

# Advancement in the prevention of postnatal depression: application of the Leverton Questionnaire

Doctoral Thesis

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## **1. INTRODUCTION**

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The importance of the topic chosen for investigation cannot be questioned nowadays, as the prevalence of psychiatric cases worldwide has become a significant health issue.

According to the predictions of the WHO, mental disorders will be among the most serious health problems in the decade after 2000, most significantly depression and its consequences. Mood disorders also appear as risk factors at other serious health problems (e.g. oncological, cardio-vascular disorders, diabetes mellitus, eating disorders), partially because of their direct physiological effects, and also because they can be associated with harmful behavioural forms (smoking, alcohol consumption, eating due to stress).

21.3% of women suffer from symptoms of major depression during their lives, and women are most vulnerable to depression in the pre and postpartum period. There are significant somatic and hormonal changes during pregnancy and the puerperium period that causes changes in the psychic status. After child-birth, the sudden decrease in the serum level of estradiol, progesterone,  $\beta$ -hCG,  $\beta$ -endorphine, prolactin and cortisol unfavourably affects the metabolism of serotonin in the central nervous system, which is responsible for the symptoms of mood disorders.

Mood disorders in a broader sense include a fairly wide scale ranging from ‘normal reactions’ caused by environmental stimuli to illnesses connected to biological factors.

Accordingly, psychiatric problems of the postpartum period can be divided into the following categories:

- Postpartum blues (mild despondency) (50-85%), occurrence of distress, low spirits, irritation, accompanied by crying and anxiety for a few days following child-birth;
- Postnatal depression (PND) (10-25%), a condition lasting for more than two weeks, exhausting all criteria of unipolar (interchanging of depressed and healthy periods) depression, in the first year after child-birth;
- Postpartum psychosis (0.1-0.2%), the most serious, yet the least frequent form of psychiatric problems of the postpartum period.

The first six week of life is a very sensitive period in view of human imprinting and personality development, which is significantly affected by the quality of the early mother-child relationship. PND can have a harmful and long-lasting effect to the mother-child

relationship and it can hinder the subsequent socialization process of the child. For the child, in the early phase of life the mother or the primary nurturer is the environment, the experiencing of which makes it possible to establish a mental model that later modifies the perception of the world and that of people. If the mother-child relationship is not adequate, insecure ties are established between the mother and the child, which can result in deformed perception of people in adulthood, as the newest research has shown.

Postnatal depression (PND) affects the everyday activities of the mother disadvantageously, and also endangers the development of the child by deteriorating the quality of life. Women in the pre and postnatal period are vulnerable and more likely to become depressed.

Despite the fact that in Hungary the medical specialists working in centres of prenatal care and social workers of districts meet almost 100% of women in the postpartum period, nearly 50% of postnatal mood disorders is not diagnosed, and thus not treated. We assume that this result is due to the fact that the medical personnel do not recognize the symptoms of PND in all cases. Even if there are numerous scales for screening PND, these must first be validated in Hungary, and only then can they be used in practice during screening.

Data from Hungary is limited, as the tests measuring the occurrence of mood disorders accompanying child-birth are rare, and there is not much attention devoted to this topic. The few research that was done in Hungary show high prevalence and incidence, drawing attention to the fact that we must deal with the topic of depression before and after child-birth in Hungary as well. Healthy development of the individual, the couple, and the family can only be assured if we recognize the symptoms of depression early.

These facts all support the relevance of this research. We supposed that PND can be screened with the questionnaire validated in Hungary, after which screened PND patients can be directed to the adequate psychiatric treatment. Co-operation with other medical professions can facilitate the successful treatment of patients, while ameliorating the patients', their families', and thus society's quality of life as well.

## **2. AIMS**

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- Test in surveys if pregnant women and women in the puerperium period can understand the questions of the Leverton Questionnaire, and whether their replies are statistically valuable;

- Validation of the for screening of PND chosen measuring tool(L-Test),in purpose of domestic adaptation.
- Deduce the frequency of PND occurrence from answers given to the questionnaire;
- Analyse PND occurrence in a region (South-eastern Hungary) between 1996 and 2006, by examining socio-demographic and psychosocial risk factors that influence PND occurrence;
- Develop efficient team training programme for pregnant women that can be used in PND prevention.

### **Hypotheses**

- I assume that the frequency of PND occurrence in South-eastern Hungary does not diverge significantly from foreign data known in literature.
- PND occurrence in the examined region shows an increasing tendency between 1996 and 2006.
- On the basis of observations of literature, I assume that both socio-demographic and psychosocial factors are determinant in the development of the pathography.
- According to my assumptions, the Leverton Questionnaire is applicable to the screening of mood disorders accompanying child-birth.
- On the basis of our hypothesis, the implementation of the team training activity we had specifically developed can positively influence the occurrence of PND.

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## **3. METHODOLOGY**

### **Chronological outline of research**

- The first measurements were done between 1<sup>st</sup> January 1996 and 20<sup>th</sup> November 1996, by questioning 2229 puerperal mothers in the sixth week after child-birth. The results of this retrospective examination have become relevant after the validation process.
- Between 1<sup>st</sup> January 2001 and 31<sup>st</sup> December 2003, we tested the questionnaire by analysing the screening test results of 109 pregnant women first, then that of 57 women 6 weeks after child-birth.
- Between 1<sup>st</sup> January 2006 and 20<sup>th</sup> January 2006, we questioned 35 puerperal women in the sixth week of the postpartum period for the validation of the measuring tool.

- Between 21<sup>st</sup> January 2006 and 20<sup>th</sup> November 2006, we interviewed 1719 pregnant women, whom we also questioned in the postpartum period.
- Between 1 February 2006 and 31 October 2006 we randomly chose from the 1719 expecting women 710 pregnant and organized team therapy meetings for them.
- Between 21<sup>st</sup> January 2006 and 20<sup>th</sup> December 2006, we included into the longitudinal research a further 604 women in the sixth week of the puerperium period.

### **Location of the research**

For the location of the research we always used the same area, 62 urban and rural centres of prenatal care and districts of social worker training in Csongrád, Bács-Kiskun, Jász-Nagykun-Szolnok, and Békés county.

### **Personal conditions of the research**

- Questioning social workers formerly prepared for the topic of postnatal depression
- During the realization of the screening protocol it had to be considered whether there were any behavioural therapeutics accessible locally or on the phone, and how they examined and treated women screened during the test in the most serious cases.
- Team therapeutic psychiatrist trainers specialized in the topic of postnatal depression, mental hygienic social workers and mathematicians.
- Enough pregnant and confined women volunteering for participation in the test and therapeutic team activities.

### **Conditions of the inclusion into the sample**

- We limited participation in the research to women who were set by specialists in the sixth week of pregnancy, or in the 6-10<sup>th</sup> week of the puerperium period.
- We extended our research to primi and multipara women, those who have children and those who are childless.
- We did not include any women whose foetus was stillborn or has died in the perinatal period.
- We did not include individuals treated for psychiatric illnesses, so that we would not get any false results.
- We included people who undertook the voluntary, anonymous, 40-minutes personal interview.

- People got included into the sample after these former selective processes, in a random way.

**Parts of the measuring tool:**

- A prenatal care questionnaire including 31 questions
- The LQ test including 24 questions
- Further questions

**Extension of the measuring tool:**

- 4 pages
- number of major question clusters: 55
- number of closed questions: 71
- number of open questions: 15

The data of the prenatal care questionnaire used during the examination of the method of personal interview by social workers include the following groups:

- soci-demographic data
- data concerning PND risk factors
- data concerning health conditions of patients
- individual life stories

The characteristics and valuation of the LQ test capable of detecting mood disorders can be summarized as the following:

- all 24 questions of the LQ is concerned with the symptoms of minor and major depression – anxiety, depressive mood, and somatic symptoms
- two or three answers can be given to all questions, and points can be given to answers on a 0-2 point scale, from answers not characteristic to PND to answers typical of it
- answers referring to depression get 2 points, answers referring to mild symptoms get 1 point, and negative answers get 0 points
- the maximum score is 48 (scores between 12 and 18 points mean temperate vulnerability, scores between 19 and 48 mean serious vulnerability)
- questions are concerned with symptoms of PND occurring in a one-week period before the test

- questions of the LQ refer to anxiety, anhedonia (lack of joyfulness), and somatic symptoms of PND
- the anxiety subscale of LQ include questions 1, 6, 7, 9, 10, 15, 16, 18, 19, 22, and 24
- the somatic symptoms subscale of LQ include questions 2, 3, 4, 5, 8, 11, 12, 14, 17, 20, and 21 (87)
- the remaining items cannot be categorized into the typical group of vulnerability symptoms

Statistic calculations were done by the Statistical Package for the Social Sciences (SPSS) software. We determined the limit of statistical significance at  $p = 0.05$ . Where we could, we calculated both the odd ratios (OR), which show the probability of the supervention of events, and the confidence intervals (CI). The latter means the acceptance range of the hypothesis on the level of the examination.

Measuring tools must have validity. Validity is the feature of the measuring scale that shows whether the scale measures the phenomenon for which it was designed. To this end we examined during the research the applied questionnaire's validity. By comparing the LQ test's and the Beck Depression Inventory's results (scores), we validated the depression-measuring characteristics of the LQ. LQ showed a significant linear correlation with BDI ( $r = 0.65$ ), which means that LQ can measure the symptoms of depression correctly. Leverton test is valid and measures depression, as it shows a close correlation with the subscales of BDI.

To measure the uniformity and structural stability of the LQ, we applied the Cronbach coefficient, which is the number most efficiently measuring reliability. LQ showed an excellent inner consistence (Cronbach  $\alpha = 0.77$ ).

### **Therapeutic team activities**

While searching for efficient methods of PND prevention, we randomly included pregnant women with Leverton test, in the therapeutic and control groups. 710 women participated in planned and directed team activities. Those participating in the team activities and those not participating were characteristically the same. The 4x3 hour educational team activities had psychotherapeutic effects and were conducted by psychiatrists and mental-hygienic social workers. The mothers included did not know that they were participating in therapeutic activities, nor the social workers got information about this research. Maximum

fifteen individuals were included in one group. We invited the fathers as well, but their participation was rare. Sound recordings were made of team activities in all cases to ensure the quality of the examination.

The training was conducted by the mentioned specialists in all prenatal care centres participating in the study. Conductors of the courses had participated in tutorial training before the course, where they got acquainted with the themes and methods of the team activities.

## 4. RESULTS

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### **The effect of team activities on pregnant women**

By repeating the LQ test in the sixth week of the confined period, among women who participated in the team activities during their pregnancy ( $N=710$ ) the proportion of PND measurable by the questionnaire was significantly lower, 12.7% ( $n=90$ ), while among those who did not participate ( $N=1009$ ), we measured 17.5%. Naturally, LQ scores were significantly lower in the case of women who participated in team activities. (Table 1.)

<b>PND frequency and LQ scores in the therapeutic and control group-in 2006-in South-east Hungary</b>					
	Confined women participating in team activities ( $N=710$ )		Confined women not treated ( $n=1009$ )		P score ** OR (95% CI) ***
	n	%	N	%	
PND	90	12.7	177	17.5	<0.01 0.68 (0.52-0.90)
LQ scores after giving birth*	9.43±2.168		10.12±3.632		<0.001

\*: Presentation of continual variables: average ± standard deviation (SD); \*\*: comparison of the continual variables were done by the Mann-Whitney U test; \*\*\*: P score, odd ratio and 95% reliability interval.

In the case of women participating in team activities during pregnancy and interviewed after giving birth, the following determining factors reduced significantly PND occurrence:

### **Protecting factors:**

- Being married [AOR: **0.01**; (95% CI: 0.00-0.02); P < 0.001],
- Planned pregnancy [AOR: **0.43**; (95% CI: 0.26-0.72); P=0.002],
- Returning to work two years after the postnatal period [AOR: **0.45**; (95% CI: 0.28-0.72); P=0.001].

The probability of PND occurrence among participants of team activities was increased by the following factors and rates:

### **Risk factors:**

- Former major depression [AOR: **7.56**; (95% CI: 4.20-13.64); P < 0.001],
- Financial problems [AOR: **5.69** (95% CI: 3.47-9.33)p<0.01]
- Formerly treated depression [AOR: **2.79**; (95% CI: 2.53-4.81)]
- Undesired pregnancy [AOR: **2.57** (95% CI: 0.80-8.27)]
- Former stressful events [AOR: **2.51** (95% CI: 1.59-3.95)p<0.01]
- Number of children [AOR: **1.8** (95% CI: 1.6-2.1 )]
- Manages everyday life alone [AOR: **1.59** (95% CI: 1.01-2.52)p=0.054]
- Unfavourable outcome of former pregnancy [AOR: **1.69**; (95% CI: 1.06-2.68); P = 0.044]

Control team(training stand off) PND **protecting factors** and values:

- Being married [AOR: **0.15**; (95% CI: 0.10-0.22); P < 0.001],
- Planned pregnancy [AOR: **0.27**; (95% CI: 0.19-0.38); P <0.001],
- Returning to work two years after the postnatal period [AOR: **0.55**; (95% CI: 0.39-0.77); P < 0.001]

**Risk factors** and values:

- Number of children [AOR: **1.44**; (95% CI: 1.25-1.60); P = 0.008],
- Managing everyday life alone [AOR: **2.01**; (95% CI: 1.43-2.83); P < 0.001],
- Former unfavourable pregnancy outcome: [AOR:**2.16**;(95%CI:1.53-3.05) P<0.01]
- Former major depression [AOR: **2.66**; (95% CI: 1.36-5.21); P = 0.004],
- Former stressful events [AOR: **3.10**; (95% CI: 2.22-4.34); P < 0.001],
- Formerly treated depression [AOR: **3.82**; (95% CI: 1.02-5.2)p< 0.01]
- Financial problems [AOR: **4.02**; (95% CI: 2.71-5.97); P < 0.001]

## **PND prevention with the team activities applied during prenatal care**

We introduced in the methodology section an informational-relaxation programme we had specifically developed for PND. We showed its effect on PND occurrence, and through which PND determining factors can it reduce PND occurrence.

Team activities moderated the number of patients suffering from PND, and also the scores referring to depression symptoms measured by the LQ test.

Team activities were not only therapeutic, but it was also aimed at the realization of notions of young mothers, so that they could get acquainted with the task awaiting them, ascertain their abilities, requirements, and their relationship with their husbands or partners. They were provided for meeting the requirements of their lives' most beautiful and probably hardest period more mature and competent, namely, motherhood. A forum was established to deal with the imagined and real fears of giving birth and parenthood. By providing adequate answers, these negative feelings, anxiety, and emotional problems could be eliminated. Regular team activities deepened the treated women's demand for higher health culture, and increased the acceptance of primary prevention services.

Closer co-operation could be commenced between social workers and other professions. More emphasis was put on the efficiency of the system of indicators. With the help of this intervention, we proved the importance of the role of positive mental health support among lay mothers.

- Team activities did not affect individuals living at particular places and having particular schooling, as the participating women (affected by PND in different proportions) can be viewed as homogeneous as regards these two variables. The age variables of the two groups were the same (women between 27.5 and 27.8 year).
- Former abortion did not affect the occurrence of PND, nor did the team activities (14.4%).
- The therapy was not so successful with spinsters and single women (51.1% PND proportion).

Thus it has been proved that with the help of the relaxation-informational programme developed during prenatal care, depression can be reduced significantly.

The particular risk factors can be influenced to different degrees. The training promotes family support factors the most. It affected the components of the low economic status the least.

## **Socio-demographic and psychosocial characteristics in 1996 (N = 2229) and 2006 (N = 1613)**

Our data show that several factors affected the prevalence of PND in different rate, from 1996-to2006

### **Reduced it:**

- Higher age of the mother.
- Stable relationship between the couple (86.8% in 1996, OR=0.35 and 15.2% in 2006, OR=0.11).
- Higher number of children, planned, joyful pregnancy.

### **Increased it:**

- Unfavourable economic status (18.9% in 1996, OR=1.08 and 28.8% in 2006, OR=3.68, meaning only 9.9% of healthy mothers indicated financial problems).
- Not planned pregnancy (18% in 1996, 44.5% in 2006), OR=1.68 in 1996, while OR=3.22 in 2006. Thus lack of planning the pregnancy has become a significant indicator of PND occurrence by 2006.
- Depression not connected to former pregnancy and the first year of postnatal period (15.9% in 1996, OR=0.92, while 50.2% in 2006, OR=3.65).
- Two or more stressful events one year before testing are serious indicators of PND. In our examination it was 15.9% in 1996, OR=0.92, while 50.2% in 2006, OR=3.65. The probability of occurrence increased fourfold in ten years.
- The effect of managing problems alone was moderated, yet it remained significant until 2006 (proportion of PND patients was 61.3% in 1996 and 65.8% in 2006).
- In accordance with former studies, we also examined minor and major depression symptoms affecting PND development that was related to the postpartum renewal of depression (12.3% in 1996, OR=2.55 and 9.3% in 2006, OR=1.71).

## **5. CONCLUSION (new findings, proposals)**

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- We can ascertain that there has been no other study in Hungary with similarly high participation of pregnant and confined women that would screen pre and postnatal mood disorders. This study is the first comprehensive survey in Hungary that systematically deals with screening and treating PND.

- To the best of our knowledge, no similarly expansive international study has been published before.

**Our hypotheses were justified by the following:**

- Our results show that the occurrence of PND in South-eastern Hungary is not higher than in Western countries. These results do not diverge significantly from the studies formerly done in Eastern Europe with the inclusion of more individuals, where PND frequency was 18%, and numerous of our partial results correspond to the results of smaller studies done in Hungary.
- The examination based on Csongrád, Bács-Kiskun, Jász-Nagykun-Szolnok and Békés county showed that PND occurrence has a growing tendency from 15.0% (in 1996) to 17.4% (in 2006).
- Our examination made it possible to investigate the socio-demographic and psychosocial risk factors affecting PND occurrence. We proved the risk and advantageous factors of the negative psychic status connected to the postpartum period, and these results were also similar to the results of international studies.
- For screening PND, we used the Leverton Questionnaire (LQ), the reliability of which we proved by statistic examinations. Thus we expanded the range of Hungarian screening methods with a cheap measuring tool that can be applied in the pre and postnatal period, and is able to determine the symptoms of both minor and major depression. We tested a method so fast and easily applicable – with positive results – that can be applied in particular regions, included into the routine tasks of social workers by expanding their competence. It can provide other professions with a primary screening process, and it can be included into the themes of social worker training at college.
- We developed and tried during prenatal care – and proved its importance by examination results – a relaxation-informational team activity, with which we could affect advantageously the mood disorders occurring around giving birth (the proportion of PND among those who participated in the team activity was 12.7%, while that of those who did not participate was 17.5%), we moderated the dysfunctions generated by symptoms of minor and major depression.

## **NEW ASSESSMENTS:**

- \*We translated and validated the Leverton questionnaire. The LQ reference score of the postnatal depression is 11/12. Its sensitivity is 85%, its specificity is 94%.
- \*We measured the PND with a valid scale. Its prevalence is commensurable to other countries-in great majority-with EPDS measured PND occurrence.
- \*We found out the social demographic and psychosocial risk coefficients of PND and their protecting factors in South-east Hungary in 2006.
- \*The occurrence of PND showed rising tendency in South-east Hungary. From 15% in 1996 to 17.4% in 2006.

## **The effect of team trainings with instructive aspect in 2006:**

- \*The therapy **moderates** the facilitating effect of the self-sufficient problem solving behaviour for PND ( $OR=0.054$ , vs  $OR=2.01$ )
- The therapy **cuts back** the unfavourable effect of the stressing life incidences. ( $OR=2.51$ , vs  $OR=3.1$ )
- \*The AND raises the risk of PND, but the achievement of team trainings **moderated** this effect.
- \*The therapy was **less successful** by unmarried and who lead a single life.
- \*The therapy had **no influence** on the PND effect by the unwanted pregnancy.
- \*The team therapy **couldn't moderate** the effects of the financial problems.
- \*The team therapy **wasn't able to moderate** the facilitating effect of the former major depression.
- \*Closing up, the former unfavourable pregnancy outcomes, the depression of mothers in the periods of following pregnancy **leaded much more often to** appearance of the clinical aspect.
- \*The effect of the former infertility or sterility **didn't extend to** the postnatal period.

## **PROPOSALS**

- The numerous and highly educated Hungarian social workers should be given a more emphasized role in the pre and postpartum period to prevent, screen, and treat PND (expand their range of competence).

- Compulsory use of the Leverton Questionnaire in the pre and postnatal period for individual social workers (prenatal care, six-week postpartum period examinations).
- Primary and secondary prevention activity of social workers should promote the efficient operation of the system of indicators and consultation, while co-operating with other professions and observing professional protocol (obstetrician-gynaecologist, paediatrician, psychiatrist, general practitioner, nurse, social worker, social sphere).
- Providing social workers for the prevention and therapeutic catering for pregnant and confined women in the pre and postpartum period by professional leadership (psychotherapy, family therapy, pharmacotherapy).
- Increase standard of social workers' training, investigation of areas in need of development, and inclusion of the results of other sciences into education (e.g. LQ, conducting team activities, acquirement of relaxation techniques in theory and in practice in the mental-hygienic part of specialization in the seventh semester of social worker training at college).
- Teaching pre and postpartum mood disorders on the level of theory and practice at the post-gradual retraining of practicing social workers, as a course of adequate number of lessons, and compulsory exam at the end.
- Strengthen the connections between institutions and places of education dealing with research, and organizations of professional supervision with a view to management and development of the profession.
- Standardizing data of prenatal care stored electronically, making the system of screening questionnaires electronic, providing guarantee of data protection and the possibility of connecting databases to one another.
- Establishment of institutions and organizations where social workers specifically deal with PND prevention and treatment.

### **Initiating further examinations:**

The expansion of the use of LQ, with a stronger co-operation of other professions e.g. tracking the physical and mental development of the foetus in co-operation with obstetricians, to see if the advancement of children with mothers participating in team therapeutic activities differ from those whose mother did not participate in these activities.

## **6. LIST OF PUBLICATIONS**

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### **. Publications connected to the thesis**

- I. **S. Csatordai**, Z. Kozinszky, A. Pal (2006) Forecasting postnatal depression with randomized representational sample. Magazine of Hungarian Gynaecologists, 69: 17-22.
- II. **S. Csatordai**, (2006) Feasibility of the prevention of postnatal depression by social workers. Nurse, 19: (1) 30-41.
- III. **S. Csatordai**, A. Krajcsi, T. Sefcsik, T. Rudisch, I. Devosa, E. Toth, Z. Kozinszky, A. Pal (2007) Validation of the Leverton Questionnaire for postnatal depression in randomized representational sample. Magazine of Hungarian Gynaecologists, 70: 229-235.
- IV. **S. Csatordai**, Z. Kozinszky, I. Devosa, E. Toth, T. Sefcsik, A. Krajcsi, A. Pal (2007) Obstetric and socio-demographic risk of vulnerability to postnatal depression. Patient Education and Counselling, 67: 84-92.
- V. **S. Csatordai**, (2007) Room of methodology, as the model of operation of the “Open Counselling” system. Nurse, 20: (4) 22-35.
- VI. **S. Csatordai**, Z. Kozinszky, I. Devosa, R. Dudas, E. Toth, J. Sikovanyec, D. Szabo, K. Barabas, A. Pal. (2009) Validation of the Levereton Questionnaire as a screening tool for postnatal depression in Hungary. General Hospital Psychiatry; 31: 56-66.

### **Publications not connected to the thesis**

- VII. Z. Kozinszky, **S. Csatordai**, Csepинé G. Szucs, S. Rabi, M. Ladanyi, A. Pal (2006) Analysis of the number of artificial abortions in Hungary. Magazine of Hungarian Gynaecologists, 69: (6) 501-514.