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The Relationship Between Psychological Resilience and Maternal Attachment in Mothers of Premature Newborns

Prematüre Yenidoğan Annelerinde Psikolojik Dayanıklılık ile Maternal Bağlanma Arasındaki İlişki

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ABSTRACT

Introduction: The process of preterm birth and hospitalization in the neonatal intensive care unit may compromise maternal psychological resilience and negatively affect mother-infant bonding.

Aim: This study aims to examine the relationship between psychological resilience and maternal attachment in mothers of premature infants.

Method: This cross-sectional study included a total of 150 mothers of preterm infants hospitalized in the neonatal intensive care unit of a city hospital in Mersin between April and September 2024. Data collection was conducted using a Personal Information Form, the Brief Resilience Scale, and the Maternal Attachment Inventory. Data were analyzed using Kruskal–Wallis, Mann–Whitney U, Spearman correlation, and simple linear regression analyses.

Results: The average Brief Psychological Resilience Scale score was 21.77 ± 4.82, while the Maternal Attachment Scale average was 96.30 ± 13.87. A weak yet statistically significant positive correlation was observed between the two scales ($r = 0.166$; $p < 0.05$) and and simple linear regression analysis confirmed that psychological resilience significantly predicted maternal attachment ($B = 0.649$; $t = 2.819$; $p = 0.005$). Furthermore, maternal education level significantly affected resilience scores, while employment status was significantly associated with maternal attachment levels ($p < 0.05$).

Conclusion: The results indicate that psychological resilience positively influences mother-infant bonding in the neonatal intensive care unit context. It is essential to provide targeted psychosocial support to enhance maternal resilience and foster healthy attachment in mothers of preterm newborns.

Keywords: Mother-child relations; premature infant; psychological resilience.

ÖZ

Giriş: Prematüre doğum ve yenidoğan yoğun bakım ünitesine yatış süreci, annelerin psikolojik dayanıklılığını zorlayarak anne-bebek bağlanmasını olumsuz yönde etkileyebilir.

Amaç: Bu araştırmanın amacı, prematüre bebek annelerinde psikolojik dayanıklılık düzeyi ile maternal bağlanma arasındaki ilişkiyi incelemektir.

Yöntem: Kesitsel tasarıma sahip bu çalışma, Nisan-Eylül 2024 tarihleri arasında Mersin ilindeki bir şehir hastanesinin yenidoğan yoğun bakım ünitesinde tedavi gören prematüre bebeklerin 150 annesi ile gerçekleştirildi. Veri toplama aracı olarak Kişisel Bilgi Formu, Kısa Psikolojik Dayanıklılık Ölçeği ve Maternal Bağlanma Ölçeği kullanıldı. Veriler Kruskal–Wallis, Mann–Whitney U, Spearman korelasyon ve basit doğrusal regresyon analizleri kullanılarak değerlendirildi.

Bulgular: Katılımcıların Kısa Psikolojik Dayanıklılık Ölçeği ortalama puanı 21,77 ± 4,82, Maternal Bağlanma Ölçeği ortalaması ise 96,30 ± 13,87 olarak bulundu. İki ölçek arasında zayıf düzeyde fakat istatistiksel olarak anlamlı pozitif bir ilişki belirlendi ($r = 0,166$; $p < 0,05$) ve basit doğrusal regresyon analizi, psikolojik dayanıklılığın maternal bağlanmayı anlamlı biçimde yordadığını gösterdi ($B = 0,649$; $t = 2,819$; $p = 0,005$). Ayrıca, annenin eğitim düzeyi dayanıklılık puanlarını önemli ölçüde etkilerken, istihdam durumu annenin bağlanma düzeyleriyle önemli ölçüde ilişkiliydi ($p < 0,05$).

Sonuç: Bulgular, yenidoğan yoğun bakım ünitesi bağlamında psikolojik dayanıklılığın anne-bebek bağlanmasını olumlu yönde etkilediğini göstermektedir. Prematüre bebek annelerinde sağlıklı bağlanmanın desteklenebilmesi için hedefe yönelik psikososyal destek sağlanması önemlidir.

Anahtar Kelimeler: Anne-çocuk ilişkileri; prematüre bebek; psikolojik dayanıklılık.

Introduction

In high-income countries, preterm births remain one of the foremost health challenges faced by newborns. Globally, in 2020, approximately 13.4 million infants were born before 37 weeks of gestation, which amounts to nearly 9.9% of all live births (Ohuma et al., 2023). Mothers experiencing premature deliveries frequently encounter emotional, psychological, and physical unpreparedness. Furthermore, hospitalization of these infants in the Neonatal Intensive Care Unit (NICU) can interfere with the natural progression of maternal role development (Kadiroğlu & Güdücü Tüfekci, 2022). This disruption, coupled with the unforeseen nature of the birth and limited control over the infant's condition, increases the risk of various psychological challenges such as anxiety, depression, posttraumatic stress disorder (PTSD) and emotional distress (Malouf et al., 2021; Worrall, Silverio & Fallon, 2023; Worrall, Christiansen, Khalil, Silverio & Fallon, 2024; Hendy et al., 2024). A recent systematic review highlighted that the prevalence of postnatal anxiety and PTSD among NICU parents within a month of delivery reached 41.9% and 39.9%, respectively (Malouf et al., 2021). Emotional upheaval caused by early separation may also hinder the initial bonding process between mother and child (Hemati, Namnabati, Taleghani & Sadeghnia, 2017; Servet Yilmaz & Akgun Kostak, 2021; Evans, Boyd, Colditz, Sanders & Whittingham 2022; O'Dea et al., 2023).

Maternal attachment is commonly conceptualized as a multifaceted connection encompassing physical, sensory, and emotional components between mother and infant (Bartels & Zeki, 2004; Bianciardi et al., 2021; O'Dea et al., 2023). The emotional bond in particular plays a crucial role in a newborn's development and overall well-being. Disruptions in this bond may manifest as maternal emotional instability or, in severe cases, neglect and rejection behaviors (Brockington, 2004; Rossen et al., 2016). Inadequate attachment can increase the risk of a range of developmental issues in the child's future, including cognitive, behavioral, emotional, and social difficulties (Servet Yilmaz & Akgun Kostak, 2021).

Upon premature delivery, NICU admission creates a difficult environment marked by early mother-infant separation and limited interaction (Hagen, Iversen, Nesset, Orner & Svindseth, 2019; Bonacquisti, Geller & Patterson, 2020; Kim & Kim, 2022). Research in the literature indicates that high levels of anxiety, depression and post-traumatic stress are observed in mothers during the process of premature birth and NICU hospitalisation, and that this disrupts the attachment process (Bonacquisti et al., 2020; O'Dea et al., 2023). However, psychological resilience is an important protective factor that increases individuals' capacity to adapt and recover from stressful life events and can positively influence mother-child interactions (Shani-Sherman, Dolgin, Leibovitch & Mazkereth, 2019; Nie, Pan & Liu, 2023).

While many previous studies have addressed the psychological state of mothers of premature newborns and maternal attachment (Bonacquisti et al., 2020; O'Dea et al., 2023), studies directly examining the relationship between psychological resilience and maternal attachment remain limited.

Aim

The present study aims to analyze how psychological resilience in mothers of preterm infants correlates with maternal attachment behaviors. In addition, the secondary aim of the study is to examine the effects of sociodemographic factors on psychological resilience and maternal attachment.

Study Questions

The specific research questions addressed are as follows:

1. What are the psychological resilience levels among mothers of preterm infants?

2. How strong is these mothers' maternal attachment to their infants?

3. Is there a significant relationship between psychological resilience and maternal attachment?

4. Do sociodemographic characteristics significantly affect psychological resilience and maternal attachment?

Method

Study Design

This study was conducted using a descriptive and correlational research design.

Study Setting

The research was conducted in the neonatal intensive care unit at a city training and research hospital in Mersin. The data were collected over a six-month period, from April to September 2024. After each mother visited her baby, data collection was carried out through face-to-face interviews in a quiet, private consultation room suitable for confidential discussions.

Study Population and Sample

The target population consisted of mothers whose preterm infants were admitted to the NICU of the same hospital. During the six-month study period (April – September 2024), approximately 170 mothers met the inclusion criteria. A priori sample size estimation was performed using G*Power software. Based on a power of 95%, a 5% margin of error, two-tailed testing, and a confidence level of 95%, the required minimum number of participants was calculated as 134. This number was derived using a medium effect size of 0.3, referencing similar past research (Nie et al., 2023). To account for potential dropouts or data loss (around 10%), the sample size increased to 150 participants. This study included mothers of babies born between 34 and 36 weeks. Babies born before 34 weeks were excluded from the study as they may have been affected by strong confounding factors, such as prolonged hospitalisation, serious morbidity and higher stress levels in parents. However, only breastfeeding mothers were included in the study, as breastfeeding is considered part of standard neonatal care in hospitals, and non-breastfeeding mothers were excluded from the study to minimise differences in mother-infant interaction.

Inclusion criteria were as follows: (1) mothers delivered between 34

and 36 gestational weeks; (2) newborns hospitalized in the NICU; (3) mothers free of high-risk pregnancy conditions; (4) breastfeeding mothers; (5) absence of psychiatric diagnosis; (6) no medical intervention during birth; (7) fluency in Turkish.

Data Collection Tools

The data were collected using the following three instruments: Personal Information Form, the Brief Resilience Scale (BRS), and the Maternal Attachment Inventory (MAI).

Personal Information Form: Developed by the present researchers, this 9-item form gathered details such as the mother's age, education, employment status, her partner's education and employment, household income level, number of live births, the infant's gender, and delivery type.

Brief Resilience Scale: Originally developed by Smith et al. (2008) and adapted into Turkish by Doğan (2015), this unidimensional, 6-item scale contains items to be rated on a 5-point Likert scale. Items 2, 4, and 6 are reverse-coded. The total score ranges from 6 to 30, with higher scores indicating greater resilience. Factor loadings for the items range from 0.63 to 0.79, with higher total scores indicating greater resilience. In the Turkish adaptation study by Doğan (2015), the Cronbach's alpha internal consistency coefficient was reported as 0.83; in the present study, it was found to be 0.80.

Maternal Attachment Inventory: Developed by Müller (1994) and adapted into Turkish by Kavlak and Şirin (2009), this 26-item instrument uses a 4-point Likert scale. The minimum and maximum total scores possible are 26 and 104, respectively. Higher scores reflect stronger maternal attachment. The Cronbach's alpha internal consistency coefficients obtained from the Turkish adaptation study was found to be 0.77 for mothers with 1-month-old babies and 0.82 for mothers with 4-month-old babies (Kavlak & Şirin, 2009). In this research, the scale's Cronbach's alpha was calculated as 0.98, indicating a high level of internal consistency.

Data Collection

Mothers whose infants were receiving treatment in the NICU were approached for participation. After consent, they were interviewed in-person, and the data collection forms were completed within 15 to 20 minutes.

Ethical Considerations

Approval was obtained from the Toros University Scientific Research and Ethics Committee (Date: 23.02.2024 and No: 37), and permission was obtained from the institution where the study was conducted. The participant mothers provided written informed consent after being informed about the purpose and procedures. The study adhered to the Declaration of Helsinki and Personal Data Protection Law.

Data Analysis

Data analysis was conducted using SPSS v26.0. Shapiro-Wilk tests checked data distribution normality. Descriptive results were presented as percentages and frequencies. Kruskal–Wallis and Mann–Whitney U tests were performed for nonparametric comparisons, and a simple linear regression analysis was conducted to evaluate whether psychological resilience predicted maternal attachment. The association between resilience and attachment scores was evaluated using Spearman's correlation coefficient. Statistical significance was defined as $p \leq 0.05$ (Mayers, 2013).

Results

The mean age of the mothers who participated in the study was 28.93 ± 5.95 years. In terms of education, 49.3% mothers were university graduates and 80.7% were not working. Of their husbands, 64.7% were university graduates and 88.0% were employed. The income of 54.7% of the families was equal to their expenses. Furthermore, 42.7% of the mothers had their first live birth and 79.3% had a caesarean section. Gender distribution among the newborns was balanced (50% female, 50% male). Descriptive characteristics of the participants are summarized in Table 1.

Table 1: Descriptive Characteristics of Participants (n = 150)

Characteristics		Min - Max	Mean ± SD †
Age		18 - 46	28.93 ± 5.95
		n	**%**
Education level			
	Primary School	11	7.3
	High School	65	43.4
	University	74	49.3
Employment status			
	Working	29	19.3
	Not working	121	80.7
Spouse's education level			
	Primary School	5	3.3
	High School	48	32.0
	University	97	64.7
Spouse's employment status			
	Working	132	88.0
	Not working	18	12.0
Income level			
	Less than expenditure	20	13.3
	Equal to expenditure	82	54.7
	More than expenditure	48	32.0
Live birth order of the baby			
	One	64	42.7
	Two	47	31.3
	Three	33	22.0
	Four	6	4.0
Gender of the baby			
	Female	75	50.0
	Male	75	50.0
Labor type			
	Normal labor	31	20.7
	Caesarean section	119	79.3

†SD: Standard Deviation; Min: Minimum Value; Max: Maximum Value; n: Number; %: Percentage

Table 2. The Relationship Between BRS and MAI of Mothers of Premature Newborns: Correlation and Regression Results (n=150)

Scale	Min - Max	Mean ± SD†	r‡	p§	B‖	t value	p
BRS	8 - 30	21.77 ± 4.82	-	-	0.649	2.819	**0.005***
MAI	47 - 104	96.30 ± 13.87	0.166	**0.043***	-	-	-

Min: Minimum Value; Max: Maximum Value; †SD: Standart Deviation; ‡r = Spearman Correlation Analysis; §p: Correlation **p-**Value; ‖ B: Regression coefficient; ***p < 0.05**

The mean scores of the mothers who participated in the study in BRS and MAI and the relationship between the scales are reported in Table 2. While the mean BRS score of the mothers was 21.77 ± 4.82 (min.: 8; max.: 30), the mean MAI score was 96.30 ± 13.87 (min.: 47; max.: 104). A low but significant positive correlation was found between the BRS and MAI scores ($r = 0.166$, $p < 0.05$), and the simple linear regression analysis confirmed that psychological resilience significantly predicted maternal attachment ($B = 0.649$, $t = 2.819$, $p = 0.005$) (Table 2).

The comparison of the mean total scores of the BRS and MAI according to the descriptive characteristics of the mothers is provided in Table 3. There was no significant difference between the groups in terms of the mean scores of the BRS according to the mother's employment status, spouse's educational and employment status, income level, live birth order, gender of the newborn, and labor type ($p > 0.05$). However, the results revealed a statistically significant difference between the mother's education level and the mean score of the BRS ($H = 10.48$, $p < 0.005$). Furthermore, there was no significant difference between the mother's educational level, spouse's educational level, income level, live birth order, gender of the newborn, labor type of the baby, and the mean MAI score ($p > 0.05$). On the other hand, a statistically significant difference was found between the mother's employment status and the mean MAI score ($p < 0.05$) (Table 3).

Discussion

This study was conducted to examine the relationship between psychological resilience and maternal attachment in mothers of premature infants admitted to NICU. The findings revealed that higher psychological resilience was associated with stronger maternal attachment. Furthermore, the mother's educational level was significantly associated with psychological resilience, while her employment status was significantly related to maternal attachment. These results highlight the complex interaction of psychosocial factors affecting the maternal attachment in the NICU context.

Previous studies have consistently reported that psychological distress in mothers of preterm infants disrupts maternal attachment (Malouf et al., 2021; Worrall et al., 2023). In line with these findings, our results demonstrate that psychological resilience may serve as a protective factor supporting maternal attachment. Like our study, Nie et al. (2023) identified resilience as a mediator in the relationship between parental stress and bonding, underscoring its importance in early maternal adaptation. Worrall et al. (2024) reported that mothers of premature infants had high levels of postnatal anxiety, which negatively affected mother-infant attachment. Similarly, in a meta-analysis study examining the relationship between maternal psychological distress and mother-infant attachment, O'Dea et al. (2023) observed that maternal psychological distress affected postnatal mother-infant attachment. Likewise, Gunduzalp and Gurol (2024) established that mothers whose babies were hospitalized in the NICU experienced stress and this negatively affected mother-infant attachment. Similarly, in a study with 98 mothers whose premature infants were hospitalized in the NICU, Servet Yilmaz and Akgun Kostak (2021) concluded that postpartum depression levels negatively affected maternal attachment. Hospitalization of the baby in the NICU may adversely affect the psychological health of the mother and elicit negative emotions such as sadness, anxiety, stress, and the feeling of inadequacy, all of which may jeopardize mother-infant attachment. This evidence highlights the need for interventions to increase psychological resilience such as providing social and emotional support to mothers whose babies are hospitalized in the NICU, implementing support and training for maternal self-efficacy, and psychotherapy practices to improve awareness and coping skills.

In the present study, we determined that psychological resilience increased with an increase of the mother's education level. This result suggests that education level may be a protective factor. Educated mothers can develop better problem-solving skills, access to appropriate information, and relevant coping strategies. In addition, they can better cope with the difficulties caused by premature birth and enjoy an easier access to social support, which considerably raises the likelihood of receiving psychological help (Shani-Sherman et al., 2019). Indeed, as identified in several international studies (Wesselhoeft et al., 2020; Di Florio et al., 2017), low education level was associated with significantly more postnatal depressive symptoms.

Furthermore, the results also showed that maternal attachment levels of working mothers were higher than those of non-working mothers. Factors such as time management, social support and regular lifestyle of working mothers may suggest that they can better manage the attachment process. In addition, self-esteem and social support provided by employment can have a positive impact on mothers' mental health (Kopp, Lindauer & Garthus-Niegel, 2024). In line with this assumption, Huston and Rosenkrantz Aronson (2005) reported that working mothers spend more time with their children by sacrificing housework and by getting engaged in leisure time activities on weekends so as to compensate for losses during the

Table 3: Comparison of the Mean Total Scores of BRS and MAI According to the Descriptive Characteristics of Mothers of Premature Newborns (n = 150)

Variables		BRS			MAI		
		Mean ± SD	Test statistic	p	Mean ± SD	Test statistic	p |
Education level							
	Primary School	20.09 ± 1.59			94.81 ± 5.14		
	High School	20.63 ± 0.59	10.48‡	**0.005***	93.10 ± 2.15	1.34‡	0.51
	University	23.02 ± 0.52			99.32 ± 0.96		
Employment status							
	Working	21.55 ± 0.92			100.55 ± 1.44		
	Not Working	21.82 ± 0.43	-0.29§	0.76	95.28 ± 1.34	-2.014§	**0.044***
Spouse's education level							
	Primary School	22.60 ± 1.20			100.20 ± 0.68		
	High School	21.18 ± 0.71	1.08‡	0.58	97.22 ± 1.92	0.63‡	0.72
	University	22.02 ± 0.49			95.63 ± 1.46		
Spouse's employment status							
	Working	21.64 ± 0.41			95.88 ± 1.25		
	Not Working	22.72 ± 1.20	-1.07§	0.28	99.33 ± 1.86	-0.45§	0.65
Income level							
	Less Than Expenditure	20.20 ± 1.04			90.45 ± 4.22		
	Equal to Expenditure	22.21 ± 0.55	3.51‡	0.17	97.23 ± 1.40	0.97‡	0.61
	More Than Expenditure	21.66 ± 0.65			97.14 ± 1.87		
Live birth order of the baby							
	One	22.20 ± 0.63			94.67 ± 1.86		
	Two	21.06 ± 0.72			96.68 ± 2.17		
	Three	21.18 ± 0.69	6.04‡	0.11	97.72 ± 1.92	4.77‡	0.18
	Four	26.0 ± 1.61			102.83 ± 0.98		
Gender of the baby							
	Female	21.28 ± 0.51			96.25 ± 1.47		
	Male	22.26 ± 0.59	-1.19§	0.23	96.34 ± 1.73	-1.17§	0.24
Labor type							
	Normal labor	21.80 ± 0.79			94.77 ± 2.94		
	Caesarean section	21.76 ± 0.45	-0.082§	0.93	96.69 ± 1.20	-0.7§	0.86

†SD: Standard Deviation; ‡Kruskal-Wallis test; §Mann-Whitney U test; ||p: p-value; ***p < 0.05**

week. However, in a study on 200 working and 200 non-working mothers with children under the age of six, Dülgeroğlu Bayazit et al. (2021) found that non-working mothers had higher maternal attachment. Considering that the effects of factors such as time of employment, duration of employment (part-time or full-time), intensity and status of employment on maternal attachment may differ, in future research, the effects of employment status on the attachment level of mothers should be examined in more depth.

Limitations of the Study

A limitation of the present study is that it was conducted with mothers whose premature infants were hospitalized in the NICU of a single hospital in Mersin province, which limits the generalizability of the findings. Moreover, as the study employed a descriptive and cross-sectional design, it was not possible to control for various external factors that may influence psychological resilience, such as social support, personality traits, or previous life stressors. The study also focused only on late preterm infants (34 - 36 weeks), excluding earlier preterm cases who may experience greater difficulties in resilience and attachment, which may reduce generalizability. In addition, the use of self-reported measures may have introduced response bias. The study's strengths include its adequate sample size, the use of reliable and validated measurement tools, and its contribution to filling an important gap in the literature by examining the relationship between psychological resilience and maternal attachment in the NICU context.

Conclusion

In this study, we found that psychological resilience of mothers of premature newborns affects maternal attachment. In addition, the results showed that psychological resilience increased with higher educational levels, and that maternal attachment levels of working mothers were higher than those of non-working mothers. From a clinical perspective, pediatric nurses who are aware of these risk factors can more effectively assess mothers' psychosocial needs and identify those at greater risk for low resilience or impaired bonding. Such an approach may guide the development of individualized support strategies and appropriate referrals to psychosocial resources. Future randomized controlled trials that adjust for sociodemographic variables are warranted to better clarify the mechanisms linking resilience and maternal attachment. In addition, future studies should specifically investigate the potential effects of nursing interventions on psychological resilience and maternal attachment, as these were not directly evaluated in the present research.

Ethical Considerations: Ethics committee approval was obtained from the Toros University Scientific Research and Publication Ethics Committee (Date: 23.02.2024 and No: 37).

Author Contribution: Study design- DPK, Data collection- DPK, MGA, AÇ, Data analysis- DPK, MGA, AÇ, Manuscript writing- DPK, MGA, Study supervision- AÇ, Manuscript writing- DPK, MGA, Critical revisions for important intellectual content- AÇ

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