

RELATIONSHIP BETWEEN PARENTAL KNOWLEDGE AND ANXIETY AMONG PARENTS OF INFANTS IN THE NICU

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ABSTRAK

Latar Belakang: Perawatan bayi di Neonatal Intensive Care Unit (NICU) dapat menimbulkan kecemasan pada orang tua akibat kondisi bayi, lingkungan perawatan intensif, penggunaan peralatan medis, dan ketidakpastian prognosis. Pengetahuan yang memadai mengenai kondisi dan perawatan bayi dapat membantu orang tua memahami situasi selama hospitalisasi.

Tujuan: Mengetahui hubungan antara tingkat pengetahuan dan tingkat kecemasan orang tua pada bayi yang dirawat di NICU RSUD Kotamobagu.

Metode: Penelitian menggunakan desain analitik cross-sectional pada 60 orang tua bayi yang dirawat di NICU, dipilih dengan purposive sampling. Pengetahuan diukur menggunakan kuesioner pengetahuan orang tua dan kecemasan menggunakan Hamilton Anxiety Rating Scale (HARS). Hubungan kedua variabel dianalisis menggunakan uji Chi-Square dengan $\alpha=0,05$.

Hasil: Tingkat pengetahuan terbanyak berada pada kategori baik (26 responden; 43,3%), sedangkan tingkat kecemasan terbanyak berada pada kategori sedang (25 responden; 41,7%). Uji Pearson Chi-Square menunjukkan hubungan yang signifikan antara tingkat pengetahuan dan tingkat kecemasan orang tua ($\chi^2=13,845$; $df=4$; $p=0,001$).

Kesimpulan: Terdapat hubungan yang signifikan antara tingkat pengetahuan dan tingkat kecemasan orang tua pada bayi yang dirawat di NICU RSUD Kotamobagu. Temuan ini menunjukkan adanya pola bahwa pengetahuan yang lebih rendah cenderung disertai kecemasan yang lebih berat, tanpa membuktikan hubungan sebab-akibat.

Saran: Edukasi terstruktur dan komunikasi berbasis family-centered care perlu diperkuat untuk meningkatkan pemahaman orang tua selama bayi menjalani perawatan di NICU.

Kata kunci: Pengetahuan orang tua; kecemasan; NICU; family-centered care

ABSTRACT

Background: Hospitalization of an infant in a Neonatal Intensive Care Unit (NICU) can cause parental anxiety because of the infant's condition, the intensive-care environment, medical equipment, and uncertainty regarding prognosis. Adequate knowledge about the infant's condition and care may help parents understand the situation during hospitalization.

Objective: To determine the relationship between parental knowledge level and anxiety level among parents of infants admitted to the NICU at Kotamobagu Regional Hospital.

Methods: This analytical cross-sectional study included 60 parents of infants admitted to the NICU who were selected using purposive sampling. Parental knowledge was assessed using a knowledge questionnaire, and anxiety was assessed using the Hamilton Anxiety Rating Scale (HARS). The association between the variables was analyzed using the Chi-Square test with $\alpha=0.05$.

Results: The largest proportion of respondents had good knowledge (26 respondents; 43.3%), while moderate anxiety was the most common anxiety category (25 respondents; 41.7%). Pearson Chi-Square analysis showed a significant association between parental knowledge and anxiety ($\chi^2=13.845$; $df=4$; $p=0.001$).

Conclusion: Parental knowledge level was significantly associated with parental anxiety among parents of infants admitted to the NICU at Kotamobagu Regional Hospital. The distribution suggests that lower knowledge

tended to be accompanied by more severe anxiety; however, the cross-sectional design does not establish causality.

Suggestions: Structured education and family-centered communication should be strengthened to improve parental understanding during NICU hospitalization.

Keywords: Parental knowledge; anxiety; NICU; family-centered care

INTRODUCTION

Neonatal Intensive Care Unit (NICU) treatment is required for newborns who need close monitoring and specialized care because of conditions such as prematurity, low birth weight, respiratory distress, infection, asphyxia, and other neonatal complications. Although intensive neonatal care is directed toward stabilizing the infant, admission to the NICU is also a major psychological event for parents. The unfamiliar environment, alarms, incubators, respiratory support, invasive procedures, and uncertainty about the infant's prognosis may generate fear, stress, and anxiety (World Health Organization [WHO], 2020, 2022, 2023, 2024; Hockenberry & Wilson, 2023).

Parental anxiety during NICU hospitalization may affect communication with health professionals, comprehension of medical information, participation in decision-making, and adaptation to the infant's condition. Previous studies have consistently described substantial psychological distress among parents of hospitalized or premature infants, including anxiety, stress, and difficulty adapting to the parental role (Franck et al., 2021, 2022; Jambon & Duhamel, 2021; Zelkowitz et al., 2021; Kurniawati & Sari, 2022; Yuliana et al., 2024). Anxiety is therefore an important component of family-centered neonatal care and should be assessed alongside the infant's clinical needs (American Psychiatric Association, 2022; Stuart, 2023).

One factor that may be associated with anxiety is parental knowledge. In this study, knowledge refers specifically to parents' understanding of the NICU, the infant's medical condition, medical equipment, procedures and treatment, infant nutrition and breast milk, changes in the infant's condition, and the role of parents during hospitalization. Adequate information may reduce uncertainty and help parents interpret medical equipment and procedures more accurately, whereas insufficient information may contribute to negative interpretations and a greater perception of threat (Notoatmodjo, 2022; Potter et al., 2022; Maree et al., 2024).

Family-centered and family-integrated care emphasize that parents remain partners in neonatal care even when their infant requires intensive treatment. Involving parents through clear communication, education, appropriate participation in care, and shared decision-making can improve parental preparedness and adaptation (Benzies et al., 2020; Cano Giménez & Sánchez-Luna, 2021; Cleveland, 2022; Gooding et al., 2023; O'Brien et al., 2023; Treyvaud et al., 2021). Preparation for transitions in care and discharge likewise depends on parents receiving information that is understandable and relevant to their needs (Aydon et al., 2020; Purdy et al., 2020).

In Indonesia, neonatal morbidity continues to require hospital and intensive-care services, and families may experience an additional psychological burden while accompanying infants during treatment (Kementerian Kesehatan Republik Indonesia, 2024). Evidence from intensive-care settings suggests that knowledge and health education are related to family anxiety and that structured education may support psychological adaptation (Lestari et al., 2023; Rahmawati et al., 2024; Sari & Putri, 2023). Sociodemographic characteristics, acceptance, prior experience, and health behavior may also shape how individuals respond to stressful health situations (Priasmoro, 2023; Priasmoro & Lestari, 2023; Priasmoro et al., 2023).

However, anxiety is multifactorial. Parental age, education, previous NICU experience, social support, the infant's clinical severity, duration of hospitalization, and the quality of communication with health professionals may influence anxiety independently of knowledge. Therefore, an observed relationship between knowledge and anxiety should be interpreted as an association rather than proof of causation. Local evidence specifically examining this relationship among parents of infants treated in the NICU at Kotamobagu Regional Hospital remains limited.

This study aimed to determine the relationship between parental knowledge level and parental anxiety level among parents of infants admitted to the NICU at Kotamobagu Regional Hospital. The findings are expected to inform educational and family-centered communication strategies that address parents' informational and psychological needs during neonatal intensive care.

RESEARCH METHODS

This study used a quantitative analytical design with a cross-sectional approach and was conducted in the Neonatal Intensive Care Unit (NICU) of Kotamobagu Regional Hospital in 2026. The population consisted of parents of infants receiving treatment in the NICU during the study period. Participant recruitment and data collection commenced only after ethical approval had been granted on 6 June 2026.

A total of 60 respondents were selected using purposive sampling. One parent was included for each infant to avoid duplicate observations. When both parents were available, the parent most involved in the infant's care was selected; the mother was prioritized when appropriate, while the father could participate when the mother was unable to do so.

The inclusion criteria were: biological mother or father of an infant receiving NICU care; age 18 years or older; having accompanied or visited the infant during NICU treatment; ability to communicate in Indonesian; ability to read and understand the questionnaire; and willingness to participate by signing informed consent. Exclusion criteria were an acute medical or psychological condition that prevented questionnaire completion, inability to complete the questionnaire, previous participation in the study, or withdrawal during data collection.

Data were collected using two instruments. The first was a parental knowledge questionnaire developed according to the study focus, covering understanding of the NICU, reasons for NICU admission, medical equipment, procedures and treatment, infant nutrition and breast milk, changes in the infant's condition, and the parental role during hospitalization. Knowledge was categorized as poor, sufficient, or good according to the study's predetermined scoring categories. The second instrument was the Hamilton Anxiety Rating Scale (HARS), used to categorize parental anxiety as mild, moderate, or severe.

The knowledge questionnaire and HARS were administered during the same period while the infant was still receiving NICU care. To minimize immediate emotional reactions, anxiety assessment was not conducted immediately after distressing medical information, a medical emergency, or a major procedure. Respondents completed the assessment individually when they were sufficiently stable and able to communicate.

Univariate analysis was used to describe respondent characteristics, knowledge level, and anxiety level. Bivariate analysis used the Pearson Chi-Square test to examine the relationship between parental knowledge level and anxiety level. Statistical significance was set at $\alpha=0.05$, and $p<0.05$ was considered statistically significant.

Ethics and Participant Protection

Ethical approval was obtained from the Health Research Ethics Committee of the Institute of Science and Health Technology, Dr. Soepraoen Hospital, Malang (Komite Etik Penelitian Kesehatan ITSK RS dr. Soepraoen), No. KEPK-EC/94/VI/2026, dated 6 June 2026 and valid until 5 June 2027. Participant recruitment and data collection began only after ethical approval had been issued. Before participation, the researcher explained the purpose, procedures, voluntary nature of participation, confidentiality, and participant rights. Written informed consent was obtained from all respondents.

RESEARCH RESULTS

All 60 respondents who met the inclusion criteria completed the parental knowledge questionnaire and HARS assessment; therefore, the final analysis included 60 respondents. Most respondents were aged 25–35 years (51.7%), were mothers (70.0%), had completed senior high school/vocational school (51.7%), and were housewives (38.3%). Most respondents (75.0%) were experiencing NICU care for their infant for the first time.

Table 1. Respondent Characteristics (n=60)

Characteristic	n	%
Parental age		
<25 years	12	20.0
25–35 years	31	51.7
>35 years	17	28.3
Gender		
Father	18	30.0
Mother	42	70.0
Education		
Elementary school/equivalent	4	6.7

Characteristic	n	%
Junior high school/equivalent	6	10.0
Senior high/vocational school	31	51.7
College/university	19	31.6
Occupation		
Housewife	23	38.3
Private employee	17	28.3
Self-employed	9	15.0
Civil servant/TNI/Polri	6	10.0
Other	5	8.4
Previous experience having an infant in the NICU		
First time	45	75.0
Previous experience	15	25.0

The largest knowledge category was good knowledge (43.3%), while moderate anxiety was the most common anxiety category (41.7%).

Table 2. Distribution of Parental Knowledge Level

Knowledge level	n	%
Poor	15	25.0
Sufficient	19	31.7
Good	26	43.3

Table 3. Distribution of Parental Anxiety Level

Anxiety level	n	%
Mild	15	25.0
Moderate	25	41.7
Severe	20	33.3

Cross-tabulation showed that severe anxiety was most frequent among respondents with poor knowledge (10 of 15), whereas mild anxiety was more frequent among respondents with good knowledge (10 of 26). Pearson Chi-Square analysis demonstrated a statistically significant association between knowledge level and anxiety level ($\chi^2=13.845$, $df=4$, $p=0.001$).

Table 4. Relationship Between Parental Knowledge and Anxiety Levels

Knowledge level	Mild	Moderate	Severe	Total	p-value
Poor	1	4	10	15	
Sufficient	4	10	5	19	
Good	10	11	5	26	0.001

Note: Pearson $\chi^2=13.845$; $df=4$; $p=0.001$; $n=60$.

DISCUSSION

The study identified a statistically significant association between parental knowledge and anxiety among parents of infants admitted to the NICU. The observed distribution showed that respondents with poor knowledge were more frequently represented in the severe-anxiety category, whereas those with good knowledge were more frequently represented in the mild-to-moderate categories. This pattern is consistent with the idea that information can help parents interpret the infant's condition and the NICU environment with less uncertainty.

Knowledge is particularly relevant in the NICU because parents are exposed to unfamiliar equipment, terminology, procedures, and rapidly changing clinical information. When the purpose of monitors, oxygen

devices, intravenous lines, feeding tubes, and other interventions is not understood, parents may interpret them as evidence of worsening illness. In contrast, clear explanations can improve understanding and help parents develop more realistic expectations about care (Hockenberry & Wilson, 2023; Potter et al., 2022).

The findings are consistent with previous research showing that parental psychological distress is common during neonatal intensive care and is influenced by uncertainty, the infant's clinical condition, parental role alteration, and communication with health professionals (Cleveland, 2022; Franck et al., 2021, 2022; Jambon & Duhamel, 2021; Zolkowitz et al., 2021). Indonesian studies have likewise reported anxiety among parents or families in intensive-care settings and support the importance of information and education (Kurniawati & Sari, 2022; Lestari et al., 2023; Rahmawati et al., 2024; Sari & Putri, 2023; Yuliana et al., 2024).

Family-centered and family-integrated care provide a practical framework for translating these findings into clinical practice. Parents should receive understandable information, opportunities to ask questions, and appropriate involvement in infant care. Previous literature indicates that structured family involvement and support can improve parental preparedness, confidence, and adaptation during neonatal care (Benzies et al., 2020; Cano Giménez & Sánchez-Luna, 2021; Gooding et al., 2023; O'Brien et al., 2023; Treyvaud et al., 2021). Preparation for discharge and transition home also depends on parents feeling informed and ready to assume care responsibilities (Aydon et al., 2020; Purdy et al., 2020).

Although the statistical association was significant, the result should not be interpreted as evidence that increasing knowledge alone will directly reduce anxiety. Anxiety is multidimensional and may be influenced by the infant's severity of illness, length of stay, parental age and education, previous NICU experience, social support, economic burden, coping style, and communication quality. Research on psychological adaptation and family responses to illness also suggests that sociodemographic characteristics, acceptance, and health behavior may influence individual responses to stressful situations (Maree et al., 2024; Priasmoro, 2023; Priasmoro & Lestari, 2023; Priasmoro et al., 2023; Stuart, 2023).

The practical implication is that NICU education should be structured, repeated, and individualized rather than delivered only once. Information should address the infant's condition, the purpose of NICU care, medical equipment, procedures, nutrition and breast milk, expected changes in clinical condition, and the parental role. Communication should be simple, empathetic, and responsive to parents' questions. Such education is consistent with national and international efforts to strengthen newborn care and family participation (Kementerian Kesehatan Republik Indonesia, 2024; WHO, 2020, 2022, 2023, 2024).

This study has several limitations. Its cross-sectional design establishes association but not temporal sequence or causality. Purposive sampling and data collection at a single hospital limit generalizability. Anxiety was assessed at one point during hospitalization and may vary with changes in the infant's clinical status. Potential confounders were described but were not statistically controlled using multivariable analysis. In addition, the source manuscript did not report detailed psychometric information or scoring thresholds for the study-specific knowledge questionnaire. These limitations should be considered when interpreting the findings and planning future research.

CONCLUSION

Parental knowledge level was significantly associated with parental anxiety level among parents of infants admitted to the NICU at Kotamobagu Regional Hospital ($\chi^2=13.845$; $df=4$; $p=0.001$). Respondents with poorer knowledge were more frequently represented in the severe-anxiety category, whereas respondents with good knowledge were more frequently represented in the mild-to-moderate categories. Because the study used a cross-sectional design, the findings indicate an association and should not be interpreted as proof that knowledge directly causes changes in anxiety.

SUGGESTION

Kotamobagu Regional Hospital is encouraged to strengthen structured parental education and family-centered communication in the NICU. Education should be provided using clear language and accessible media, repeated according to parental needs, and include the infant's condition, medical equipment, treatment procedures, nutrition, progress, and opportunities for parental participation. Future studies should consider longitudinal or interventional designs, larger samples, and multivariable analysis to evaluate whether improving parental knowledge leads to measurable reductions in anxiety.

DECLARATIONS

Ethics Approval and Informed Consent

Ethical approval was obtained from the Health Research Ethics Committee of the Institute of Science and Health Technology, Dr. Soepraoen Hospital, Malang (Komite Etik Penelitian Kesehatan ITSK RS dr. Soepraoen), No. KEPK-EC/94/VI/2026, dated 6 June 2026 and valid until 5 June 2027. Participant recruitment and data collection commenced after ethical approval was granted. Written informed consent was obtained from all participants before participation in the study.

Author Contributions

Megawati Lambuangi contributed to the conceptualization of the study, methodology, data collection, data analysis, interpretation of the results, and preparation of the original manuscript. Dian Pitaloka Priasmoro contributed to supervision, methodological guidance, interpretation of the findings, critical review, and revision of the manuscript. Both authors read and approved the final version of the manuscript.

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Conflict of Interest

The authors declare that there is no conflict of interest related to this study.

Artificial Intelligence Declaration

Generative artificial intelligence (OpenAI ChatGPT) was used solely to support language editing, consistency checking, and manuscript formatting during the revision process. All AI-assisted outputs were reviewed and verified by the authors. The authors remain fully responsible for the accuracy, originality, integrity, and final content of the manuscript.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical, privacy, and confidentiality requirements.

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