Research Paper

Relationship Between Maternal Fear and Anxiety About COVID-19 and Maternal Role Attainment in Mothers of Preterm Neonates

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ABSTRACT

Background: Mothers of preterm neonates are more concerned about their babies’ health than other mothers, which causes them to be worried and anxious. Meanwhile, the possibility of catching COVID-19 may increase their worries and anxiety and negatively affect their parenting roles. This study aims to determine the relationship between maternal fear and anxiety about COVID-19 and maternal role attainment in Iranian mothers with preterm neonates admitted to neonatal intensive care units (NICUs).

Methods: This descriptive correlational study was conducted from June to July 2021 in 3 level-III NICUs in Tehran, Iran. The study samples were 211 mothers of preterm neonates who were recruited by convenience sampling. The study data were collected using a sociodemographic questionnaire, the Coronavirus anxiety scale, the fear of COVID-19 scale, and the maternal role adaptation scale in NICUs. The obtained data were analyzed utilizing the independent samples t-test, one-way ANOVA, and the Pearson correlation coefficient in SPSS software, version 23. P<0.05 was considered significant.

Results: The mean scores of anxiety, fear, and maternal role attainment were 11.44±3.19, 26.49±5.92, and 57.61±11.95, respectively. There were weak, positive, and significant relationships between anxiety and fear (r=0.385, P<0.001), anxiety and maternal role attainment (r=0.213, P<0.002), and some of it’s dimensions: Participation in care, distant mothering, interaction, and growth and development (P<0.05). There were also weak, positive, and significant relationships between fear and maternal role attainment (r=0.204, P<0.003) and some of it’s dimensions: Participation in care and growth and development (P<0.05).

Conclusion: Considering the relationship between the fear and anxiety of COVID-19 with maternal role attainment and the special importance of this issue in NICUs, evaluating the mental health of mothers with preterm neonates and implementing effective psychological interventions to support them is recommended.

Keywords: COVID-19, Anxiety, Fear, Maternal role attainment, Preterm neonate, Neonatal intensive care unit
1. Introduction

The novel Coronavirus 2019 (COVID-19) outbreak started in China in 2019 and quickly became a menace to global health. The World Health Organization (WHO) has introduced COVID-19 as an international public health emergency (Cucinotta & Vanelli, 2020; Wachs et al., 2009). COVID-19 pandemic is a serious public health emergency, especially in populations that health systems are vulnerable to crisis (Rothe et al., 2020; McIntosh et al., 2020). The official announcement of the disease outbreak in Iran also caused panic and public concern (Salimi et al., 2020). Mothers are concerned about their children being infected with this virus. Preterm neonates have an immature immune system, which puts them at greater risk for severe infections. Cases of neonatal pneumonia were identified in newborns whose mothers were infected with COVID-19 (Zeng et al., 2020). While mothers and their neonates were not initially identified as high-risk populations, evidence from previous viral outbreaks suggests a risk of adverse outcomes for both mother and infant (Alfaraj et al., 2019). This possibility has given rise to pandemic policies, such as observing social distancing and preventing vertical infection, as well as establishing special considerations to protect the health of mothers and babies and the need to consider unwanted consequences for them (Buekens et al., 2020). The neonatal intensive care unit (NICU) environment appears to facilitate the transmission of the COVID-19 virus, and given the role of asymptomatic persons in the spread of the virus, these dangers cannot be undervalued (Caviechiolo et al., 2020). Studies on different types of transmission, clinical spectrum, and duration of virus excretion in COVID-19 patients are ongoing. In the absence of sufficient evidence, it is recommended that a cautious approach be taken to close contact between an asymptomatic, suspected, or established COVID-19 mother and her infant (Verma et al., 2020).

The COVID-19 pandemic will negatively affect maternal psychological health, highlighting the need for intervention (Saccone et al., 2020). Several studies have been conducted on the effects of quarantine on maternal psychological health, which have stated a high prevalence of emotional symptoms (Brooks et al., 2020; Liu et al., 2012a). Women are more psychologically affected by the same pandemics, such as severe acute respiratory syndrome and middle eastern respiratory syndrome (Schwartz & Graham, 2020). Concerns related to contracting COVID-19 start from the first hours of birth and continue until the days after delivery, making mothers an emotionally susceptible group (Thapa et al., 2020). Recently, several studies have indicated the negative effect of COVID-19 on maternal psychological health.

Highlights

- Becoming a mother is a significant event in a woman’s life.
- Mothers of preterm neonates are much more concerned about their babies’ health than other mothers.
- The possibility of catching COVID-19 may increase mothers’ worries and anxiety and negatively affect their role as mothers.
- The results indicated weak, positive, and significant relationships between anxiety and fear and also between stress and maternal role attainment.
- A weak, positive, significant relationship existed between fear and maternal role attainment.

Plain Language Summary

Maternal role attainment in mothers with premature infants hospitalized in neonatal intensive care units (NICUs) could be influenced by various factors. One is the mental state of the mother. The COVID-19 pandemic caused restrictions in NICU, which could affect the mothering process along with the fear and anxiety caused by the virus. The results of our study revealed a significant association between maternal role attainment and the fear and anxiety caused by COVID-19. Providing effective psychological care is suggested to reduce the fear and anxiety of these mothers and improve their maternal role attainment.
Maternal psychological wellbeing difficulties are believed to be related to short-term and long-term risks to the mother-newborn relationship, especially the mother-newborn attachment (Nolvi et al., 2016; Fallon et al., 2021; Tolja et al., 2020). According to the mentioned reasons, healthcare providers must pay more attention to the psychological health of mothers after childbirth (Bassetti et al., 2020). Mothers with premature babies must cope with the unknown stresses of the postpartum period and endure the pressures caused by the pandemic during the critical care period for their children (Dekel et al., 2019). Mothers may also face broader challenges that undermine their ability to care for high-risk infants. Disruption of the social support structure due to the need for social distance may increase the mother’s sense of isolation and symptoms of anxiety and depression (Lemmon et al., 2020). Some studies about Coronavirus pandemic indicated fear, anxiety, depression and the symptoms caused by them through self-reporting and clinical evaluations in the postpartum period (Saccone et al., 2020; Jungari, 2020).

The term “maternal role attainment” is part of the transition process that leads to acquiring maternal role identity. During this period, the mother can fulfill her maternal role and behave appropriately for the determined maternal role (Fouquier, 2013). Achieving the maternal role is one of mothers’ greatest fundamental and significant roles (Sansom, 2010). Mother, neonate, and environment are variables associated with the maternal role. Maternal variables such as marital status, maternal age, maternal confidence, birth experience, stress, and emotional state influence maternal role attainment (Kordi et al., 2017). However, the effects of COVID-19 on maternal stress due to childbirth and subsequent maternal complications are unknown (Mayopoulos et al., 2021). Despite the vulnerability of mothers with preterm infants during the COVID-19 pandemic, no study has been conducted on the fear and anxiety of mothers with preterm newborns admitted to NICU in Iran. Also, the effect of COVID-19 disease on mother-infant relationships and maternal role attainment is unclear. Accordingly, our study will determine the relationship of maternal fear and anxiety about COVID-19 with maternal role development in Iranian mothers with premature neonates admitted to NICUs.

2. Materials and Methods

This descriptive correlational study was conducted in three level-III NICUs affiliated with the Iran University of Medical Sciences (IUMS) in Tehran City, Iran, from June 2021 to July 2022. NICUs in Iran comprise two sections: NICU and post-NICU. Preterm newborns after birth are admitted to the NICU due to dangerous health situations and the need for intensive medical care. Preterm newborns are transported to the post-NICU for continuation of care after recovering and stabilizing their condition. In both areas, access is restricted to prevent transmission of infection, and only parents of preterm neonates can visit their children whenever they wish. The basic principles and policies are the same in both areas.

Sampling was performed from both NICU and post-NICU. This study sample was mothers with their premature neonate in the NICU who were recruited via convenience sampling. The sample size was calculated to be 211 at a 95% confidence interval and 80% test power. Also, for the relationship between maternal role, fear, and anxiety of COVID-19 to be considered statistically significant (considering the absence of a similar study), the amount of the correlation coefficient was considered equal to 0.2. After inserting the values in Equations 1 and 2, the sample size was estimated as follows:

\[ n = \frac{2}{1-r} \left( \frac{1}{W^2} + \frac{3}{W^2} \right) \]

The inclusion criteria were being mothers of neonates admitted to NICU, having a neonate with 28–37 weeks gestational age, having the ability to read and write in Persian, having no previous experience in the NICU, lacking experience of a dead neonate, and passed at least 3 days of neonate admission to NICU. The exclusion criteria were having a positive PCR test, cognitive impairment, having severe gynecologic problems before, during, or after delivery, drug abuse, and the use of antidepressants. Convenience sampling was used to select the eligible subjects. For this purpose, the researcher visited one of the hospitals every day and invited the mothers who met the inclusion criteria to the study until the sample size was achieved.

The data were collected using a sociodemographic questionnaire, the Coronavirus anxiety scale (CAS), the fear of COVID-19 scale, and the maternal role adaptation scale in NICUs.

The sociodemographic questionnaire consisted of the mother’s characteristics, including age, occupation, education level, economic status, and neonatal characteristics, including neonate’s sex, gestational age, corrected age, and neonatal birth weight that the researcher completed.
The maternal role adaptation scale in NICUs was designed by Heydarpour et al. (2016) and contained 32 items and 6 dimensions: Participation in care (14 items), self-efficacy (6 items), distant mothering (3 items), uncertainty (4 items), interaction (3 items), and growth and development (2 items). They are scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score is calculated by the sum of the dimensions’ scores ranging from 32 to 160, and the higher scores indicate better maternal role attainment. The scale’s reliability has been approved with Cronbach α and intraclass correlation coefficient as 0.77 and 0.81, respectively. This tool is relatively simple, and mothers of preterm babies can complete it within 10 minutes (Heydarpour et al., 2016). The present study obtained a Cronbach α coefficient of 0.801 for the maternal role adaptation scale, confirming its reliability.

After receiving the letter of introduction from IUMS, the data were collected in different shift works according to the predetermined schedule. The mothers had enough time to complete the questionnaires through self-reporting. Data were collected in a relaxed and safe place without compromising the care of the baby. SPSS software, version 23 was used for all statistical analyses. Descriptive statistics were used to assess the frequency (percentage) and Mean±SD of participants’ characteristics. The Kolmogorov-Smirnov test was used to determine data distribution, indicating all the data have a normal distribution. Accordingly, the parametric inferential statistics consisting of the independent samples t-test, one-way ANOVA, and the Pearson correlation coefficient were used to assess the relationship between demographic variables and anxiety, fear, and maternal role attainment. The Pearson correlation coefficient test evaluated the association between anxiety, fear, and maternal role attainment.

3. Results

In this study, 211 mothers with preterm neonates participated. Most mothers had secondary education (66.82%), were second para (41.2%), had a history of Coronavirus infection (67.8%), had received the COVID-19 vaccine (65.9%), had not any abortion (65.8%), and were housewives (83.4%). The characteristics of the mothers and their neonates are presented in Table 1.

There were statistically significant relationships between para (P<0.001), children’s number (P<0.001), neonate’s birth weight (P<0.001), neonatal gestational age (P<0.001), and maternal role attainment. Also, none of the demographic variables had a significant relationship with anxiety and fear (P>0.05).

The mean score of the mothers’ anxiety was 11.44±3.19, and 59.2% had not experienced Coronavirus-related anxiety. The mean fear and maternal role attainment score was 26.49±5.92 and 57.61±11.95, respectively (Table 2). The Pearson correlation coefficient was used to assess the linear relationship between the variables, and the results indicated a positive and significant relationship between anxiety and fear (r=0.385, P<0.001). Also, there were positive and significant relationships between anxiety and maternal role attainment (r=0.213, P=0.002), and dimensions of participation in care (r=0.163, P=0.018), distant mothering (r=0.255, P=0.001), interaction (r=0.188, P=0.006), and growth and development (r=0.192, P=0.005). There were also positive and significant relationships between fear and maternal role attainment (r=0.204, P=0.003) and the di-
dimensions of participation in care ($r=0.219$, $P=0.001$) and growth and development ($r=0.173$, $P=0.012$) (Table 3).

4. Discussion

Many mothers experience psychological symptoms such as acute stress, anxiety, depression, and fear while their babies are admitted to NICU (Rogers et al., 2013; Treyvaud et al., 2014). These problems have recently called for increased psychological support for families with neonates admitted to NICUs (Treyvaud et al., 2019). The COVID-19 pandemic is acting as a great new environmental stressor, adding to the pre-existing psychological distress of these mothers (Erdei & Liu, 2020). This study investigated the relationship between maternal fear and anxiety about COVID-19 and maternal role attainment in Iranian mothers with preterm neonates admitted to NICUs.

### Table 1. Demographic and perinatal characteristics of the mothers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean±SD/No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>28.23±5.87</td>
</tr>
<tr>
<td>Neonate’s 1-min Apgar score</td>
<td>7.61±1.34</td>
</tr>
<tr>
<td>Neonate’s 5-min Apgar score</td>
<td>9.35±1.56</td>
</tr>
<tr>
<td>Neonate’s birth weight (g)</td>
<td>2259.59±689.33</td>
</tr>
<tr>
<td>Neonatal gestational age (d)</td>
<td>235.47±20.31</td>
</tr>
<tr>
<td>Neonatal corrected age (d)</td>
<td>249.19±54.67</td>
</tr>
<tr>
<td>Delivery method</td>
<td></td>
</tr>
<tr>
<td>Cesarean section</td>
<td>142(67.3)</td>
</tr>
<tr>
<td>Normal vaginal delivery</td>
<td>69(32.7)</td>
</tr>
<tr>
<td>Neonate’s gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>88(41.7)</td>
</tr>
<tr>
<td>Female</td>
<td>123(58.3)</td>
</tr>
<tr>
<td>Para</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>73(34.60)</td>
</tr>
<tr>
<td>2</td>
<td>87(41.2)</td>
</tr>
<tr>
<td>≥3</td>
<td>51(24.2)</td>
</tr>
<tr>
<td>Number of children</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>75(35.5)</td>
</tr>
<tr>
<td>2</td>
<td>83(39.3)</td>
</tr>
<tr>
<td>≥3</td>
<td>53(25.1)</td>
</tr>
<tr>
<td>Abortion</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>139(65.8)</td>
</tr>
<tr>
<td>1</td>
<td>51(24.2)</td>
</tr>
<tr>
<td>2</td>
<td>21(10)</td>
</tr>
<tr>
<td>History of Coronavirus infection</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>162(76.8)</td>
</tr>
<tr>
<td>No</td>
<td>49(23.2)</td>
</tr>
<tr>
<td>Corona vaccine injection</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>139(65.9)</td>
</tr>
<tr>
<td>No</td>
<td>72(34.1)</td>
</tr>
<tr>
<td>Maternal educational status</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>35(16.6)</td>
</tr>
<tr>
<td>Secondary</td>
<td>141(66.82)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>35(16.59)</td>
</tr>
<tr>
<td>Maternal employment status</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>176(83.4)</td>
</tr>
<tr>
<td>Employee</td>
<td>35(16.6)</td>
</tr>
</tbody>
</table>
The findings of this study indicated that the mean scores of COVID-19 anxiety and fear in mothers with preterm neonates were at a high level. Some studies on pregnant women have reported the same levels of COVID-19 anxiety (Karimi et al., 2021; Abedzadeh-Kalahroudi et al., 2021; Moyer et al., 2020). Pregnancy, childbirth, postpartum, and the period of adjustment with motherhood are the most sensitive times for mothers physically and mentally. Therefore, there may be a risk of mental disorders in these episodes. The negative view and uncertainty about the baby’s health caused by the COVID-19 pandemic increase the mother’s fear and anxiety (Mertens et al., 2020). A study of mothers with neonates admitted to the NICU found that concerns related to COVID-19 were strongly associated with mental health symptoms in this population (Lemmon et al., 2020). A study investigating the psychological effect of COVID-19 on mothers with premature babies reported that the average overall score for COVID-19 anxiety was mild (Eghbali Babadi et al., 2021). A study conducted during the COVID-19 outbreak found that over half of parents whose babies were admitted to the NICU scored higher than the cut-off point on anxiety (Polloni et al., 2021).

As shown in previous pandemics, outbreaks of infectious diseases increased fear in society (Su et al., 2007; Zhu et al., 2008). Fear is an adaptive defense mechanism in humans that is essential for survival and involves several biological processes preparing to respond to potentially dangerous events. However, when it is chronic or disproportionate, it can cause psychiatric disorders (Su et al., 2007). The fear is increased among women during the COVID-19 outbreak because of concern about their children’s health (Pearson et al., 2021). Studies on maternal fear of COVID-19 are limited. In a study by Uzun et al. which examined postpartum COVID-19 fear and its association with breastfeeding, mothers scored high on COVID-19 fear (Uzun et al., 2021). Prolonged separation from the infant leads to impairment in the parent/child relationship, a substantial neurological factor for the infant’s health and development (Tandberg et al., 2019; Erdei & Liu, 2020).

Conversely, the interaction between parents and their neonate lead to infant development, while separation may cause distress and fear in both (Bergman et al.,...
It is shown that worry about the baby contracting COVID-19, along with the social restrictions caused by preventive measures, negatively affects the thoughts and feelings of mothers and increases psychological symptoms such as anxiety, depression, and distress (Zanardo et al., 2020; Liu et al., 2021). The research results also showed a direct and significant relationship between anxiety and fear of COVID-19 and maternal role attainment. To situate motherhood in the global COVID-19 pandemic context, one must first consider motherhood in a broader social context (Hillier & Greig, 2020). It seems that due to the effects of poverty and social inequality on the pandemic in Iran and the world (Asaadi & Daliri, 2021), as well as mothers’ perception of the uncontrollability of the pandemic, these mothers have experienced more fear and anxiety and therefore put a lot of effort into taking care of their babies. According to the results, the mother’s participation in childcare has the highest score, while the growth and development dimension has the lowest score. The results of another study on the determinants of a mother’s role adaptation in mothers with premature babies also showed that participation in the childcare dimension has the highest score (Khalesi et al., 2021). The mother’s presence and the repeated hugging of the baby can make a stronger parent-child attachment and become the basis for subsequent interactions that provide the possibility of further child development. In addition, it strengthens the feeling of motherhood and leads to greater achievement of maternal role (Sullivan et al., 2011). Another study shows that mothers with a passive role in caring for their infants, whose participation is low, are less adapted to maternal roles (Taubman-Ben-Ari et al., 2009). It has been shown that most mothers of normal babies and those hospitalized in NICU have reported the negative impact of this pandemic on social and family relationships and the motherhood role, and this negative impact was more prominent among mothers with babies hospitalized in NICU (Bin-Nun et al., 2021). The presence and active participation of parents in the care of infants are essential for the infant’s health and wellbeing of the parents. Such aspects of care should always be considered, and adequate psychological support should be provided to parents if restrictions must be re-imposed (Bembich et al., 2020; Carter et al., 2021).

The results of the present study indicated that maternal role attainment improves with higher parity rates. Consistent with this result, it has been shown that most primiparous women are not ready to face maternal role (Ruchala & James, 1997). A positive correlation between maternal confidence and parity was observed in the Liu study (Liu et al., 2012b). Knowledge and skill are requirements of maternal role attainment. Mothers should know infants’ normal growth and development and have information regarding their child’s unique crying patterns, sleeping, feeding, and other behaviors. The multipara mothers experience these issues, and the inexperienced primiparas have more concerns about maternal attainment (Hung, 2007).

The findings showed that maternal role attainment improves with more children. The experiences of first-time mothers are generally different from the experiences of mothers with more children (Black et al., 2009). These mothers are not adjusted to their new maternal role in the early postpartum period and need constant learning and adaptation (Shrestha et al., 2019). Prior experience caring for babies is reported to affect maternal confidence (Maehara et al., 2016). It seems that increasing the children number will improve maternal role attainment related to increasing experiences, competency, and confidence. The present study indicated that maternal role attainment was enhanced with increased gestational age. Consistent with this result, Ahmadpour et al. study also shows that maternal role adaptation and gestational age have a significant relationship (Ahmadpour et al., 2022). The findings also show that maternal role attainment improves with the increase in the neonate’s birth weight. Traditional methods of caring for preterm infants in the incubator led to the separation of infants from their mothers and defect in maternal role identity (Badiee et al., 2014). Consistent with this result, another study shows a positive relationship between maternal role adaptation and neonatal birth weight (Rajabi et al., 2018).

The cross-sectional design and convenience sampling are among the limitations of the current study, which reduce the generalizability of the findings. Therefore, it is better to conduct future studies using longitudinal designs that separate the possible stress and anxiety caused by the admission of a newborn in NICU from psychological problems caused by exposure to the Coronavirus and also by using random sampling. Also, fear and anxiety are subjective concepts, and evaluating them objectively has shortcomings. The self-report method has restrictions to reject the possibility that participants respond under the influence of social desirability factors.

5. Conclusion

This study determined the relationship between maternal fear and anxiety of COVID-19 and maternal role attainment in Iranian mothers whose preterm neonates were admitted to the NICU; the results indicated that the mother’s anxiety and fear were at a high level and there were weak significant positive relationships between
maternal role attainment and the mentioned variables. The results highlight the strong need to evaluate the mental health of these mothers during the COVID-19 pandemic. Healthcare providers should always be aware of effective interventions as much as possible and utilize strategies to support mothers with preterm infants in this pandemic and potential future health crises.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by Institutional Ethics Committee of Iran University of Medical Sciences (Code: IR.IUMS.REC.1401.285). The research aims and the confidentiality of the data were explained, and written informed consent was obtained from participants.

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Authors' contributions

Conceptualization, writing the initial draft, review, and editing: Mona Alinejad-Naeini and Farshad Heidari-Behni; Methodology and data analysis: Farshad Heidari-Behni; Data collection: Mona Alinejad-Naeini and Parvaneh Zamani; Final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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