

Awareness of Neonatal Danger Signs and Timely Healthcare-Seeking Behaviour in Mothers of 0–12-Month-Old Infants

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KEYWORDS

Neonatal danger signs, healthcare-seeking behaviour

ABSTRACT

Introduction: Neonatal mortality is a critical issue in Indonesia, with a staggering 63% of infant deaths occurring during this period. Early detection of neonatal danger signs is vital in encouraging mothers to seek healthcare services promptly. Further research is necessary to evaluate the level of knowledge among mothers regarding neonatal danger signs and their healthcare-seeking behaviour in primary healthcare facilities within Tangerang District, which has the highest neonatal mortality rate. Methods: A cross-sectional study assessed the knowledge of neonatal danger signs in mothers with infants aged 0-12 months. Data was collected through interviews and questionnaires and analyzed using SPSS-25 and the Pearson Chi-Square test ($p < 0.05$). Results: Two factors were significantly associated with healthcare-seeking behaviour: knowledge of neonatal danger signs ($p=0.000$, AOR=13.374, 95% CI) and maternal education ($p=0.019$, AOR=14.939, 95% CI). Conclusions: Educating mothers of infants about neonatal danger signs increases their likelihood of seeking healthcare for their babies. Health education campaigns and initiatives are crucial to promoting awareness of neonatal health among caregivers.

1. Introduction

In Indonesia, there persists a notable concern regarding infant mortality, notably with 63% of fatalities occurring within the neonatal phase. Despite a decrease observed in neonatal mortality rates from 15 to 13 in 2018, this figure still falls short of the targeted goal set by the Sustainable Development Goals (SDGs).¹ The Infant Mortality Rate (IMR), as delineated by the World Health Organization (WHO), stands as a pivotal metric reflecting a nation's health advancement and the standard of living, with SDG 3 striving to diminish the Neonatal Mortality Rate (NMR) to a minimum of 12 per 1000 live births by 2030.^{2,3} The proactive mitigation of elevated infant mortality rates can be facilitated through enhanced educational initiatives targeted at families, particularly focusing on the recognition of neonatal danger signs. These signs serve as clinical markers indicative of heightened risks of illness and mortality in infants.⁴ Timely identification of these signs holds paramount importance, given the vulnerability of newborns to swift declines in health. Maternal awareness concerning neonatal danger signs significantly influences the propensity for seeking healthcare services, thereby enabling early identification and appropriate intervention to mitigate neonatal mortality rates.⁵ The WHO has identified nine critical neonatal danger signs, encompassing feeding difficulties, convulsions, rapid breathing, chest indrawing, abnormal temperature, jaundice, lethargy, and indications of local infection.⁶ While research conducted in developing nations like Ethiopia has showcased a noteworthy correlation between awareness of neonatal danger signs and the inclination to seek healthcare, investigations in Indonesia concerning this matter remain sparse, despite the persistently high IMR.⁶ Recent health assessments conducted in Banten Province and Tangerang District have unveiled concerning levels of infant and neonatal mortality, particularly in specific areas.⁷ Therefore, the objective of this study is to explore the nexus between maternal familiarity with neonatal danger signs among mothers of infants aged 0-12 months and their healthcare-seeking behavior, with a specific emphasis on regions witnessing elevated mortality rates.

2. Methods

The research adopted a non-paired comparative analytic approach with a cross-sectional design. We conducted the research in accordance to the STROBE guideline and had gained ethical clearance from Universitas Pelita Harapan with the following IRB number 116/K-LKJ/ETIK/III/2023. We focused on

mothers with infants aged 0-12 months, conducting the study from February to May 2023. The target population comprised mothers with infants of the same age group in Tangerang District, specifically those attending Cikupa Health Center, Cikuya Health Center, and Panongan Health Center. Accidental sampling technique was employed as the sampling method. Inclusion criteria encompassed mothers with infants aged 0-12 months visiting the Community Health Center who were willing to participate in the study and completed the informed consent process. Conversely, exclusion criteria involved mothers of infants aged 0-12 months who submitted incomplete questionnaires or those experiencing postpartum psychological conditions. In their study, we established various variables to measure factors related to the mother healthcare-seeking behavior regarding neonatal danger signs. Firstly, we assessed mothers' knowledge of neonatal danger signs based on their understanding of indicators set by the WHO. Respondents were interviewed to identify at least three out of nine predetermined neonatal danger signs. In this research, maternal awareness regarding neonatal danger signs was examined. It involved assessing mothers' comprehension of specific indicators set forth by the World Health Organization (WHO). Through structured interviews adhering to WHO guidelines, mothers were evaluated on their understanding of various neonatal danger signs, such as inadequate breastfeeding, rapid breathing exceeding 60 breaths per minute, chest retractions, fever with a body temperature below 35.4°C, jaundiced skin, lethargy (manifested by minimal movement or no response to stimuli), indications of local infections (e.g., red or discharging navels, skin abscesses, or purulent eyes), convulsions, and a body temperature surpassing 37.5°C. Evaluation criteria distinguished mothers who could identify at least three out of nine neonatal danger signs (denoting good knowledge) from those who could identify fewer than three (indicating poor knowledge).

Another variable of interest for current the study was the behavior of mothers when seeking healthcare services. The study delved into the approaches employed by mothers in accessing healthcare, whether at hospitals, community health centers (Puskesmas), or private clinics. The questionnaire utilized to assess this conduct had been adapted from a thesis authored by Tiomarni Lumban Gaol in 2013, consisting of six inquiries and corresponding responses. This questionnaire has been subjected to validity testing by previous researchers to measure the extent of suitability or accuracy between what is measured and the actual conditions. Each item question in the questionnaire can be considered valid if the value of the corrected item-total > the value of the table r (0.361) at $\alpha = 5\%$. The indicators of this questionnaire obtained corrected item values of 0.596-0.819. Furthermore, previous researchers have also conducted reliability testing using the Cronbach alpha formula (a statistical test program to measure the lower limit of the reliability value of a variable). This reliability test was conducted to determine the consistency of research results if this activity is repeated. The questionnaire can be considered reliable if the Cronbach alpha value is > 0.6. The Cronbach alpha value obtained for this questionnaire is 0.839-0.88. Therefore, this questionnaire can be considered valid and reliable because the corrected item-total > 0.361 and the Cronbach alpha value > 0.6 were obtained. If respondents had opted for choices c-g for question number three, they would have progressed to question number four. In the event of a negative response to question number four, respondents had proceeded to question number six. Favorable evaluation had been warranted if respondents had selected one of the options "c-f" in question number three, had affirmatively responded to question number five, and had chosen option "b-e" for question number six. Conversely, the unfavorable evaluation had ensued if respondents had chosen one of the options "a or b" in question number three, had negatively responded to question number five, and had opted for option "a" in question number six. Questions featuring favorable response options had been awarded two points, whereas those with unfavorable options had garnered a single point. Behavior had been deemed favorable if the cumulative score had fallen between five and six, and unfavorable if it had ranged from three to four. Other observed variables included maternal age, education, parity, employment status, marital status, family income, travel time to healthcare facilities, transportation availability, and health insurance ownership. All data were collected through prepared respondent data sheets, allowing for further analysis of how these factors contributed to maternal knowledge and behavior towards neonatal health. The data obtained from respondents were processed using Microsoft Excel 365 and analyzed using chi-square in the Statistical Package for the

Social Sciences - 25 (SPSS-25), ensuring a precision level of 95% ($p < 0.05$).

3. Results and Discussion

Table 1 demonstrates that among the 74 participants from Cikupa Health Center, Cikuya Health Center, and Panongan Health Center, the predominant demographic consisted of mothers aged 21 years and above, with educational backgrounds ranging from high school to university level, and predominantly without employment. It is notable that all participants in this study were married.

Table 1. Socio-demographic characteristics of mothers of Infants 0-12 months

Variables of Interests		N	Percentage (%)
Age mother's	<21	2	2.7%
	≥21	72	97.3%
Mother's education level	Grade 1-8	18	24.3%
	Grade 9-above	65	75.7%
Occupation of the mother	Yes	16	21.6%
	No	58	78.4%
Parity	Primipara	30	40.5%
	Multipara	44	59.5%
Marital status	Married	74	100%
	Not Married	0	0%
Family monthly income	≥ Regional Minimum Wage	44	59.5%
	< Regional Minimum Wage	30	40.5%
Distance from healthcare facility	≤20 Minutes	64	86.5%
	>20 Minutes	10	13.5%
Transportation	Easy	74	100%
	Hard	0	0%
Health insurance	Yes	61	82.4%
	No	13	17.6%

The survey, aimed at assessing mothers' awareness of neonatal danger signs, was conducted among a cohort of 74 mothers with infants aged between 0 and 12 months who attended healthcare facilities, including Cikupa Health Center, Cikuya Health Center, and Panongan Health Center. Out of the total respondents, 34 individuals (45.9%) exhibited a suboptimal comprehension of neonatal danger signs. Interviews conducted with 74 mothers of infants aged 0-12 months at Cikupa Health Center, Cikuya Health Center, and Panongan Health Center revealed that a majority of the respondents displayed positive tendencies towards healthcare-seeking behavior, with 56.8% exhibiting such behavior. The chi-square analysis presented in Table 2 indicated a significant correlation between familiarity with neonatal danger signs and healthcare-seeking behavior among mothers, as evidenced by a p-value of 0.000. The odds ratio (OR) of 27.000 derived from the table suggested that mothers possessing adequate knowledge of neonatal danger signs were 27 times more likely to exhibit proactive healthcare-seeking behavior compared to those with limited knowledge in this area.

Table 2. Relationship between knowledge of neonatal danger signs and healthcare seeking behavior

Knowledge Level of Neonatal Danger Sign	Healthcare Seeking Behavior				
	Good (n)	Bad (n)	OR	95% CI	P-Value
Good	35	5	27	7.715 – 94.488	0.000
Bad	7	27			

Utilizing a binary logistic regression model, four variables were identified as having potential associations with maternal healthcare-seeking behavior (p -value < 0.25), namely maternal awareness of neonatal danger signs, maternal educational attainment, maternal occupation, and possession of health insurance (as shown in Table 3).

Table 3. Binary logistic regression model

Variable	P Value	COR	95% CI
Knowledge level of neonatal danger sign	0.000	27.000	7.715 – 94.488
Age mother's	0.845	1.323	0.080 – 21.985
Mother's education level	0.000	46.467	5.680 – 380.107
Occupation of the mother	0.105	2.800	0.808 – 9.707

Parity	0.990	0.994	0.390 – 2.356
Marital status	-	-	-
Family monthly income	0.624	1.264	0.496 – 3.222
Distance from healthcare facility	0.644	1.370	0.361 – 5.208
Transportation	-	-	-
Insurance ownership	0.150	2.467	0.721 – 8.437

Subsequent multivariable analysis revealed that two of these variables retained significant associations with maternal healthcare-seeking behavior (p -value < 0.05) after adjusting for confounding factors. These variables were maternal knowledge of neonatal danger signs and maternal educational level (refer to Table 4).

Table 4. Multivariable logistic regression model

Variable	B	P Value	COR	AOR	95% CI
Knowledge level of neonatal danger sign	2.593	0.000	27.000	13.374	3.488 – 51.285
Mother's education level	2.704	0.019	46.467	14.939	1.568 – 142.340

Omnibus test = 0.000; Nagelkerke R Square = 0,608. The data from Table 4 further underscored the significant relationship between awareness of neonatal danger signs and maternal healthcare-seeking behavior ($p = 0.000$). The Adjusted Odds Ratio (AOR) of 13.374 suggested that mothers with adequate knowledge in this domain were 13 times more likely to pursue appropriate healthcare compared to those with insufficient knowledge, even after controlling for confounding variables such as education. Additionally, a noteworthy association was observed between maternal educational level and maternal healthcare-seeking behavior ($p = 0.019$, AOR 14.939, 95% CI). The resulting model exhibited significance, as indicated by an omnibus test p -value of 0.000 ($p < 0.05$). The Nagelkerke R Square value of 0.608 indicated that approximately 61% of the variance in maternal healthcare-seeking behavior could be explained by the model, which comprised maternal knowledge of neonatal danger signs controlled for the confounding influence of maternal education. Level of Knowledge of Neonatal Danger Signs. In this investigation, it was discovered that nearly half of the respondents exhibited inadequate familiarity with neonatal danger signs. This finding aligns with prior research conducted by Nurul Hikmah Annisa et al. at the Gerung Health Center, where a significant portion of the participants, specifically 37 out of 84 respondents (44%), demonstrated insufficient knowledge regarding neonatal danger signs.⁸ Similar findings were reported in a study conducted in Africa by Gomora et al., which revealed that 272 mothers (68.8%) lacked sufficient knowledge of neonatal danger signs, while 135 mothers (33.2%) possessed adequate knowledge.⁹ Hence, there are notable resemblances among the outcomes of these three investigations. The deficiency in maternal understanding of neonatal danger signs is believed to stem from inadequate sources of information concerning these indicators.⁸

Maternal Healthcare Seeking Behavior

In our investigation, 42 mothers out of 74 respondents exhibited favourable healthcare-seeking behaviour (56.8%), while 32 mothers demonstrated unfavourable healthcare-seeking behaviour (43.2%). These findings are consistent with prior research conducted by I Gusti Ngurah Agung et al. at Puskesmas II Karangasem Bali, where 25 mothers were reported to have favourable healthcare-seeking behaviour (58.14%), whereas 18 mothers displayed unfavourable healthcare-seeking behaviour (41.86%).¹⁰ Similarly, a study by Hikmah Annisa et al. at the Gerung Health Center revealed that the majority of respondents, specifically 81 mothers, exhibited positive behaviour (96.4%), with only three mothers displaying negative behaviour (3.6%).⁸ Additionally, research conducted in Africa indicated that 159 mothers demonstrated favourable healthcare-seeking behaviour (57.6%), while 117 mothers exhibited unfavourable healthcare-seeking behaviour (42.4%).⁹ These congruences among the findings of the four aforementioned studies suggest various factors, such as education, influence maternal healthcare-seeking behaviour. Education emerges as a significant determinant affecting an individual's propensity to seek health services. According to findings from a study by Chilot et al., it

was observed that women with higher education levels were more inclined to seek healthcare compared to those with lower education levels.¹¹

The Relationship between Maternal Knowledge of Neonatal Danger Signs and Healthcare-Seeking Behavior

Based on the findings derived from the analysis presented in Table 2, it is evident that respondents with a strong grasp of neonatal danger signs tend to exhibit favourable healthcare-seeking behaviour. Conversely, those with limited knowledge of neonatal danger signs tend to display inadequate healthcare-seeking behaviour. The Chi-Square test results yielded a p-value of 0.000, indicating a significant association between knowledge of neonatal danger signs and healthcare-seeking behaviour. Furthermore, the odds ratio (OR) value obtained from the data in the table is 27.000, signifying that respondents possessing good knowledge of neonatal danger signs are 27 times more likely to demonstrate favourable healthcare-seeking behaviour.⁹

This finding is consistent with previous research conducted in Ethiopia, which also revealed a significant correlation between knowledge of neonatal danger signs and healthcare-seeking behaviour. Another study in Ethiopia similarly demonstrated that mothers with a proficient understanding of neonatal danger signs were three times more inclined to exhibit favourable healthcare-seeking behaviour.¹²

Factors Associated with Maternal Healthcare Seeking Behavior

Following multivariable logistic regression modelling, the final results reveal that only the variable of knowledge of neonatal danger signs exhibits a significant association with healthcare-seeking behaviour. Additionally, the education variable is identified as a confounding factor.

As highlighted by Wawan and Dewi, there exists a strong correlation between knowledge and education. Higher levels of education are anticipated to broaden an individual's knowledge base.¹³ However, it is essential to note that having a lower level of education does not necessarily equate to having limited knowledge. Various factors, such as access to information, can significantly impact one's knowledge level. Information can be acquired through both formal and informal channels, including television, social media, interactions with healthcare workers, reading books, journals, and health-related articles. Therefore, individuals with lower educational attainment, provided they have access to reliable sources of information, can still enhance their knowledge. Nevertheless, the fundamental factor driving knowledge acquisition is the individual's interest in learning. Interest in learning is spurred by personal needs, desires, and curiosity, which subsequently motivate individuals to engage in learning activities to enhance their knowledge and behavior.¹⁴

4. Conclusion

A noteworthy correlation was observed between mothers' knowledge regarding neonatal danger signs and their healthcare-seeking behavior for infants aged 0-12 months. Specifically, mothers possessing a comprehensive understanding of neonatal danger signs were found to have a 13-fold higher likelihood of exhibiting favorable healthcare-seeking behavior compared to those with limited knowledge of neonatal danger signs. This association persisted even after adjusting for the confounding variable of education.

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