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# Severity of post-traumatic stress symptoms, level of experienced stress and coping strategies in mothers of children previously treated in the neonatal intensive care unit

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**Summary**

**Aim.** The aim of the study was to develop a model of the relationship between the severity of post-traumatic stress symptoms, levels of experienced stress and coping strategies in mothers of children previously treated in neonatal intensive care units.

**Material and method.** Anonymous questionnaire survey covered 62 mothers of infants aged from three to 12 months who had previously been hospitalized in neonatal intensive care units. Respondents completed a questionnaire comprising standardized tools such as the Impact Event Scale – Revised (IES–R), COPE Inventory and Perceived Stress Scale (PSS–10).

**Results.** The severity of PTSD symptoms is explained by the model comprising four variables: three stress coping strategies (focus on and venting of emotions, denial and mental disengagement) and perceived stress. The model explains nearly 40% of post-traumatic stress symptoms. Perceived stress partly affects PTSD through one stress coping strategy – denial, which also has the effect on post-traumatic stress symptoms severity regardless of perceived stress.

**Conclusions.** Focus on and venting of emotions, denial, mental disengagement, and the level of perceived stress are potentially modifiable factors that are strongly associated with PTSD. Planning, realization and assessment of interventions aimed at reduction of maladaptive coping strategies and perceived stress are recommended for mothers of infants requiring treatment in neonatal intensive care units. In order to minimize distress and improve coping with the treatment of the child, it is necessary to evaluate the effects of various methods of supporting parents.

**Key words:** post-traumatic stress disorder, distress, intensive care, coping strategies, neonatal intensive care unit

## Introduction

According to the American Psychiatric Association (APA), post-traumatic stress disorder (PTSD) is a mental disorder that can develop after experiencing a traumatic event concerning the threat of death or serious injury to an individual or another person. The symptoms of PTSD include recurrent, uncomfortable recollections of the trauma, fixed avoidance of stimuli concerned with it and a persistent increase in arousal [1].

Even though the probability of exposure to traumatic events in a lifetime in the general population is relatively high, PTSD prevalence ranges from 5 to 21% [2 – 4]. The probability of PTSD in postpartum women appears to be comparable to the overall population [5 – 9]. The results by O'Donovan et al. indicate that in the group of women who described childbirth as a traumatic event, PTSD was diagnosed in 7.9% of mothers between the fourth and sixth week postpartum [6]. PTSD is more common in mothers of sick children who require hospital treatment [10]. It has been shown that these women are exposed to numerous health problems, such as acute stress disorder (ASD), PTSD, depression and intensified anxiety [11]. For instance, in the group of mothers of pre-term infants born at 26–34 weeks of gestation, nearly three-quarters (71.1%) of the sample met screening criteria for ASD, almost half (47.4%) of the mothers presented anxiety symptoms, while over one-third (35.6%) were found positive for depressive symptoms.

PTSD risk factors in the mothers of children hospitalised in the neonatal intensive care unit (NICU) can be divided into the following groups: (1) maternal socio-demographic data, (2) health status and personality characteristics of the mother, (3) child's health status. It appears that socio-demographic factors indicate limited usefulness in the prevalence of PTSD. For example, in the research by Shaw et al., the socio-demographic variable was not useful in predicting mothers' PTSD except for one variable (place of birth – the USA) [11]. Other research performed in mothers of children hospitalised in the NICU showed the significance of marital status [12]. In the group of postpartum mothers, their age was a significant factor that was negatively associated with the symptoms of PTSD [13]. Research has also shown that the clinical state of the infant or the child's death are significant predictors of PTSD risk [14]. It appears that symptoms of post-traumatic stress are significantly associated within couples. Acute trauma symptoms in men are related to the intensification of post-traumatic stress in their partners. Furthermore, less secure attachment style and dissatisfaction with support provided by the partner were associated with higher levels of post-traumatic stress. Moreover, women's and men's concurrent symptoms of post-traumatic stress and postpartum depression were significantly associated [13]. A review of the literature on the subject implies that psychological factors are to a great extent related to PTSD. Among the mothers of sick children or bereaved parents, PTSD was related to the following: emotion-focused coping, rational coping, feeling let down and social support satisfaction [15]. Other studies report that avoidance strategies proved to be a significant factor for PTSD in the parents [16]. Furthermore, Franck et al. emphasised the relationship between PTSD and peri-traumatic dissociation, avoidance coping and maladaptive coping strategies, such as denial, venting and self-blame [17].

The possibility of predicting the development of PTSD in order to implement preventive and therapeutic interventions is crucial since PTSD in the parents of sick children, including infants treated in the NICU, is related to numerous negative changes affecting the relationship between the mother and the child. Feeley et al. showed that the mothers with higher intensity of PTSD symptoms were less sensitive and effective at interacting with their child [14]. Other researchers suggested that mothers of premature infants with high intensity PTSD symptoms tended to build a more controlling, distorted relationship with the child [18]. It was also shown that mothers with elevated PTSD symptoms, six months after childbirth, were more likely to develop an avoidance attachment pattern seven months later [19]. It is also worth emphasising that PTSD may be chronic. Tremolada et al. showed that in a sample of 76 Italian mothers of children receiving treatment for leukemia, a moderate presence of clinical PTSD was found in 24% at 1 month, 18% at 6 months, 16% at 12 months and 19% at 24 months post the diagnosis [20].

## Aim

The aim of the study was to develop a model of the relationship between the severity of post-traumatic stress symptoms, levels of experienced stress and coping strategies in mothers of children previously treated in neonatal intensive care units.

## Material and methods

**Participants.** The study involved 62 mothers of infants aged from three to 12 months. Participation in the study was offered to biological mothers of children who had been hospitalised in the past in the NICU for a minimum three days. Information about the aim of the study was provided during a phone call with the potential respondents. Having obtained a verbal consent to complete the questionnaire, the set of scales, instructions on how to complete them, an informed consent form and an addressed return envelope with an affixed postage stamp (in order not to bear any costs) were sent to the respondents by post. Out of 374 biological mothers of children hospitalised in the NICU from 1 June 2012 to 31 October 2014, who could speak Polish, 80 individuals sent back written informed consents to participate in the study. A total of 62 respondents completed the questionnaires properly.

**Methods.** The study design was exploratory and cross-sectional. Standardised research tools and a questionnaire compiled by the authors were used in the course of the study.

**The Impact Event Scale – Revised (IES-R)** is a self-report, 22-item scale used to measure subjective response to a traumatic event [21, 22]. This tool was adapted into Polish by Juczyński and Ogińska-Bulik. The Polish version of the IES-R is characterised by high reliability and internal consistency. The Cronbach's alpha coefficient for the Polish adaptation of the scale was 0.92 [21]. The selection of the tool to assess the severity of PTSD symptoms was based on its psychometric properties along with a relatively small number of items. Additionally, this tool was successfully

used in assessing individuals who experienced traumatic events similar to the ones experienced by the mothers in this study – for example, cancer in a child or the loss of a child through miscarriage.

**The Perceived Stress Scale (PSS-10)** is a 10-item tool developed for self-assessment of stress intensity resulting from an individual's life situation during the last month. Higher scores indicate a greater level of perceived stress [23]. The instrument was adapted into Polish by Juczyński and Ogińska-Bulik. The Cronbach's alpha for the Polish version of the scale is 0.86 [24].

**The COPE Inventory** is a self-descriptive, 60-item questionnaire used to measure 15 strategies of reacting to a stressful event. These strategies include: Positive reinterpretation and growth, Mental disengagement, Focusing on and venting of emotions, Use of instrumental social support, Active coping, Denial, Religious coping, Humour, Behavioural disengagement, Restraint, Use of emotional social support, Substance use, Acceptance, Suppression of competing activities and Planning [25, 26]. A higher score indicates more frequent application of a given strategy in stress-related situations. This questionnaire was adapted into Polish and validated by Juczyński and Ogińska-Bulik. The Cronbach's alpha coefficient for individual subscales of the COPE Inventory obtained in the course of the cultural adaptation of the tool ranged from 0.48 to 0.94 [26].

**The Parent and Infant Characteristic Questionnaire** is the tool compiled by the authors. It comprises of a range of questions about the socio-demographic status and medical data of both the respondents and their children.

**Data Analysis**. Descriptive statistics were used to summarise the demographic, social and medical characteristics of the sample, using frequencies and percentages to describe categorical variables, and mean (*M*) and standard deviation (*SD*) for continous variables. Pearson correlation coefficients were used to assess the relationship between PTSS, perceived stress and the fifteen domains of the coping strategies. A hierarchical linear regression analysis was used to determine the explanatory variables of the PTSD score. The level of statistical significance was set at $\alpha < 0.05$. Statistical analysis was conducted with the IBM SPSS software (ver. 22.0.0.). Structural equation modelling was used to test associations between all constructs and potential mediating influences. The Amos software (ver. 22.0.0.) was used for the modelling procedure. Good model fit was defined by a non-significant $\chi^2$ value (i.e. $p > 0.05$), a root mean square error of approximation (RMSEA) value less than 0.05, comparative fit index (CFI) greater than 0.95 and adjusted goodness of fit index (AGFI) greater than 0.95 [27].

**Ethical Approval.** The research project was approved by the Ethical Committee of the Medical University of Lublin (KE-0254/77/2013).

## Results

A total of 62 mothers of infants aged from three to 12 months ($M = 7.48$; $SD = 2.49$) were included in the study. The mean age of the respondents was slightly above 30 years ($M = 30.47$; $SD = 5.36$). Almost half of the women researched reported having a higher education ($n = 29$; 46.8%). The majority of women had one child ($n = 27$;

43.5%), less frequently two children ($n$ = 22; 35.5%), three children ($n$ = 10; 16.1%) or four children ($n$ = 3; 4.8%). The mean gestation age of the infants hospitalised in the NICU was 34.5 weeks ($M$ = 34.44; $SD$ = 4.73) and the Apgar score obtained at 1 minute was slightly above 6 points ($M$ = 6.26; $SD$ = 3.08). The mean birth weight of the infants hospitalised in the NICU was almost 2400 grams ($M$ = 2393; $SD$ = 982). The mean duration of the infants' hospitalisation in the NICU was more than 16 days ($M$ = 16.27; $SD$ = 16.23). The infants suffered from, among others, respiratory tract diseases ($n$ = 53; 85.5%), cardiovascular system diseases ($n$ = 18; 29.0%) and nervous system diseases ($n$ = 17; 27.4%). More than half of the infants were diagnosed with an infection ($n$ = 38; 61.3%) and two in five infants required surgery ($n$ = 25; 40.3%). The characteristics of the group researched are depicted in Table 1.

Table 1. **Characteristics of the sample (n=62)**

| | | |
|---|---|---|
| Age, M (SD) | | 30.47 (5.36) |
| Higher education (n; %) | | 29 (46.8%) |
| Number of children | 1 | 27 (43.5%) |
| | 2 | 22 (35.5%) |
| | 3 | 10 (16.1%) |
| | 4 | 3 (4.8%) |
| Gestation age (weeks), M (SD) | | 34.44 (4.73) |
| The Apgar score (first minute), M (SD) | | 6.26 (3.08) |
| Birth weight (g), M (SD) | | 2,393 (982) |
| Current age of child (months), M (SD) | | 7.48 (2.49) |
| Duration of hospitalisation in the NICU (days), M (SD) | | 16.27 (16.23) |
| Respiratory system diseases (n; %) | | 53 (85.5%) |
| Cardiovascular system diseases (n; %) | | 18 (29.0%) |
| Nervous system diseases (n; %) | | 17 (27.4%) |
| Surgeries (n; %) | | 25 (40.3%) |
| Infections (n; %) | | 38 (61.3%) |

M – mean, SD – standard deviation

Although there is no such questionnaire whose results entitle to the diagnosis of PTSD, in this research, which utilises a set of self-report instruments, PTSD occurrence can be suspected in more than half of the respondents (n=34, 54.84%). Table 2 indicates the correlations between the intensification of post-traumatic stress disorder symptoms, perceived stress and stress coping strategies. It was established that there is a statistically significant positive correlation between PTSS and perceived stress ($r$ = 0.36; $p$ < 0.01) and five stress coping strategies, namely: active coping ($r$ = 0.31; $p$ < 0.05), focusing on and venting of emotions ($r$ = 0.46; $p$ < 0.01), denial ($r$ = 0.39; $p$ < 0.01), mental disengagement ($r$ = 0.36; $p$ < 0.01) and behavioural disengage-

Table 2. **Means, standard deviations and linear correlations among the measured variables (n=62)**

| | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Post-Traumatic Stress Disorder symptoms | 49.73 | 17.95 | – | | | | | | | | | | | | | | | |
| 2. Perceived stress | 20.84 | 7.23 | 0.36** | – | | | | | | | | | | | | | | |
| 3. Active coping | 2.83 | 0.52 | 0.31* | -0.09 | – | | | | | | | | | | | | | |
| 4. Planning | 2.74 | 0.58 | 0.11 | -.030* | 0.61** | – | | | | | | | | | | | | |
| 5. Use of instrumental social support | 2.74 | 0.86 | 0.11 | -0.27* | 0.54** | 0.45** | – | | | | | | | | | | | |
| 6. Use of emotional social support | 2.71 | 0.88 | 0.18 | -0.18 | 0.41** | 0.31* | 0.79** | – | | | | | | | | | | |
| 7. Suppression of competing activities | 2.74 | 0.58 | 0.23 | -0.17 | 0.47** | 0.57** | 0.43** | 0.49** | – | | | | | | | | | |
| 8. Religious coping | 2.79 | 0.98 | 0.21 | 0.22 | 0.05 | 0.06 | 0.03 | 0.10 | 0.06 | – | | | | | | | | |
| 9. Positive reinterpretation and growth | 2.77 | 0.62 | 0.11 | -0.29* | 0.43** | 0.59** | 0.54** | 0.46** | 0.39** | .22 | – | | | | | | | |
| 10. Behavioural disengagement | 2.38 | 0.47 | 0.33** | -0.03 | 0.30* | 0.25 | 0.23 | 0.34** | 0.39** | 0.11 | 0.42** | – | | | | | | |
| 11. Acceptance | 2.92 | 0.68 | 0.19 | -0.03 | 0.22 | 0.15 | 0.20 | 0.33** | 0.35** | 0.08 | 0.23 | 0.25 | – | | | | | |
| 12. Focusing on and venting emotions | 2.89 | 0.67 | 0.46** | 0.15 | 0.46** | 0.28* | 0.28* | 0.33** | 0.42** | 0.25* | 0.20 | 0.24 | 0.32* | – | | | | |
| 13. Denial | 1.70 | 0.54 | 0.39** | 0.22 | 0.02 | -0.15 | -0.16 | -0.12 | 0.13 | -0.05 | 0.05 | 0.17 | -0.01 | 0.03 | – | | | |
| 14. Mental disengagement | 1.91 | 0.57 | 0.36** | 0.12 | 0.12 | 0.06 | -0.00 | 0.05 | -0.03 | -0.02 | 0.12 | 0.31* | -0.19 | 0.02 | 0.40** | – | | |
| 15. Restraint | 1.65 | 0.62 | 0.19 | 0.15 | -0.12 | -0.37** | -0.29* | -0.19 | -0.20 | 0.04 | -0.31* | 0.29* | -0.04 | -0.04 | 0.44** | 0.23 | – | |
| 16. Substance use | 1.20 | 0.40 | 0.02 | 0.08 | -0.04 | -0.15 | -0.07 | -0.23 | -0.16 | -0.24 | -0.18 | -0.01 | -0.31* | -0.10 | 0.29* | 0.09 | 0.40** | – |
| 17. Humour | 1.24 | 0.40 | -0.04 | -0.24 | 0.01 | 0.04 | 0.09 | 0.01 | -0.12 | -0.21 | 0.07 | -0.04 | -0.33** | -0.12 | 0.07 | 0.17 | 0.23 | 0.40** |

M – mean, SD – standard deviation, * $p < .05$, ** $p < .01$

ment ($r = 0.33$; $p < 0.05$). It was also shown that there is a statistically significant negative correlation between the level of perceived stress and the use of coping strategies which involve planning ($r = – 0.30$; $p < 0.05$), use of instrumental social support ($r = – 0.27$; $p < 0.05$) and positive reinterpretation and growth ($r = 0.29$; $p < 0.05$). Due to the size of the sample, only explanatory variables that correlated statistically significantly with the explanatory PTSD variable were taken into account in the development of the model of interdependent variables. The variables include perceived stress, active coping, focusing on and venting of emotions, denial, mental disengagement and behavioural disengagement. Hierarchical linear regression analysis was used wherein stress coping strategies were entered into the first block and perceived stress was entered into the second one. The stepwise method was used to select variables in the first block. The final model included three stress coping strategies (focusing on and venting of emotions, denial, and mental disengagement), which together explained more than 36% of PTSD variance. Perceived stress explained 4% of variance. The model that consisted of four variables was statistically significant ($F$ (3, 58) = 11.098; $p < 0.001$) and explained 40% of post-traumatic stress symptoms variance (Adjusted $R^2 = 0.398$) – Table 3.

Table 3. **Hierarchical linear regression model – outcome variable: intensification of post-traumatic stress symptoms (n=62)**

| | Unstandardised coefficients | | Standardised coefficients | *T* | p |
|---|---|---|---|---|---|
| | *b* | Std Error | Beta | | |
| Step 1 | | | | | |
| (Constant) | 14.075 | 9.172 | | 1.534 | 0.130 |
| Focusing on and venting emotions | 12.331 | 3.093 | 0.458 | 3.987 | 0.001 |
| Step 2 | | | | | |
| (Constant) | -6.258 | 10.149 | | -0.617 | 0.540 |
| Focusing on and venting emotions | 12.003 | 2.831 | 0.445 | 4.240 | 0.001 |
| Denial | 12.536 | 3.520 | 0.374 | 3.562 | 0.001 |
| Step 3 | | | | | |
| (Constant) | -14.782 | 10.685 | | -1.383 | 0.172 |
| Focusing on and venting emotions | 11.932 | 2.754 | 0.443 | 4.333 | 0.001 |
| Denial | 9.410 | 3.738 | 0.281 | 2.518 | 0.015 |
| Mental disengagement | 7.359 | 3.528 | 0.233 | 2.086 | 0.041 |
| Step 4 | | | | | |
| (Constant) | -20.577 | 10.752 | | -1.914 | 0.061 |
| Focusing on and venting emotions | 11.099 | 2.707 | 0.412 | 4.100 | 0.001 |
| Denial | 8.013 | 3.695 | 0.239 | 2.169 | 0.034 |

*table continued on the next page*

| | | | | | |
|---|---|---|---|---|---|
| Mental disengagement | 7.067 | 3.432 | 0.223 | 2.059 | 0.044 |
| Perceived stress | 0.534 | 0.256 | 0.215 | 2.090 | 0.041 |

The variables entered in the first block: active coping, focusing on and venting emotions, denial, mental disengagement, behavioural disengagement. The variable entered in the first step (stepwise method): focusing on and venting emotions.Step 1: $F(1, 60) = 15.895$, $p < 0.001$, Adjusted $R^2 = 0.196$. The variable entered in the second step: denial. Step 2: $F(2, 59) = 15.839$, $p < 0.001$, Adjusted $R^2 = 0.327$, and $R^2$ change = 0.140. The variable entered in the third step: mental disengagement. Step 3: $F(3, 58) = 12.609$, $p < 0.001$, Adjusted $R^2 = 0.363$, and $R^2$ change = 0.045.

The variable entered in the second block: Perceived stress. The variable entered in the fourth step: perceived stress. Step 4: $F(4, 58) = 11.098$, $p < 0.001$, Adjusted $R^2 = 0.398$, and $R^2$ change = 0.043.

After entering perceived stress into the first block, the model turned out to be statistically significant ($F(1, 60) = 8.748$; $p < 0.01$). and explained 11% of the dependent variable (Corrected $R^2 = 0.113$). The analysis of structural equations was used in order to address the question whether the model developed explains associations between the variables, and whether perceived stress acts as a partial mediator between the strategies (focusing on and venting emotions, denial, mental disengagement) and post-traumatic stress symptoms (Figue 1). The following fit indices were obtained, which indicate that the model fits with the data well: $\chi^2(4) = 1.521$; $p = 0.824$; AGFI = 0.963; CFI = 0.999; RMSEA = 0. Perceived stress partially mediates the influence on post-traumatic stress symptoms of only one stress coping strategy – denial, which also affects the intensification of post-traumatic stress symptoms regardless of perceived stress. In contrast, the strategies of focusing on and venting emotions, and mental disengagement directly affect the intensification of post-traumatic stress symptoms without the mediating role of perceived stress. These strategies do not modify, in a statistically significant manner, the level of perceived stress, although they determine the intensification of post-traumatic stress symptoms – Figure 1.

## Discussion

The aim of the research was the development of the model showing the role of perceived stress and stress coping strategies in explaining the intensification of PTSD. Post-traumatic stress disorder is known to be a serious and relatively common problem among the parents of seriously ill children, and the parents bereaved by infant death, which affects mothers more frequently than fathers [6, 15, 28, 29]. Despite the attempts to predict PTSD in the parents who struggle with their child's illness or death, and the use of various configurations of explanatory variables (including the socio-demographic data, psychological factors of the parents, child's clinical status and the time that has lapsed since the incident), the models explain the intensification of PTSD poorly or, at most, moderately. For instance, Tremolada et al., in a group of Italian mothers whose children were receiving treatment for acute leukaemia, were able to explain between 14% and 34% of the variance of PTSD intensification depending on the time that had lapsed since the beginning of the treatment. In this study, a short time from the diagnosis was associated with a better prediction of PTSD intensification [20]. The model

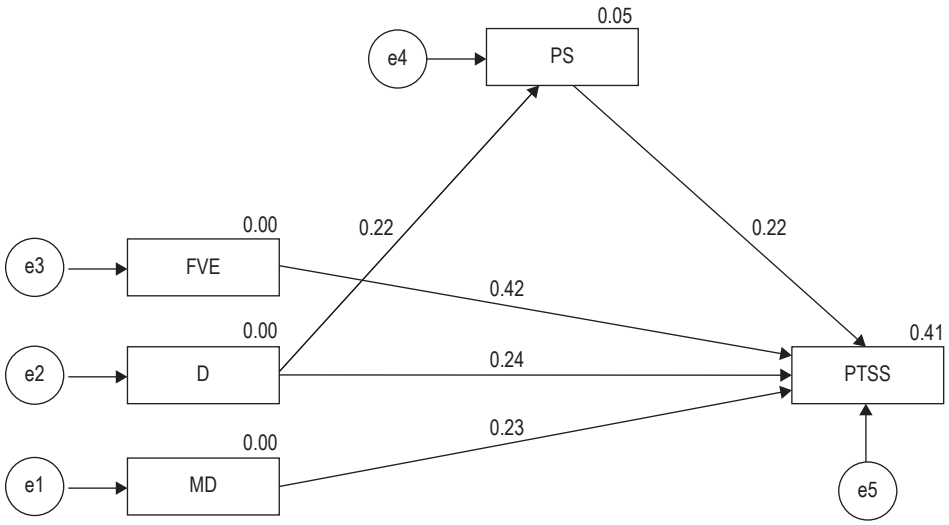


Figure 1. **Comprehensive model of PTSD determinants**

PTSS – post-traumatic stress symptoms, PS – perceived stress, FVE – focus on and venting emotions, D – denial, MD – mental disengagement; e1-e5 – error (residual) variance

described by Christiansen et al., which explains PTSD intensification in a group of mothers who have lost a fetus at the last stage of pregnancy or an infant during labour or in the first 12 months of life, accounts for the following variables: time since the loss, female sex, attachment avoidance, attachment anxiety, emotion-focused coping, rational coping, feeling let down and social support satisfaction, which account for 42% of the variance of the dependent variable [15].

Our model, which consists of three stress coping strategies (focusing on and venting emotions, denial and mental disengagement), as well as perceived stress, explains 40% of PTSD intensification variances. Not only does the model comprehensively explain the relations between the variables, but it also precisely indicates which of the strategies focused on avoidance and emotions are asssociated with PTSD to the greatest extent. The link between avoidance coping and PTSD was shown in a group of mothers and fathers after the paediatric intensive care unit (PICU) treatment of their child [30], parents following child hospitalisation on paediatric (non-intensive care) wards [17], mothers of premature infants in the NICU [31] and parents of children with cancer [32]. Shaw et al. indicated in a similar sample group, which encompassed mothers of premature infants hospitalised in the NICU, that avoidance coping was related to an increased risk of delayed PTSD [31]. Moreover, emotion-focused coping might be connected with PTSD. This relationship was described in a group of parents bereaved by infant death [15].

The results depicted in this study are consistent with the aforementioned ones whereby the model presented provides a precise description of behaviour that often

coexists with the intensified PTSD. The behaviour includes: constant pondering over and expressing emotions, persistent anxiety (focusing on and venting emotions), being occupied by work or other activities (including prolonged sleep) in order not to think about the difficulties (mental disengagement), repeating to oneself that what has happened was not true, and pretending and behaving as if nothing has happened (denial). Similarly to the literature on the subject, in this study, rational coping (problem-focused coping strategies) does not seem to be related to PTSD [11, 31, 33, 34]. Nevertheless, several studies have shown a significant relationship between rational coping and PTSD. For instance, in the general population of Lausanne (Switzerland), the risk of PTSD was significantly associated with problem-focused coping strategies [3]. It appears that problem-focused coping strategies may have a dual connection with stress and an individual's health state, depending on the duration of the stressor (illness) and its severity. In the case of severe, life-threatening stressors, problem-focused coping strategies may have a negative effect on health, whereas in the case of chronic illnesses, these strategies show to have a positive effect on health.

It is known that peri-traumatic stress is related to ASD and PTSD [35]. The research results indicate that currently perceived stress correlates with PTSD intensification. Moreover, perceived stress partially mediates the influence of one stress coping strategy (denial) on post-traumatic stress disorder. The relation between denial and PTSD is presented in the literature of the topic; however, still, little is known about its relationship regarding the mothers of seriously ill children [36-38]. In this respect, the presented study appears to be both interesting and innovative.

In further research on PTSD prediction, it seems worthwhile to include the occurrence and intensification of ASD, and conduct the research in a prospective manner. The results imply that in the parents of children recently diagnosed with cancer, an important risk factor for PTSD symptoms at 6–8 weeks after diagnosis was ASD symptoms [6, 29]. A similar correlation was also confirmed in the mothers of premature infants [39]. Another factor, which can be taken into account in PTSD prediction, is PTSD intensification in the mother's partner. It was supported that post-traumatic stress symptoms were significantly related within couples after childbirth [13]. In a group of couples with pregnancies complicated by pre-term pre-eclampsia or PPROM, within-couple correlation was low and not significant during pregnancy, but strong at postpartum [9].

Application of such coping strategies as focusing on and venting of emotions, denial and mental disengagement, as well as the level of perceived stress, are potentially modifiable risk factors strongly associated with PTSD. Planning, realisation and effectiveness assessment of interventions addressing dysfunctional coping strategies and perceived stress are recommended for mothers with PTSD following their infants' hospitalisation in the NICU.

**Limitations.** Some of the research limitations include a relatively small number of participants, low percentage of mothers who agreed to participate in the study, and a heterogenous sample in terms of time that lapsed since the trauma (birth of a seriously ill child or their falling ill right after birth). It seems that the respondents found the need to sign the informed consent form with their first name and surname a major

problem, which is currently required by the Bioethical Commision. Another explanation is the fact that the research was performed in the respondents who presented a high risk of PTSD compared to the general population, and one of its key symptoms involves avoidance of stimuli concerned with the trauma. Completing the questionnaire related to the child's hospital stay in the intensive care unit that includes questions on the child's health state after birth undoubtedly constitutes a stimulus evoking memories of the trauma, which the respondents admitted afterwards. Other limitations are related to the fact that the data on PTSD symptoms, perceived stress, as well as coping strategies, were obtained from self-report instruments rather than from clinical studies. Moreover, the group studied represented only one centre and was uniform for race and nationality. Further multi-centre studies that will contribute to the development of system solutions are definitely recommended.

## Conclusions

1. Post-traumatic stress disorder intensification is explained by three coping strategies, namely focus on and venting of emotions, denial and mental disengagement as well as by the level of perceived stress.
2. Perceived stress partially mediates the effect of one coping strategy (denial) on the intensification of post-traumatic stress.
3. Strategies, such as focusing on and venting of emotions and mental disengagement, directly affect the intensification of post-traumatic stress disorder. These strategies, while conditioning the intensification of post-traumatic stress symptoms, do not modify the level of perceived stress in a statistically significant manner.
4. It is necessary to assess the efficacy of various methods of providing support for parents, in order to alleviate distress and enhance parental coping with the child's treatment.

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