We aimed to determine the psychosocial and obstetric correlates of depressive symptomatology during pregnancy in South-Eastern Hungary. A total of 1719 women were screened for depression in four counties in 2006 and 2007, based on a Leverton Questionnaire (LQ) score of ≥ 12 at 14–24 weeks of gestation. The LQ scores indicated a probable depressive illness (PDI) in 17.2% of the study group. The best predictors in a multiple regression analysis were history of major depression (adjusted odds ratio [AOR] = 3.23), and major life events (AOR = 2.43). A perceived lack of social support from partner (AOR = 1.79) and lack of support by family (AOR = 1.23) were also significant determinants. Lack of planning of pregnancy (AOR = 1.12) and a history of unfavourable obstetric outcome (AOR = 1.42) also seem to predispose to PDI. Overall, psychosocial factors appeared important in the prediction of PDI, whereas economic features did not.

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1. Introduction

Pregnancy involves major changes in the mother’s life in many respects, (e.g. hormonal status, social role, etc.), and the exact correlation between these and depression is of increasing scientific interest (Ross et al., 2004; Halbreich, 2010). There is a growing body of literature about depressive symptoms during pregnancy with most studies using questionnaire measures to detect probable cases with high levels of symptomatology. In a wide-ranging literature review, Lancaster et al. (2010) found that the strongest predictors of depressive symptomatology during pregnancy were maternal anxiety during pregnancy, life stress, past history of depression, lack of social support, experiencing stressful life events in the previous year, lower education, smoking, single marital status, and poor relationship quality. Mothers satisfied with their family life appear more protected from depression during pregnancy (Goyal et al., 2010; Lancaster et al., 2010). Unplanned or unwanted pregnancy can likewise be a risk factor (Lancaster et al., 2010), and these are major determinants for depression in the postpartum period as well (Beck, 2001; Leverton and Elliott, 2000a, b; Robertson et al., 2004; Kozinszky et al., 2011). In the Eastern half of Central Europe, mothers have to cope with a different pattern of psychosocial risk factors compared to those described in the existing literature, e.g. increasing poverty rate and a transition in attitudes to returning to work in the postpartum period (Kozinszky et al., 2011).

Roughly 5–15% of women (Chatillon and Even, 2010) are found during pregnancy (Goyal et al., 2010; Lancaster et al., 2010). Unplanned or unwanted pregnancy can likewise be a risk factor (Lancaster et al., 2010), and these are major determinants for depression in the postpartum period as well (Beck, 2001; Leverton and Elliott, 2000a, b; Robertson et al., 2004; Kozinszky et al., 2011). In the Eastern half of Central Europe, mothers have to cope with a different pattern of psychosocial risk factors compared to those described in the existing literature, e.g. increasing poverty rate and a transition in attitudes to returning to work in the postpartum period (Kozinszky et al., 2011).

Roughly 5–15% of women (Chatillon and Even, 2010) are found to suffer with high levels of depressive symptoms during pregnancy at any moment in time, whereas as many as 12.7% of pregnant women experience major depressive disorder at some point during pregnancy (Gaynes et al., 2005; Vesga-López et al., 2008). However the reported prevalence values vary depending on the method used for diagnosis and on whether the data collection was done in a prospective or retrospective manner (Austin, 2003). In community studies, usually, only prevalence estimates based on screening test scores are feasible (Robertson et al., 2004).

Although it is of paramount importance to identify and treat depression during and after pregnancy, especially among women...
at heightened risk, in Central Europe there is a dearth of research on the epidemiology of depression during pregnancy. Identification of the sociocultural factors most relevant to the sufferer’s own experience makes it possible for any intervention to be more closely targeted to the individual case (Nahas et al., 1999). To our knowledge, ours is the first study to estimate prevalence rates and to look into the sociodemographic, economic and psychological predictors of probable depression during pregnancy in Central Europe.

1.1. Aims

The main goals of this study were to perform a large-scale survey to (1) estimate the prevalence of depression during pregnancy in South-Eastern Hungary and (2) to examine the influence of sociodemographic, economic, and psychological risk factors on this.

We predicted that several of the sociodemographic variables (e.g. marital status, number of children, etc. (Hungarian Statistical Office, 2007) had an influence on the prevalence of probable depression in the antepartum period, as they did in the postpartum (Kozinszky et al., 2011). It was suggested that the unfavourable economic situation of the average Hungarian family would have a strong influence on depressive symptoms during pregnancy (Kozinszky et al., 2011). The poverty rate in the entire Hungarian population was 14.3% in 2006 (Hungarian Statistical Office, 2008), and in those households where the mother returned to work soon after delivery the poverty rate was less than half of that in households were the mother remained at home (Hungarian Statistical Office, 2008). The mother’s wish to return to work soon after delivery and self-reported low financial income had appeared to be linked to higher risk of probable postpartum depression (PPD) in South-Eastern Hungary (Kozinszky et al., 2011), but its association with depression during pregnancy was unknown.

2. Methods

2.1. Participants and procedure

The study was carried out in all the 62 pregnancy-care centres of South-Eastern Hungary between 20th November, 2006 and 31st September, 2007. All women between weeks 12 and 24 of their pregnancy living in the four counties of South-Eastern Hungary were invited into the study.

After an explanation of the objectives of the study and informed consent, a trained health visitor conducted a questionnaire interview, guaranteeing anonymity. Initially, 2117 pregnant mothers were invited to participate in the study, out of whom 286 (13.2%) declined to participate. One hundred and twelve (5.2%) mothers were excluded mainly due to second trimester abortion, and, a smaller proportion of them, due to mourning for a deceased husband or parent, depression due to a general medical condition not related to the pregnancy (e.g. progressive malignant illness) or other acute psychiatric illness diagnosed by a trained psychiatrist, neurological problems, such as epilepsy, or illiteracy, which was very rare. A remaining 1719 pregnant women in the second trimester (between 14 and 24 weeks of gestation) participated in the study.

Leverton and her colleagues created their 24-item questionnaire (LQ) tapping into symptoms of major and minor depression to detect PPD (Elliott et al., 2000). We had previously confirmed that it was a valid scale measurement for screening for depression at a cut-off value of 11/12 (Csatordai et al., 2009).

The interview in this study included the LQ, and additional structured questions (see Appendix) exploring sociodemographic, obstetric, economic, and psychological risk factors. Some questions derived from worldwide findings regarding major risk factors for perinatal depressive symptoms, whereas others were created in an attempt to study the effects of sociodemographic and psychosocial determinants specific to Hungary.

All of these questions were ‘yes/no’ questions and corresponded to a variable in our analysis, except for the variable of major life events in the past year for which a minimum of two items from a list of ten questions selected from established life events scales (Paykel et al., 1971) was required to be answered positively for the variable to be coded as positive (Robertson et al., 2004); (1) being separated or divorced, (2) serious problems in marriage or cohabiting relationship, (3) serious problems or conflicts with family, friends, or neighbours, (4) problems at work or in place of education, (5) economic problems, (6) serious illness or injury, (7) serious illness or injury in close family, (8) road traffic accident, fire, or theft, (9) loss of a close relative, and (10) other difficulties (Newman and Bland, 1994). As described by several authors, the occurrence of two or more stressful major life events in the previous year is a strong predictor of postnatal depression (Newman and Bland, 1994; Elliott et al., 2000; Robertson et al., 2004; Kozinszky et al., 2011). A history of major depression independent of childbirth or prior postpartum depression has a strong influence on perinatal depression (Elliott et al., 2000; Robertson et al., 2004; Lancaster et al., 2010; Kozinszky et al., 2011), and this too was examined. Health visitors explored any previous history of depression from the patient’s account, clinic letters, discharge summaries, and prescription records. Where previous records were not available and the patient reported a history of low mood suggestive of a depressive illness, a psychiatrist also interviewed the patient to establish whether the diagnosis of a past episode was warranted. Self-defined low income and the intention to return to work after the postpartum period (6–12 months after delivery) also appeared of interest based on the previous literature (Leverton and Elliott, 2000a,b; Lancaster et al., 2010; Kozinszky et al., 2011). Emerging evidence suggests that subjective evaluation of one’s own economic status is a better predictor of future psychiatric morbidity than unemployment or objectively defined poverty (Weich and Lewis, 1998).

Intention to return to work was an important variable, as, although the relevant laws and state provision had not changed, there seemed to be a changing trend in mothers to return to work as early as possible and this had not been examined in previous studies. Further wishes to examine associations with different aspects of satisfaction with family life, perceived support by partner and family, relationship quality, and an independent style of management of problems of everyday life (Elliott et al., 2000; Tammentie et al., 2002), were also interested to study the effect of previous stillbirth, congenital malformations, and spontaneous and induced abortion.

The study protocol and the questionnaire were approved by the Clinical Research Ethics Committee of the University of Szeged (date of approval: 29 November 2005; reference number: 13-3/63/2005). The study was carried out in full accordance with the Declaration of Helsinki.

2.2. Statistical analysis

Computations were carried out with the SPSS 14.0 software (SPSS Inc., Chicago, IL). Most continuous variables did not show normal distribution in our participants group; therefore, non-parametric tests were used.

The correlations between binary categorical variables were analysed by chi-square tests. To test between group differences, the Kruskal–Wallis analysis of variance was used. Also, multiple logistic regression analysis was applied to assess demographic and psychosocial characteristics of probable depression during pregnancy in a simultaneous fashion. All bivariate analyses were weighted to age and type of residence representative for South-Eastern Hungary (McCulloch and Searle, 2001). Each variable included into the final model was highly significant and the most robust model was chosen (Hosmer and Lemeshow, 1989). Multicollinearity of the variables and linearity of log odds in the final model were also tested.

3. Results

3.1. Participant attributes

The social and demographic circumstances of the participants are presented in Table 1. Out of our 1719 participants, 295 (17.2%) mothers had an LQ score of ≥12 (probable depressive illness; PDI). The PDI group was different in terms of age from the mothers scoring below 12 on the LQ (non-PDI). A higher proportion of those with PDI lived on farms (8.5%) than of those without depression (3.8%) (p=0.002). Healthy mothers were more likely to be married or to live in a cohabitant partnership (with no significant difference). A slightly lower educational attainment was observed in the PDI relative to the non-PDI group, and there was practically no difference in the number of children.

A notable difference could be observed in the rates of primiparity between the PDI and non-PDI group, with significantly more primiparous women in the non-PDI group. Previous induced abortion or unfavourable obstetric outcome increased the likelihood of PDI. Mothers with PDI were generally less likely to have fertility or infertility before the actual pregnancy. Importantly, pregnancy planning was a factor highly distinctive between the

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PDI and non-PDI mothers (rate of unplanned pregnancy: 31.2% vs. 22.1%, respectively). As expected, the occurrence of unwanted pregnancy was relatively small, as were the differences observed between the PDI and non-PDI group in this regard.

Psychosocial factors potentially associated with PDI were listed in Table 2. There was a significant association between a past history of a major depressive episode and PDI (OR: 4.6). The likelihood of developing PDI was nearly 3 times higher in those reporting a history of a major depressive episode and PDI (OR: 4.6). The likelihood of PDI was almost double in those reporting a previous unfavourable pregnancy outcome: previous spontaneous or induced abortion, stillbirth. Abbreviations: PDI: probable depressive illness; LQ: Leverton questionnaire.

### Table 2

<table>
<thead>
<tr>
<th>Psychosocial determinants of PDI during pregnancy</th>
<th>Mothers with PDI during pregnancy (≥ 12 points in the LQ) (N=295)</th>
<th>Non-depressed mothers (&lt; 12 points in the LQ) (N=1424)</th>
<th>P value* OR (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)(a) (year)</td>
<td>27.73 ± 5.05</td>
<td>27.76 ± 4.28</td>
<td>NS(c)</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primiparity</td>
<td>151 51.2</td>
<td>848 59.6</td>
<td>0.009 0.71 (0.55–0.92)</td>
</tr>
<tr>
<td>Number of children (mean ± SD)b</td>
<td>1.75 ± 1.18</td>
<td>1.48 ± 0.83</td>
<td>NS(c)</td>
</tr>
<tr>
<td>Type of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married or cohabiting</td>
<td>181 61.4</td>
<td>906 63.6</td>
<td>0.002 0.95 (0.69–1.31)</td>
</tr>
<tr>
<td>Intention to return to work after postpartum period</td>
<td>82 27.8</td>
<td>665 46.7</td>
<td>0.001 0.55 (0.37–0.79)</td>
</tr>
<tr>
<td>Self-reported low financial income</td>
<td>120 40.7</td>
<td>630 44.2</td>
<td>NS(c)</td>
</tr>
<tr>
<td>History of major depression</td>
<td>31 10.5</td>
<td>37 2.6</td>
<td>&lt; 0.001 4.6 (2.68–7.22)</td>
</tr>
<tr>
<td>Major life events in past year</td>
<td>142 48.1</td>
<td>364 25.6</td>
<td>&lt; 0.001 2.7 (2.09–3.5)</td>
</tr>
<tr>
<td>Unstable relationship</td>
<td>14 4.7</td>
<td>82 5.8</td>
<td>NS(b) 0.81 (0.46–1.46)</td>
</tr>
<tr>
<td>Lack of support by partner</td>
<td>100 33.9</td>
<td>390 27.4</td>
<td>0.028 1.36 (1.04–1.78)</td>
</tr>
<tr>
<td>Lack of support by family</td>
<td>90 30.5</td>
<td>341 23.9</td>
<td>0.022 1.39 (1.06–1.84)</td>
</tr>
<tr>
<td>Self-reported low financial income</td>
<td>57 19.3</td>
<td>160 11.2</td>
<td>&lt; 0.001 1.90 (1.36–2.64)</td>
</tr>
<tr>
<td>Intention to return to work after postpartum period</td>
<td>82 27.8</td>
<td>665 46.7</td>
<td>&lt; 0.001 0.44 (0.33–0.58)</td>
</tr>
<tr>
<td>Independent style of management of problems of everyday life</td>
<td>165 55.9</td>
<td>755 53.0</td>
<td>NS(b) 1.12 (0.88–1.45)</td>
</tr>
</tbody>
</table>

Abbreviations: PDI: probable depressive illness; LQ: Leverton questionnaire.

* P value, odds ratio and 95% confidence interval of comparison of categorical data with Fisher exact test or chi-square test.

### Table 3

Table 3 presents the logistic regression model, including parameters and corresponding adjusted odds ratios (AORs) for PDI as compared with the non-PDI mothers. There was no multi-collinearity between the significant variables and the liner correlation of the logit odds was significant.

There was no significant association between PDI and the type of residence of the mother, despite the difference experienced in the single comparison. Primiparity had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family had a small but significant risk-reducing effect on PDI. Like in the univariate analyses, the lack of perceived support from the partner or the family has...
nancy seemed to increase the odds of PDI to a relatively small stronger than that of the previous variables. Unplanned preg-
past year posed a risk for PDI, and their effect was remarkably 
to be relatively strong predictors in a multiple regression analysis. 
or induced abortion or stillbirth in the obstetric history appeared 
before they became pregnant had lower odds of PDI, with history 
Table 3 

<table>
<thead>
<tr>
<th>Variable</th>
<th>P value</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primiparity</td>
<td>0.008</td>
<td>0.78</td>
<td>0.67-0.95</td>
</tr>
<tr>
<td>Lack of support by the partner</td>
<td>&lt;0.001</td>
<td>1.79</td>
<td>1.32-1.89</td>
</tr>
<tr>
<td>Lack of support by family</td>
<td>0.018</td>
<td>1.23</td>
<td>1.10-1.41</td>
</tr>
<tr>
<td>Previous infertility</td>
<td>0.004</td>
<td>0.26</td>
<td>0.14-0.42</td>
</tr>
<tr>
<td>Previous unfavourable obstetric outcome</td>
<td>&lt;0.001</td>
<td>1.42</td>
<td>1.19-1.69</td>
</tr>
<tr>
<td>Unplanned pregnancy</td>
<td>&lt;0.001</td>
<td>1.12</td>
<td>1.03-1.20</td>
</tr>
<tr>
<td>History of major depression</td>
<td>&lt;0.001</td>
<td>3.23</td>
<td>2.22-4.00</td>
</tr>
<tr>
<td>Major life events in past year</td>
<td>&lt;0.001</td>
<td>2.43</td>
<td>1.42-3.77</td>
</tr>
</tbody>
</table>

Abbreviations: PDI: probable depressive illness; LQ: Leverton questionnaire. 

a Adjusted odds ratio. 
b 95% CI: 95% confidence interval.

4. Discussion

4.1. Psychosocial and obstetric risk factors in PDI during pregnancy

Our findings suggest that the prevalence of PDI among preg-
nant women in Hungary, 17.2%, is not specifically higher than that 
in most Western populations (de Tychey et al., 2005; Lancaster et al., 2010; Gaynes et al., 2005). There is a relative dearth of data 
from the rest of the world, and to our knowledge ours is the first 
report on PDI during pregnancy from Central Europe. As regards 
sociodemographic characteristics, the overall number of preg-
nancy terminations has declined in parallel with the number of 
live births during the past decade (Hungarian Statistical Office, 2007; Bunevicius et al., 2009). Similarly to Western European 
countries, there has been a shift in Hungary towards delaying 
childbirth, due to the more career-oriented lifestyle of women, 
besides other social and economic reasons (Hungarian Statistical 
Office, 2007; Kozinszky et al., 2002). In the middle of the 1990s 
in Hungary, around 80% of unintended pregnancies were prevented 
either by modern contraception or terminated by abortion. By 
2002, merely 2% of live births could be classified as unwanted pregnancy (Hungarian Statistical Office, 2007). In our study, the 
corresponding figure was 4.2%. It is of note that, similar to our 
findings with PPD (Kozinszky et al., 2011), we detected a remarkably 
higher rate of unplanned pregnancy amongst pregnant women with 
PDI (31.2%) as compared to controls (22.1%), which is in line with 
the 17% reported for 2002 in Hungary (Hungarian Statistical Office, 
2007). A greater prevalence of depressive disorder during pregnancy is independently associated with unplanned and unwanted preg-
nancy (Lancaster et al., 2010; Bunevicius et al., 2009).

Although the overall purchasing power parity values for 
Hungary have increased over the 10-year period prior to our 
study, in 2006 more families fell into the lower economic bracket 
10 years earlier and more mothers were compelled to return 
to work after giving birth due to the unfavourable socioeconomic 
circumstances (Hungarian Statistical Office, 2008) with its poten-
tial health consequences. Interestingly, economic factors (self-
reported low income and intention to return to work after the 
postpartum period) seemed to be less convincingly influential on 
PDI during pregnancy than on PPD (Kozinszky et al., 2011); as 
regards PDI during pregnancy, they only appeared to be signifi-
cant risk factors in univariate (but not in multivariate) analyses.

In accordance with previous studies, we observed that the 
presence of a previous minor/major depressive disorder was 
significantly associated with antepartum depression (Kozinszky et al., 2002; Bunevicius et al., 2009; Goyal et al., 2010; Lancaster et al., 2010); whereas the independent management of everyday problems was not a significant predictor.

Families now tend to raise fewer children (Hungarian Statistical 
Office, 2007), at a later age, after a more risky pregnancy than earlier 
(Kozinszky et al., 2002; Bunevicius et al., 2009), which can give rise to 
PDI during pregnancy more easily (Lancaster et al., 2010). It is of 
relevance that an average of 1.6 children are born per families in 
Hungary and the mother is at least 27 years of age at the first 
childbearing (Hungarian Statistical Office, 2007). The mothers in our 
sample were of a similar age (27.75 ± 4.51 years), with a similar 
number of children (1.58 ± 0.92), with no significant difference 
between the study groups. Apart from the increasing jeopardy of 
the instability of relationships, the decrease in fertility with increasing 
age could also be a genuine risk factor (Kozinszky et al., 2002). Every 
third Hungarian child was born out of wedlock in 2006, Hungarian 
women nowadays being less likely to be married. The mothers in our 
survey reflected this tendency (the rate of being married at the time 
of delivery was 66% in 2006). Nowadays, more than half (52.3%) of 
marriages end with divorce (Hungarian Statistical Office, 2007).

Interestingly, in our study a married status did not play an 
important role in triggering or protecting from PDI during 
pregnancy, whereas others concluded that living alone is asso-
ciated with a higher chance of developing a depressive illness 
(Bunevicius et al., 2009; Lancaster et al., 2010; Melville et al., 2010). A possible explanation for this paradox is the trend of 
raising a child in a cohabitant relationship, which does not 
necessarily mean that the relationship is unstable. An unstable 
relationship with the partner has been described to have a 
detrimental effect in terms of depression risk (Pajulo et al., 
2001; Bunevicius et al., 2009; Lancaster et al., 2010), however, in 
our study, we found no significant effect in either univariate or 
multivariate analyses, which is a surprising result. In our multiple 
regression model, unstable relationship was displaced by lack of 
support from partner.

It is evident that a lack of support from her partner and family 
may force a mother to try and overcome her everyday problems 
alone, which makes it necessary for the mother to overcome her 
distress (Pajulo et al., 2001; Lancaster et al., 2010; Melville et al., 
2010). Similar to what we saw in PPD (Kozinszky et al., 2011), 
with an increasing trend in Europe for couples not to get married, 
we predict that the stability and quality of the relationship will 
likely take over the protective quality against depression of being 
made, as not being married is becoming more common and 
probably less of a sign of relationship problems and a risk factor 
for perinatal depression.

Our study has provided further evidence that perceived sup-
port from the family environment can help the mother (Pajulo 
et al., 2001; Lancaster et al., 2010; Melville et al., 2010). However, 
it is difficult to assess causal relations, and to establish whether 
depression during pregnancy is caused by a lack of support or it 
distorts a depressed mother’s perception of her environment’s 
attitude.

When the features were examined simultaneously, family-
related risk factors (lack of partner and family support) still 
appeared important. However, a history of depression and life 
stressors in past year, as other ‘traditional’ risk factors, still 
seemed to be the strongest predictors. Although stressful life 
events and depression are consistently found to be strongly 
associated, establishing the degree to which stress has a causal
effect in triggering antepartum depression is difficult and would require a very complex analysis (Kendler and Gardner, 2010).

Contrary to what we had previously found in PPD (Kozinszky et al., 2011), the probability of PDI was lower among mothers who expected their first newborn. This is inconsistent with the result of a previous review (Lancaster et al., 2010). A significant proportion of primiparas have a history of infertility and IVF, and becoming pregnant is a very positive experience for these women, according to our data, reducing the prevalence of antepartum mood disorder, whereas obstetric complications, which are more common in these women (Kozinszky et al., 2002), are likely responsible for the increase in the risk of postpartum depression (Adouard et al., 2005).

4.2. Methodological issues

Our study has some strengths that deserve mentioning. As far as we are aware, this is the first study to use a logistic regression analysis model to evaluate the determinants of PDI during pregnancy. Robust, simultaneous estimates of multiple risk factors were possible due to the fairly extensive data set collected from each participant. Conducting a personal interview enabled us to reduce the likelihood of misdiagnosed perinatal depression and the overestimation of the observed risk factors relative to the results of self-reported questionnaire surveys (Austin, 2003; Cox and Holden, 2003). It was a limitation of our study that we did not conduct diagnostic clinical interviews with psychiatrists to establish a clinical diagnosis of depression; however, our previous study (Csatornai et al., 2009) had proved that the LQ had excellent sensitivity and specificity for PND when compared against a full psychiatric assessment. In fact, we are only aware of a few studies that used a clinical interview for the diagnosis of antepartum depression, whereas the decisive majority relied on estimates based on scoring above a cut-off score on established screening tools.

Another advantage of our report is that it is based on a large community sample in Central Europe. Eberhard-Gran et al. (2001) pointed out that many published predicted value estimates are exaggerated, because they are measured in higher-prevalence populations. It is important to note that only a small proportion of the eligible women declined to participate in the study (13.2%). It was a strength of our study that we surveyed a chosen set of questions exploring the effect on the mothers their intention to return to work, their financial difficulties, or their perceived support from their social environment.

This study has been the first and only wide-ranging survey in Hungary so far, drawing attention to the relatively high rate of depression in pregnant mothers in Hungary. Our findings, consistent with reports from the most developed countries with regard to some but not all risk factors (e.g. primiparity, history of unfavourable obstetric outcome), raise the question of the need to some but not all risk factors (e.g. primiparity, history of obstetric complications, which are more common in these women (Kozinszky et al., 2002), are likely responsible for the increase in the risk of postpartum depression (Adouard et al., 2005).

Appendix 1

- Did you plan to get pregnant? Y/N
- Is your pregnancy unwanted? Y/N
- Do you get practical or emotional support from your partner? Y/N
- Do you get practical or emotional support from your family? Y/N
- Do you consider your relationship with your partner stable? Y/N
- Do you prefer to sort out your problems by yourself? Y/N
- Do you have any financial problems? Y/N
- Do you intend to return to work within 6–12 months after delivery? Y/N

References


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