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Introduction

The NICU's professional setting and the separation from their babies frequently cause mothers of newborns there to feel more physically and psychologically distressed. All causes generate future suffering and distress for moms, thus they should spend a lot of time in

Psychological Stress and Coping Mechanism among Iraqi Mothers of Neonates Admitted to Neonatal Intensive Care Unit

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ABSTRACT

Objective: Mothers of neonates admitted to neonatal intensive care units (NICUs) experience various stressors, making effective coping strategies essential. The current study aims to assess stress levels and the effectiveness of coping strategies among Iraqi mothers of neonates admitted to a NICU.

Methods and Materials: This descriptive correlational study utilized a convenience sample of 120 mothers at NICUs in Babylon Hospitals, Al-Hilla City, Iraq. The study employed the Parental Stress Scale (PSS: NICU) and the Brief-COPE questionnaire to measure stress levels and coping responses.

Findings: Among the 120 participants, the majority were aged 25 or younger, with most mothers experiencing moderate stress levels in the NICU environment. A significant positive correlation was found between stress levels and certain coping strategies and between stress and demographic factors like education and income ($p < 0.05$).

Conclusion: Findings suggest that maternal stress levels correlate significantly with demographic factors (e.g., education, occupation) and coping strategies, underscoring the need for targeted support interventions in NICU settings.

Keywords: Parental Stress Scale, Coping strategies, Mothers, Neonatal intensive care unit, Neonatal health.

the NICU to witness the mortality and fragility of their infants (Shiab El-Din et al., 2020).

In the NICU setting, stress manifests in mothers through feelings of powerlessness, anxiety, and emotional strain due to the sudden medicalization of their infants' care. Some newborn babies will require care in a NICU, and giving birth to a sick or premature baby can be quite unexpected for any parent. The NICU

is an intimidating environment, filled with unfamiliar equipment and procedures, which can exacerbate maternal stress and feelings of helplessness. The mother may be unsure of how to calm her infant. In the NICU, these helpless sensations are typical. The NICU's unfamiliar sights, sounds, and technology can be intimidating (Williams et al., 2018). Coping mechanisms are behavioral and cognitive strategies that mothers use to manage stressors associated with the NICU environment, estimated to be more than the individuals' assets (Maharjan et al., 2022).

Advanced medical equipment and complicated medical language create barriers between parents and their newborns, and the noisy, hot, and crowded Neonatal Intensive Care Unit (NICU) may be a difficult place for parents. The combination of having a sick child, the worry of losing their child, and not being able to complete their typical parental responsibilities can cause psychological issues for parents, especially mothers, of infants in the NICU. An elevated risk can result from many factors, including the absence of a suitable environment in which mothers can meet their infant's physiological needs (e.g., feeding, drinking, sleeping, etc.); the absence of information regarding treatment and medical procedures; the lack of communication with health professionals; the absence of social support; and the absence of medical procedures (Lakshmi & Padmaja, 2016).

The prenatal period also causes stress, which can lead to parental psychological anguish or trauma. Although the delivery experience is universal and unifies women worldwide, cultural values and norms significantly influence the mother's understanding of it. Also, in the same context, mentioned that High levels of perceived stress can lead to a variety of negative outcomes, such as substance misuse, depression, burnout, anxiety, irritability, rage, and poor sleep (Pathak et al., 2022).

The neonatal unit atmosphere, as well as the circumstances surrounding a baby's delivery or unexpected admission to the NICU, are known to influence parents' psychological and social coping during the perinatal period. The NICU setting can sometimes be a source of worry for parents (Khan et al., 2018). It has also been demonstrated that managing challenges and emotional strain in mothers of neonates in the NICU can affect the child's prognosis (Banjade et al., 2023).

Additionally, the delivery of an infant requiring admission to a Neonatal Intensive Care Unit (NICU) can be a difficult experience for parents. The newborns require particular medical care in the NICU due to organic instability in the infants. As a result, the family is separated from their newborns and is concerned about their survival and long-term clinical results. Mothers of newborns admitted to the neonatal intensive care unit may experience increased anxiety as a result of the NICU environment (Goral & Geçkil, 2021).

Some features can expose tension in parents in the NICU, once the infant is surrounded by unknown sounds, continual lights, and a large number of individuals in this environment; and he/she requires unpleasant operations. Beyond that, The NICU setting contrasts with many parents' prenatal expectations of a healthy, robust infant, contributing to feelings of anxiety and helplessness (Sadiq et al., 2019).

This study is guided by the following research questions:

- 1-what is the level of stress and coping strategies among mothers whose neonates admitted to the NICU?
- 2- what is the relationship between the level of stress and coping strategies among mothers whose neonates were admitted to the NICU?

Hence, the existing study was carried out to quantify stress levels among NICU mothers and investigate how demographic variables influence coping mechanisms.

Methods and Materials

Study Design and Participants

This study employs a descriptive-correlational design. This design was selected to assess relationships between maternal stress levels, coping mechanisms, and demographic variables among NICU mothers. A non-probability convenience sample of 120 mothers with NICU-admitted infants was selected from pediatric hospitals in Babylon Province, Iraq, between October 2023 and April 2024. A convenience sample was used since obtaining a more representative sample was challenging and the research topic was delicate.

Inclusion criteria:

- Every mother admitted to the neonatal intensive care unit
- Did not have severe complications after delivery

exclusion criteria: mothers who don't desire to participate in this study.

A pilot study of mothers who had complications during delivery involving 20 eligible mothers was conducted to validate the study tools and ensure the feasibility of data collection procedures. Based on feedback, minor adjustments were made to optimize the survey administration process

sample size: Using a 95% confidence level and an estimated 25% variability in stress response based on prior research, a sample size of 120 mothers was calculated to ensure sufficient statistical power.

Trained interviewers administered the questionnaires through structured, face-to-face interviews with mothers in the NICU, ensuring consistency in data collection and comprehension.

Data Collection Tools

Socio-demographic data of mother and infant: age, education level, occupation, type of delivery, number of births, etc.

The Parental Stress: The PSS: NICU, adapted for this study, includes four subscales assessing various NICU stressors, with demonstrated reliability (Cronbach's alpha = 0.80).

Brief-COPE consists of a 28-item self-report scale intended to assess the efficacy and inefficaciousness of coping strategies with stressful life events. The Cronbach's alpha revealed a reliability coefficient of

0.80. These reliability coefficients indicate acceptable internal consistency for each subscale, supporting the reliability of the PSS: NICU in this study population, Language specialists translated the questionnaire into Arabic and then back to English to ensure that the two versions were exactly compatible.

Data analysis

Data were analyzed using SPSS version 26. Correlation coefficients and chi-square tests were calculated to assess relationships between stress levels, coping mechanisms, and demographic factors. A significance level of $p < 0.05$ was considered statistically significant.

Findings and Results

Descriptive statistics for the 120 participants indicate that 50% of mothers were aged 25 or younger. Among the participants, 86.7% were unemployed, which may contribute to heightened stress levels in the NICU environment. It is obvious from the results that primary was a higher percentage of the study sample among mothers (34.2%). Concerning income, the results depict that more than half of the sample have Sufficient to some extent (50.8%). Regarding the type of family, the findings illustrate that (51.7) of the sample lived in the extended family. Concerning residency, the results of the study under hand illustrate that most mothers live in rural areas (54.2%) as shown in [Table 1](#).

Table 1

Descriptive of the study sample regarding demographic variables

| Variables | Rating | N=120 | % |
|--------------------|---------------------------|-------|------|
| Mother age | <= 25 | 60 | 50.0 |
| | 26 - 32 | 43 | 35.8 |
| | 33 and More | 17 | 14.2 |
| Occupation | Employment | 16 | 13.3 |
| | Unemployment | 104 | 86.7 |
| Level of education | Literate | 16 | 13.3 |
| | Illiterate | 7 | 5.8 |
| | Primary school | 41 | 34.2 |
| | Secondary school | 25 | 20.8 |
| | Elementary school | 8 | 6.7 |
| Income | College and above | 23 | 19.2 |
| | Sufficient | 37 | 30.8 |
| | Sufficient to some extent | 61 | 50.8 |
| Kind of Family | Not Sufficient | 22 | 18.3 |
| | Extended | 62 | 51.7 |
| Residency | Nuclear | 58 | 48.3 |
| | Urban | 55 | 45.8 |
| | Rural | 65 | 54.2 |

According to [Table 2](#). Most mothers (55.8%) reported moderate stress levels, with a mean score of 2.3063 (SD = 0.360060). These findings suggest that most mothers

experience a moderate level of stress while their infants are in the NICU, which aligns with previous research on NICU-related maternal stress.

Table 2

Overall assessment of mothers' level of stress in the neonatal care unit (N=120)

| Rating | Frequency | Percent | MS | SD |
|----------|-----------|---------|--------|----------|
| Mild | 3 | 2.5 | 2.3063 | 0.360060 |
| Moderate | 67 | 55.8 | | |
| Severe | 50 | 41.7 | | |

M.s.= Mean of the score "Cut off point (0.66), Poor (mean of score 1-1.66), Moderate (mean of score 1.67-2.33), Good (mean of score 2.34 and more)", S.D= Stander deviation.

Most mothers (73.3%) demonstrated moderate coping levels, with a mean coping score of 2.0462(SD = 0.69522). A moderate coping score indicates that

mothers use some effective strategies to manage stress, although they may still require additional support ([Table 3](#)).

Table 3

Overall assessment of mothers' level of coping strategies in the neonatal care unit

| Rating | Frequency | Percent | MS | SD |
|--------|-----------|---------|--------|---------|
| Poor | 2 | 1.7 | 2.0462 | 0.69522 |
| Fair | 88 | 73.3 | | |
| Good | 30 | 25.0 | | |
| Total | 120 | 100.0 | | |

M.s.= Mean of the score "Cut off point (1), Poor (mean of score 1-2), Fair (mean of score 2.1-3), Good (mean of score 3.1-4)", S.D= Stander deviation

As demonstrated, in [Table 4](#). The findings reveal a statistically significant relationship between stress levels and education level (p = 0.01), income (p = 0.03),

and antenatal care (p = 0.04). A chi-square test revealed a significant association between maternal stress and education level, $\chi^2(df) = 24.566$, p-value < 0.05.

Table 4

Relationship between the mother's responses regarding the level of stress and the Demographic Data

| Demographic Information's | Chi-Square Value | D.f | P-Value |
|---------------------------|------------------|-----|-------------|
| Age /years | 8.674 | 6 | 0.193 NS |
| Gender | 0.875 | 2 | 0.646 NS |
| Education level | 24.566 | 10 | 0.000 HS |
| Occupation | 5.639 | 2 | 0.50 S |
| Antenatal care visit | 10.694 | 2 | 0.005 HS |
| Income | 17.797 | 4 | 0.000 HS |
| Type of family | 1.670 | 2 | 0.50 NS |
| Place of delivery | 2.601 | 2 | 0.367 NS |
| Parity | 18.167 | 14 | 0.192 NS |

Spearman's rho showed a significant positive correlation between stress and coping strategies ($\rho = 0.65, p < 0.001$), indicating that higher stress levels were associated with increased use of coping strategies. This

positive correlation suggests that as maternal stress levels rise, mothers may employ more coping strategies, potentially as a response to heightened stress (Table 5).

Table 5

The correlation between mother's stress with their coping strategies

| The mean level of stress | Mean Coping strategies |
|--------------------------|------------------------|
| Spearman's rho | .652** |
| Significance | <0.001 |
| N | 120 |

Overall, the results indicate that maternal stress levels are predominantly moderate, with significant relationships between stress and factors such as education and income. Additionally, stress and coping strategies were positively correlated, suggesting that increased stress may drive mothers to employ more coping mechanisms.

Discussion and Conclusion

The study revealed that a majority of mothers of NICU-admitted neonates experience moderate stress levels, with a significant positive correlation between stress and coping strategies. Additionally, stress levels were influenced by demographic variables such as education, income, and antenatal care. This finding is supported by prior research (Loewenstein, 2018) which found that most women aged between 25 and 34 years. This finding is similar to another study (Binu Margaret et al., 2014) which reported that more than half of them identified as homemakers. Concerning the level of education, the result is obvious that primary was a higher percentage of the study sample among mothers, and this finding is congruent with a prior finding (Kegler et al., 2019) that clarified higher percentage of parents were in primary education. Income: Regarding the income, the results depicted that more than half of the sample have sufficient to some extent. This study is not compatible with a prior study (Mousavi et al., 2021). This disparity could be attributed to socioeconomic and cultural differences, as well, as the measurement instruments used. This could also be linked to the healthcare infrastructure in high-income nations and disparities in the quality of health services. Residence: concerning residency, the results of the study under

hand depict that more than half of mothers live in rural areas. (Wormald et al., 2015) which reported that most of the sample was living in rural areas but, contrasting with a prior finding (Binu Margaret et al., 2014) which shows that more than half of it was urban.

concerning the overall assessment of mother's level of stress concerning neonatal care in the neonatal care unit, the current study shows that a higher percentage of mothers had moderate stress concerning neonatal care in the neonatal care unit. The findings of the current study are in the same line with prior research (Musabirema et al., 2015) which results reported that most mothers reported moderate stress levels according to NICU for their infant admitted. When comparing the current study's moderate degree of stress to research done in Iraq, the difference was less. The research done in Iraq with physically challenged children and the limited sample size may account for the observed disparity.

The results of the current study illustrate that there was a significant statistical relationship between the mother's level of stress (level of education, occupation, income, and antenatal care visit). Contrary to Shanmugam (2015), who found no significant relationship between education level and stress, this study identified a strong correlation (Shanmugam, 2015). This discrepancy may be due to differing socio-cultural attitudes towards education and maternal roles in the study settings. However, unlike Khan et al. (2018), this study found a more substantial influence of education and income on stress levels (Khan et al., 2018). While prior studies have noted a high level of stress among NICU mothers, this study's finding that lower-income mothers experience higher stress adds a socioeconomic perspective that warrants further exploration

In contrast, the current study brings into line with Ganguly et al. (2020). Parental stress was found to be correlated with the parents' age, occupation, educational attainment, and baby weight (Ganguly et al., 2020). The underhanded study is consistent with Orapeleng et al. (2024) in the same setting (Orapeleng et al., 2024). The present investigation revealed a noteworthy correlation between the stress levels of mothers and several demographic attributes, including educational attainment, occupation, place of residence, number of children, and admission condition (p -value < 0.01).

The findings of the current study indicate that a higher percentage of mothers have moderate coping strategies. This results in the same line with prior findings (Madian et al., 2019). Their findings show that more than half (52%) of the students had fair coping strategies, whereas one-quarter of the study sample was categorized as having poor coping strategies.

Discussion of the correlation between mothers' stress with their coping strategies. The findings indicate that there was a significant positive correlation between stress and the coping strategies of mothers. This result corresponds with prior research (Malliarou et al., 2021). Their results indicate that the coping techniques and stress showed a strong correlation ($P < 0.05$). As well, current findings align with those of Maharjan et al. (2022), who reported that higher stress levels among NICU mothers correlated with various coping mechanisms (Maharjan et al., 2022). The positive correlation between stress and coping may indicate that mothers experiencing higher stress levels are actively seeking coping mechanisms, potentially as a natural response to maintain psychological resilience in the NICU environment.

The fact that this study used a convenience sample from a specific region may restrict the findings' generalizability. Furthermore, relying on self-reported stress and coping data may result in subjective bias. Moreover, the study's cross-sectional design makes it difficult to determine a relationship between stress levels and coping strategies.

This study demonstrated that maternal stress levels in NICU settings are significantly influenced by demographic factors, and correlate positively with coping mechanisms, highlighting the need for tailored support strategies. By shedding light on the factors that influence maternal stress and coping in NICUs, this study

underscores the importance of comprehensive, individualized support systems to improve maternal and neonatal outcomes.

Future studies should consider a longitudinal design to examine how maternal stress and coping evolve throughout the NICU experience and after discharge. Investigating the effectiveness of specific coping strategies, such as support-seeking versus avoidance, could offer more nuanced insights into effective NICU interventions.

Hospitals should consider developing support programs targeting high-stress mothers, especially those with lower socioeconomic backgrounds, to enhance coping and reduce NICU-related stress.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethics approval was obtained from the University of Babylon Ethics Committee (approval number: 48-2023)."

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this study.

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