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RESEARCH ARTICLE

PREDICTING MATERNAL ATTACHMENT: THE ROLE OF EMOTION REGULATION AND RESILIENCE DURING PREGNANCY

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ABSTRACT

Purpose: Evidence suggests that maternal attachment (MA) is both a developmental task of pregnancy and an indicator of compliance with pregnancy and associated with prenatal health. Understanding all aspects of attachment will contribute to improving our understanding of developing preventions.
Methods: The study design was prospective cohort study. The relationship between emotion regulation skills or psychological resilience of pregnant women in the second or third trimester period and postpartum MA was investigated. After written consent was obtained, two interviews were completed with the participants. In the first interview, Difficulties in Emotion Regulation Scale-Brief Form (DERS), Connor–Davidson Resilience Scale (CD-RISC) was applied to all participants. In the second interview, the Maternal Attachment Inventory (MAI) was applied to the participants in the 30-40 days postpartum period.
Results: Of the 120 women recruited, 77 completed two interviews. A negative correlation between MAI scores and DERS scores ($p=0.001$) and a positive correlation between MAI scores and CD-RISC scores ($p<0.001$) were found. It was performed multiple linear regression analysis to determine the best predictive factors of the MA and found individuals who breastfeed and individuals with higher resilience have higher MA. Logistic regression analysis performed to determine the best predictive factor of breast-feeding and found individuals with lower difficulties in emotion regulation breastfeed their children.
Conclusion: This study obtained evidence to suggest the psychological benefits of psychological resilience and emotion regulation skills and breast-feeding for MA. It also found that breast-feeding and psychological resilience predict MA in the postpartum period and emotion regulation skills predict breastfeeding.

Keywords: Emotion regulation, resilience, breast feeding, maternal attachment

INTRODUCTION

The concept of attachment focuses on the availability of the mother when the baby needs it and the interpretation of the mother's reactions and behaviors (1). "Bonding" or "maternal attachment" is one of the most important elements underpin healthy growth and development. The child's first experience of attachment is the basis for later attachment experiences. The mother-baby bonding process starts during pregnancy and continues for the first year following birth. Once attachment is determined as secure or insecure, it shows continuity throughout life. If the secure attachment cannot be formed in the first year of life, the newborn may experience difficulties with emotional, social, physical, mental, and language development (2). Women with more

depressed symptomatology and avoidant attachment patterns were more likely to have children with developmental impairments in early childhood (3). Maternal attachment (MA) is a special bond between a mother and her child that develops through time. The attachment process develops during the prenatal, natal and postpartum period and is supported through the mother-infant interaction in the postpartum period. The primary relationship between mother and baby during pregnancy was defined as maternal fetal attachment (MFA). It was reported that healthy MFA helped to establish post-natal communication and secure attachment (4). In the last trimester of pregnancy, prenatal attachment had been shown to be associated with postpartum attachment (5).

It was stated that attachment to the unborn baby is associated with psychological health during pregnancy and delivery (6). When psychosocial health status was high during pregnancy, attachment was positively affected. Biological accommodation and psychosocial changes during the perinatal period can lead to psychiatric disorders like depression (7). The fact that pregnant women diagnosed with depression had a weak mother-baby attachment in the postpartum period supports the origin of an attachment that may occur during pregnancy (8). Children with developmental deficits in early childhood were more likely to have mothers with avoidant attachment patterns and more depressed symptomatology (3). Depressive symptoms such as irritability, sadness, and worthlessness can prevent the pregnant's bond with the baby. Depression in pregnancy was seen as a critical problem. Its early diagnosis and treatment were emphasized, as it affects the health status of both the baby and the mother negatively (9). It has been proven that prenatal depression had a negative impact on MFA. The link between maternal depression and bonding was complicated, and the mother's role in childcare may compensate for depression's negative consequences. (10). Mothers with high anxiety and depression had low mother-infant attachment level. A significant relationship between mental health problems of pregnant women and their hostile behavior to their babies was found and, the important determinant of prenatal attachment was mental health (2, 6, 11, 12).

Breastfeeding was one of the main ones that strengthen the mother-baby bond in the postnatal period and was found to be a factor associated with attachment. Breastfeeding had encouraged attachment by making breastfeeding babies warmer and lovable, more cooperative, and less angry than others. The exchange of positive emotions with a baby during breastfeeding was found to be linked to attachment. The most essential elements leading to MA in the first month of the postpartum period were regarded as the primary caregiver's sensitivity, emotional exchange with the baby, and the development of breastfeeding (13).

Emotion management abilities, psychological well-being and functioning of people had great importance (14). Ineffective use in understanding, perceiving and regulating emotions could cause people to experience emotional and psychological problems (15). Difficulties in emotion regulation had been linked to depression, anxiety, stress, and self-harming behavior (16). It was also shown that problems with emotion regulation were linked to the onset of some psychiatric disorders (17). It was found female gender significantly higher scores for difficulties in emotion regulation (18). Positive personality characteristics like resilience, subjective well-being, and hardiness prompted researchers to refocus their focus away from psychopathology and toward mental health (19). Psychological well-being was found to be positively related to resilience, while psychological distress, depression, and anxiety were found to be negatively related. Resilience was assumed to influence psychological health and vulnerability (20). Lower resilience was discovered to be a predictor of worry and distress during pregnancy (21). Studies about stress factors like preeclampsia and being exposed to violence associated with pregnancy showed that pregnant who had low resilience were vulnerable to postpartum depression (22, 23). It was reported that emotion regulation skills and psychological resilience could be effective strategies for minimizing and managing anxiety about death among pregnant women (24). More extroverted and agreeable women were reported to have higher MFA levels. In contrast, women who perceived more stress reported lower MFA levels (25).

The importance of showing a facial expression that reflects the emotional content was emphasized in the attachment of the mother and baby (2). Even if there is no psychiatric disorder in a pregnant woman, controlling the psychological factors that may affect this process may help us plan interventions. It could provide a better attachment between mother and baby. Emotion regulation skills and psychological

resilience, two skills linked to the studies, were deemed to be useful in this process. Social competence, scholastic performance, and psychological well-being all benefit from the development of emotion regulation. It's one of the most crucial aspects of early socialization, as well as for parent-child relationships. Psychological resilience is defined as resisting and overcoming difficulties and ensuring a positive adaptation to changes. This provides positive results regarding our problem-solving skills, coping, and building social and supportive relationships (26).

It had been demonstrated that attachment was both a developmental task of pregnancy and an indicator of compliance with pregnancy and positively associated with prenatal health (27). Pregnant women at risk of insecure attachment during pregnancy could be treated with appropriate interventions and benefit from education and motivation (28). Understanding all aspects of attachment would contribute to improving our understanding of developing preventions (6). In this context, the study's hypothesis is that high MA is linked to emotion regulation skills and psychological resilience. The goal of this study was to look into the link between emotion regulation skills and psychological resilience in pregnant women in their second or third trimester, as well as postpartum MA. In addition, because of the reciprocal relationship between MA and the breast-feeding, it was aimed to investigate the factors predicting breast-feeding.

METHODS

Participants and Procedure

The study design was prospective cohort study. After the start of the study, all pregnant women who wanted to get information about pregnancy in a tertiary university hospital were informed about the study. If potential participants showed interest, it was given thorough information about the study's objectives, procedures, and ethical concerns. Pregnant women who are at least primary school graduates (able to read Turkish and to answer questions) and volunteers in the second or third trimester period were evaluated in terms of exclusion criteria. A history of diagnosis or treatment of a psychiatric disorder, having psychiatric complaints, concomitant neurological disease, or a history of trauma with a loss of consciousness for more than one hour, unstable or chronic medical disease all listed as exclusion factors. After the work plan was explained, written consent was obtained for participation. For the purpose of this study, two different times were defined, first-time and follow-up. The evaluation made during the second or third trimester of pregnancy was defined as "first-time", and one month after childbirth was defined as "follow-up." In first-time and follow-up, a data form was collected, in which sociodemographic and pregnancy information prepared by the author.

In the first interview, a one-session psychiatric interview was conducted to evaluate whether she had any psychiatric complaints. All participants were assessed using the Beck Depression Inventory, which is regarded an appropriate measure for evaluating depressed symptoms, both in first-time and follow-up. The study comprised participants with a score of less than 17, which is regarded the cut-off point.

All participants were given “Difficulties in Emotion Regulation Scale-Brief Form (DERS)” and “Connor–Davidson Resilience Scale (CD-RISC)” for the first time. The follow-up was made by contacting the phone and inviting them to the hospital. The Maternal Attachment Inventory (MAI) was applied to the participants in the 30-40 days postpartum period at hospital.

All pregnant women in the second or third trimester who applied to the clinic were informed about the study and invited. Participants were recruited as of March 2020 and completed in six months. The participants were composed of 120 individuals, and 77 participants completed the first-time and follow-up. There were 23 participants who could not be contacted or did not want to continue the current study after the first time. In addition, 20 participants who had psychiatric complaints at the first interview or who scored above the threshold score in the Beck Depression Inventory were excluded from the study. In terms of sociodemographic and clinical features, there was no significant difference between the groups that continued and those who did not.

Ethical considerations

The Ethical Committee at Giresun University approved the study (Date: 26.02.2020, No: 20.02.2020/08).

Measures

A form designed expressly for this study was used to collect information about the participants' sociodemographic status and pregnancy information. Information such as birth, mode of delivery and

gender of the baby were confirmed from the medical records of the participants.

DERS is a self-report measure assessing difficulty in emotional regulation (16). High scores from the scale indicate more emotional regulation difficulties. The scale consists of 16 items (e.g., “When I feel bad, my emotions become unbearable”) with a 5-point Likert type (0 = almost never, 4 = almost always). The scale, which shows a five-factor structure, includes the dimensions of clarity, goals, impulse, strategies, and non-acceptance. The scale was adapted in Turkish, and the internal consistency coefficient was determined to be 0.92 in both the original and adaptation studies (17).

CD-RISC was used to measure the level of resilience (29) and the adaptation study of the scale was conducted (19). Resilience is a structure that can resist stress against difficult events in human capacity. And it is positioned in mental health rather than mental disorders, which regulates optimal human functioning. The measure comprises 25 statements (e.g., “I try to reach my goals, no matter what obstacles get in my way.”) and has a 5-point Likert type ranging from 'not at all true' (0) to 'always true' (4). Higher scale scores imply greater psychological resiliency. Three subscales make up the scale: tenacity and personal competence (15 items), tolerance of negative affect (six items), and tendency toward spirituality (three items). The Cronbach alpha coefficient for the Turkish version of the scale was 0.92. The CD-RISC Turkish version was found to be a valid and reliable measure of resilience.

MAI is a self-report questionnaire, formed to assess maternal-infant attachment in the postpartum period (30) and adapted to Turkish (31). It is a 4-point Likert type, one-dimensional scale consisting of 26 items (e.g., “I feel special when my baby laughs.”), each item ranging from 'always' to 'never'. Each item contains direct narratives and is calculated as 'always = 4 points, often = 3 points, sometimes = 2 points, never = 1 point'. A high score indicates MA is high. The Turkish version of the MAI is valid and reliable in mothers with a baby between one and four months after birth. Cronbach Alpha internal consistency coefficient was found 0.77 - 0.82.

Statistical analysis

SPSS v21 was used for all analyses. The independent samples t-test was used to examine normally distributed variables. For the normality check, the Kolmogorov-Smirnov test was used. The Mann Whitney U test or the Kruskal Wallis test were used to assess non-normally distributed variables, depending on the number of groups. To analyze associations between continuous variables, Pearson or Spearman correlation coefficients were determined. To find the best predictors of MA, researchers used multiple linear regression analysis (stepwise selection method). To find the best predictors of breast-feeding, researchers used multiple logistic regression analysis (forward conditional method). The best cut-off point for DERS Total scores to predict breast-feeding was determined using receiver operating characteristic (ROC) curve analysis. Statistical significance was defined as a two-tailed p-value of less than 0.05.

RESULTS

The study sample consisted of 77 women between the ages of 22-38. The mean age of the mothers was 28.47 ± 4.16 whiles the mean age of the fathers was 31.76 ± 4.52. Fifty-eight (75.32%) mothers had her first child. Thirteen (16.88%) mothers had abortus history. Most of the pregnancies were planned (92.2%) and most common birth type was cesarean (61.03%). Sixty-seven (87.01%) mothers breastfeed their babies. MAI score was found as 94.06 ± 11.83 (range 60 - 104) whiles mean DERS total score was 18.08 ± 11.58 (range 1 - 47) and mean CD-RISC total score was 64.21 ± 15.69 (range 23 - 92) (Table 1).

When evaluated MAI scores with regard to groups, it was found MAI scores were significantly higher in the individuals breastfed infants than who did not ($p<0.001$). There were no significant MAI scores differences with regard to the educational background of mother, birth order of infant, planned pregnancy, abortus history, type of birth, gender of newborn (Table 2).

The relationship between MA and emotion regulation and resilience scale scores was examined. It was found a low negative correlation between MAI scores and all DERS subscores, low negative correlation between MAI scores and total DERS scores ($r=-0.384$, $p=0.001$). It was found a moderate positive correlation between MAI scores and “Tolerance of negative affect scores” ($r=0.509$, $p<0.001$), low positive correlation between MAI scores and “Tenacity and personal competence scores” ($r=0.348$, $r=0.002$), low positive correlation between MAI scores and total CD-RISC scores ($r=0.407$, $p<0.001$). In addition, there were low negative

correlation between total DERS scores and total CD-RISC scores (r=-0.336, p=0.003) (Table 3). Scatter plots of the MAI, DERS, and CD-RISC total scores are shown in Figure 1 and Figure 2.

When using multiple linear regression for prediction MA, it was found individuals who breastfeed (p<0.001) and individuals with higher CD-RISC total scores (p=0.052), DERS Total scores (p=0.144), CD-RISC Tendency toward spirituality scores (p=0.928), CD-RISC Tolerance of negative affect (p=0.617), CD-RISC Tenacity and personal competence scores (p=0.238) were found to be non-significant (Table 4). In addition, logistic regression analysis was performed to determine the best predictive factors of

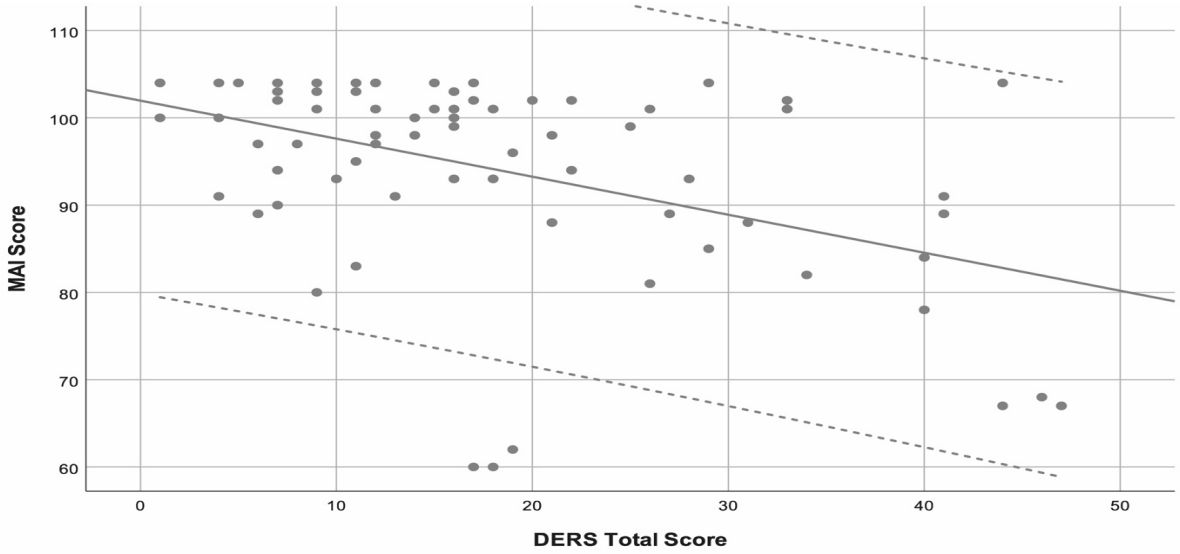

Figure 1. Scatter plot of the MAI and DERS total scores

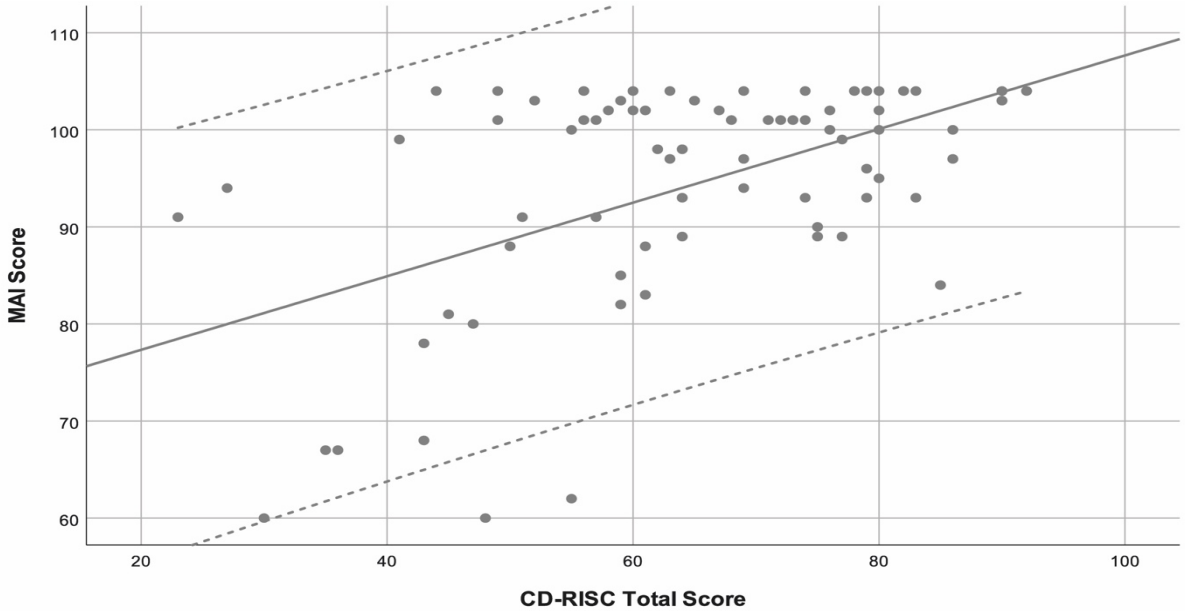

Figure 2. Scatter plot of the MAI and CD-RISC total scores

scores (p<0.001) have higher MAI scores. Other variables included in the model, age of mother (p=0.263), age of father (p=0.090), number of children (p=0.201), birth week (p=0.132), DERS Clarity scores (p=0.148), DERS Goals scores (p=0.210), DERS Impulse scores (p=0.918), DERS Strategies scores (p=0.154), DERS Non-acceptance breast-feeding. We found individuals with lower DERS Total scores breastfeed their children (Table 5). Other variables included in the model, DERS Clarity scores (p=0.065), DERS Goals scores (p=0.521), DERS Impulse scores (p=0.668), DERS Strategies scores (p=0.305), DERS Non-acceptance scores (p=0.392), CD-RISC Tendency toward

Table 1. Summary of individuals characteristics and scale scores

Gestational Week	30.25 ± 5.87
Age of Mother	28.47 ± 4.16
Age of Father	31.76 ± 4.52
Educational Background of Mother	
Primary School	2 (2.59%)
Secondary School	4 (5.19%)
High School	21 (27.27%)
Associate Degree	17 (22.07%)
Graduate Degree	29 (37.66%)
Advanced Degree	4 (5.19%)
Birth Order of Child(ren)	
1st	58 (75.32%)
2nd	16 (20.77%)
3rd	3 (3.89%)
Pregnancy Status	
Planned	71 (92.2%)
Abortus History	13 (16.88%)
Birth Week	38.57 ± 2.22
Type of Birth	
Cesarean	47 (61.03%)
Normal	30 (38.96%)
Gender	
Girl	34 (44.15%)
Boy	43 (55.84%)
Breast-feeding	
Absent	10 (12.98%)
Present	67 (87.01%)
MAI Score	94.06 ± 11.83
DERS Scores	
Clarity	2.36 ± 1.88
Goals	4.84 ± 2.64
Impulse	3.00 ± 2.72
Strategies	4.92 ± 4.01
Non-acceptance	2.96 ± 2.63
Total	18.08 ± 11.58
CD-RISC Scores	
Tendency toward spirituality	7.63 ± 2.13
Tolerance of negative affect	12.82 ± 4.63
Tenacity and personal competence	40.74 ± 11.14
Total	64.21 ± 15.69

MAI: Maternal Attachment Inventory,
DERS: Difficulties in Emotion Regulation Scale, CD-RISC: Connor–Davidson Resilience Scale
Data are given as mean ± standard deviation (minimum - maximum) for continuous variables and as frequency (percentage) for categorical variables

spirituality scores (p=0.079), CD-RISC Tolerance of negative affect (p=0.071), CD-RISC Tenacity and personal competence scores (p=0.965) and CD-RISC Total scores (p=0.706) were found to be non-significant. DERS total scores have 72.92% sensitivity, 100.00% specificity, and 76.36% accuracy to predict breast-feeding with a cut-off point of 18.5 (lower than this score predicts breastfeeding). Area under ROC curve was calculated as 0.882 (95% CI: 0.780 – 0.985, p<0.001).

DISCUSSION

The main aim of the current study was to evaluate impact of emotion regulation skills and psychological resilience on MA. The study sample comprised 77 participants and the participants were assessed in the second or third trimester period of pregnancy and postpartum. The findings were determined in the study supporting the research hypothesis. The risk factors about attachment include issues related to mother, baby, pregnancy, birth and postpartum and social environment. When the characteristics of mother, pregnancy and birth were examined in our study, no significant relationship was found between MA and educational background of mother, birth order of infant, planned pregnancy, abortus history, type of birth, gender of newborn. In the literature, there are studies showing cesarean delivery can have a negative effect on MA, as well as studies reporting that cesarean delivery has no effect on MA (7, 32, 33). The current study supports studies reporting that cesarean delivery has no effect on MA.

It was stated that attachment is related to psychological health in pregnancy and delivery period (6). In our study, two skills thought to be related to psychological well-being were examined; psychological resilience and emotion regulation skills. The findings of this study showed that there was a significant relationship between emotional regulation difficulty and psychological resilience. In the literature, resilience was associated with psychopathology and vulnerability to psychiatric disorders during pregnancy (21, 23, 24). Our study results showed that although pregnant women in the second and third trimesters did not report a psychiatric complaint or a history of psychiatric disorder, emotion regulation skills and resilience might be associated with MA. Emotion regulation

Table 2. Summary of Maternal Attachment Inventory Scores with regard to individuals' characteristics

	Mean ± Std Deviation	p
Education Status of Mother		
High School and below	98.59 ± 8.37	0.718
Associate Degree	99.58 ± 4.03	
Graduate or Master Degree	99.09 ± 4.84	
Order of Child(ren)		
1st	99.89 ± 5.29	0.071
2nd & 3rd	96.54 ± 7.39	
Pregnancy Status		
Not-planned	98.75 ± 7.37	0.986
Planned	99.06 ± 5.96	
Abortus History		
Absent	98.64 ± 6.48	0.764
Present	100.89 ± 2.26	
Type of Birth		
Cesarean	93.50 ± 14.56	0.776
Normal	97.73 ± 7.12	
Gender		
Girl	99.48 ± 5.39	0.947
Boy	98.68 ± 6.53	
Breast feeding		
Absent	74.29 ± 15.87	**<0.001**
Present	99.12 ± 6.05	

skills and psychological resilience have been reported to be strategies that can be used to minimize anxiety among pregnant (24). Considering the effects of these skills on stress and psychiatric symptoms during pregnancy, creating strategies for routine support and development of these skills during pregnancy can make a significant contribution to the healthy MA and thus the mental and physical development of the newborn. As a result of multiple linear regression analysis, it was noted that psychological resilience and breastfeeding were the best predictive factors of MA. In a recent study, resilience had a mediating effect on the trait anger during pregnancy and postnatal depression. Additionally, the importance of providing interventions to improve their resilience to minimize the risk of postnatal depression was emphasized (34). Our results support the importance of finding of the previous study. Studies indicate a reciprocal relationship between MA and the breast-feeding (35, 36). It has been reported that attachment predicts the possibility of changing the feeding method of the mother and affects breastfeeding ability. Our study results are similar to study results emphasizing the importance of breastfeeding. In addition to previous studies, we found emotion regulation skills had a significant predictive value for breastfeeding which plays an important role both in MA and development of the child. In addition, 18.5 point of DERS was calculated for predicting breastfeeding. It will be valuable to repeat this finding in the larger sample group. However, it may be important to identify a group that may need support for breastfeeding with such an assessment in terms of emotion regulation in the prenatal period.

In our country, the number of studies focused on pregnancy and infant period is limited. Çak et al. found insecure attachment style of mother and father, psychiatric symptoms and postpartum anxiety level in the mother as predictors of postpartum depression (37). Usta and Karabekiroğlu's study with 2775 babies aged 10-48 months showed that mothers' psychiatric symptoms, fathers' education and health problems, breastfeeding duration, unplanned pregnancy were important in predicting social emotional/behavioral problems in early childhood

Table 3. Correlations between scale scores

		DERS Scores						CD-RISC Scores			
		Clarity	Goals	Impulse	Strategies	Non-acceptance	Total	Tendency toward spirituality	Tolerance of negative affect	Tenacity and personal competence	Total
MAI Score	r	-0.315*	-0.280*	-0.318*	-0.390*	-0.277*	-0.384*	-0.117	0.509*	0.348*	0.407*
	p	0.006	0.014	0.005	0.001	0.016	0.001	0.312	<0.001	0.002	<0.001
DERS Scores											
Clarity	r		0.452*	0.358*	0.555*	0.384*	0.638*	0.016	-0.420*	-0.315*	-0.367*
	p		<0.001	0.002	<0.001	0.001	<0.001	0.890	<0.001	0.006	0.001
Goals	r			0.509*	0.730*	0.571*	0.840*	0.113	-0.566*	-0.271*	-0.354*
	p			<0.001	<0.001	<0.001	<0.001	0.333	<0.001	0.018	0.002
Impulse	r				0.574*	0.460*	0.723*	0.207	-0.372*	-0.235*	-0.285*
	p				<0.001	<0.001	<0.001	0.073	0.001	0.041	0.013
Strategies	r					0.599*	0.916*	0.175	-0.489*	-0.224	-0.316*
	p					<0.001	<0.001	0.131	<0.001	0.052	0.005
Non-acceptance	r						0.734*	0.218	-0.318*	-0.053	-0.103
	p						<0.001	0.059	0.005	0.647	0.375
Total	r							0.192	-0.541*	-0.243*	-0.336*
	p							0.097	<0.001	0.034	0.003
CD-RISC Scores											
Tendency toward spirituality	r								0.037	0.204	0.283*
	p								0.754	0.077	0.013
Tolerance of negative affect	r									0.711*	0.827*
	p									<0.001	<0.001
Tenacity and personal competence	r										0.970*
	p										<0.001

* Correlation is significant at the 0.05 level (2-tailed).

Table 4. Significant predictive factors of the maternal attachment, multiple linear regression analysis

	Unstandardized β	Standard Error	Standardized β	t	p	95.0% Confidence Interval for β	
(Constant)	62.031	4.102		15.124	<0.001	53.801	70.261
Breast-feeding	22.242	2.890	0.656	7.696	<0.001	16.443	28.041
CD-RISC Total Score	0.229	0.059	0.331	3.881	<0.001	0.110	0.347
Dependent Variable: MAI score; R^2=0.645; F=47.283; p<0.001							

Table 5. Significant predictive factor of the breast-feeding, multiple logistic regression analysis

	β coefficient	Standard Error	Wald	p	Exp(β)	95.0% Confidence Interval for Exp(β)	
(Constant)	4.380	1.112	15.503	<0.001	79.847		
DERS Total Score	-0.104	0.035	8.565	0.003	0.902	0.841	0.966
Dependent Variable: Breast-feeding; Nagelkerke R^2=0.323							

(38). The superiority of this study over previous studies; 1) It is not cross-sectional but a prospective design, 2) the present study investigated two new skills that may support maternal attachment, not just in the light of psychiatric disorders, but emotional regulation and resilience. According to the results of this study, further studies are needed to investigate whether a health program to enhancing resilience and emotion regulation during pregnancy may be part of a pregnancy school program.

Limitations

Our study includes some limitations. This study focused predominantly on the effect of individual characteristics on attachment. The relationship between attachment and environmental factors such as perceived social support, the function of the father during pregnancy has not been investigated sufficiently. One of our limitations was that the self-report scales were subjective and would have recall bias. Larger sample and longitudinal studies are recommended to replicate the effect of emotion regulation and psychological resilience on attachment and mother-baby well-being.

CONCLUSION

This study investigated psychological resilience and emotion regulation skills in pregnancy and obtained evidence to suggest superior psychological benefits of these skills and breast-feeding for MA. It was also found that breast-feeding and psychological resilience predicted MA in the postpartum period and emotion regulation skills predict breastfeeding. Further research is required to enhance by using larger sample sizes and an advanced sampling method.

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