Factors Affecting Breastfeeding Practice among Mothers with Hospitalized Neonates

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Abstract
Introduction: Breastfeeding is essential for premature infants, as it reduces morbidity while enhancing cognitive development, ultimately supporting a more productive adulthood. However, in the United States, where 10–12% of infants are born prematurely, hospitalization in the Neonatal Intensive Care Unit (NICU) presents significant challenges to breastfeeding practices as it introduces barriers such as maternal stress, mother-infant separation, limited visitation, and inadequate support, which hinder successful breastfeeding.
Method: This review used several databases, namely Google Scholar, Science Direct, Elsevier, Medline, PubMed, Proquest, dan Wiley Online Library to search original and review articles in English about breasfeeding, internsive care unit, and risk factors in the last 10 years. Other reference sources used were guidelines and textbooks.
Result: The findings reveal that breast milk's bioactive components play a critical role in protecting against morbidity during NICU hospitalization, while also fostering cognitive development. Factors influencing breastfeeding practices include demographic (maternal age, education), biological (maternal and infant health), attitudinal (breastfeeding confidence), social (family support), and hospital regulations (NICU policies).
Conclusion: Factors affecting breastfeeding practice among mothers with hospitalized neonates include planned pregnancy, medical interventions, and family support. NICU hospitalization can be a significant barrier to breastfeeding due to inadequate support, visitation time, mother-infant separation, maternal stress and anxiety, and clinical conditions.

Key words: Breastfeeding, Breast milk, Mothers, NICU, Risk factors

Faktor-Faktor yang Memengaruhi Praktik Menyusui pada Ibu dengan Neonatus Rawat Inap

Abstrak
Pendahuluan: Pemberian Air Susu Ibu (ASI) sangat penting bagi bayi prematur karena dapat mengurangi morbiditas sekaligus meningkatkan perkembangan kognitif, yang pada akhirnya mendukung kehidupan dewasa yang lebih produktif. Namun, di Amerika Serikat, di mana 10–12% bayi lahir prematur, rawat inap di Neonatal Intensive Care Unit (NICU) menghadirkan tantangan signifikan terhadap praktik menyusui akibat berbagai hambatan seperti stres maternal, pemisahan ibu dan bayi, waktu kunjungan yang terbatas, serta dukungan yang tidak memadai, yang menghalangi keberhasilan menyusui.
Metode: Tinjauan pustaka ini menggunakan beberapa basis data, yaitu Google Scholar, Science Direct, Elsevier, Medline, PubMed, Proquest, dan Wiley Online Library, untuk mencari artikel asli dan ulasan dalam bahasa Inggris tentang menyusui, unit perawatan intensif, dan faktor risiko dalam 10 tahun terakhir. Sumber referensi lainnya yang digunakan adalah pedoman dan buku teks.
Hasil: Kumpulan bukti yang ada di literatur saat ini menunjukkan bahwa komponen bioaktif dalam ASI memiliki peran penting dalam melindungi bayi dari morbiditas selama hospitalisasi di NICU, sekaligus mendukung perkembangan kognitif. Faktor-faktor yang memengaruhi praktik menyusui meliputi faktor demografis (usia ibu, pendidikan), biologis (kesehatan ibu dan bayi), sikap (kepercayaan diri dalam menyusui), sosial (dukungan keluarga), dan kebijakan rumah sakit (aturan di NICU).
Kesimpulan: Faktor-faktor yang memengaruhi praktik menyusui pada ibu dengan bayi yang dirawat di NICU meliputi kehamilan yang direncanakan, intervensi medis, dan dukungan keluarga. Rawat inap di NICU dapat menjadi penghalang signifikan terhadap keberhasilan menyusui akibat kurangnya dukungan, waktu kunjungan yang terbatas, pemisahan ibu dan bayi, stres dan kecemasan maternal, serta kondisi klinis bayi.

Kata kunci: Air susu ibu, Faktor risiko, Ibu, Menyusui, NICU

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Introduction

The World Health Organization, along with American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), and Indonesian Pediatrics Society recommends exclusive breastfeeding for the first 6 months of life, followed by appropriate complementary feeding while continuing breastfeeding for two years or more for optimal health outcomes.[1,2] Based on the Indonesian Central Bureau of Statistics, it was found that in 2021, 2022, and 2023 the exclusive breastfeeding coverage in Indonesia was 71.58%, 72,04%, and 73,97%. Although the percentage increased, this is still far from the national target of 100%.[3] Approximately 10-12% of infants delivered in the United States are born prematurely, necessitating hospitalization in the Neonatal Intensive Care Unit (NICU). NICU hospitalization is believed to be a significant barrier to breastfeeding, with NICU babies showing lower breastfeeding rates than healthy babies.[4-5] Possible causes of this phenomenon include inadequate support, limitations in visitation time and the timing of breast milk delivery, mother-infant separation, maternal stress and anxiety, and maternal and/or infant clinical conditions.[6-8] It is crucial to identify factors affecting breastfeeding in order to promote breastfeeding practice among mothers with hospitalized neonates. This study will review the literature regarding factors affecting breastfeeding practice among mothers with hospitalized neonates.

Review

Exclusive Breastfeeding

Exclusive breastfeeding is defined as a condition in which a baby only receives breast milk from the mother and no other fluids or solids, except for oral rehydration solutions, drops, or syrups consisting of vitamins, mineral supplements, or medications. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months, followed by complementary feeding, while continuing breastfeeding for two years or more.[8]

Sokou et al (2022) reported that 78.1% of infants were breastfed in the initial days after birth. Out of all newborns, 58.1% were only nourished with breast milk in their first month. This percentage gradually declined to 36.9% and 19.4% by the end of the third and sixth months, respectively. The incidence of children who were nursed was 14.7% and 7.5% at twelve and eighteen months of age, respectively. Prematurity was found to be a separate predictive factor for the length of time that exclusive and any breastfeeding occurred. Furthermore, the mother's nationality, experience with breastfeeding in the neonatal intensive care unit (NICU), the use of maternal milk throughout the baby's hospital stays, and the mother's previous nursing experience were all separate factors that influenced the length of time the mother breastfed.[9]

Factors Affecting Exclusive Breastfeeding

a. Socioeconomic and Demographic Factors

In developed countries countries, only about 78% of babies have ever been breastfed. On the other hand, about 97% of infants in developed countries are breastfed. Individual socioeconomic and demographic factors, i.e. maternal age, maternal education, family income, and living residency, also greatly influenced breastfeeding practice.[10]

It is globally found that older women, those with higher education, and higher income breastfeed for longer durations. In high-income countries, there is a positive correlation between women's education level and the length of time they breastfeed their children.[11] Higher-income, better-educated, and urban women in low- and middle-

income nations are less likely to engage in breastfeeding. Infants born into low-income households had a 1.5 times higher likelihood of being nursed at the age of 2 compared to infants born into high-income households.[10] Breastfeeding is often perceived as inferior and unsophisticated. These women would choose milk formula for modern and prestigious alternatives to breastfeeding. Women residing in urbanized communities exhibited enhanced levels of education, income, and household wealth, indicating their increased capacity to afford and desire commercially available breast milk replacements. Rural mothers in Indonesia engaged in breastfeeding and had a greater intention to breastfeed for a longer period compared to urban mothers. Maternal disposition towards nursing, understanding of breastfeeding, past encounters, and other breastfeeding approaches (such as improving maternal nutritional quality) had a positive impact on the continuation of breastfeeding. Mothers in metropolitan areas faced several obstacles to nursing, including concerns about insufficient breast milk, instances of child biting, and instances of breastfeeding rejection. As a result, they resorted to utilizing formula milk as a substitute or supplement to breast milk. Furthermore, the decisions made by mothers about the continuation of breastfeeding and the choice to use formula are influenced by factors such as families, communities, health practitioners, and employment. Therefore, it is crucial to implement educational programs and community support initiatives to improve knowledge and awareness regarding exclusive breastfeeding practice.

b. Biological Factors

Obese women tend to breastfeed for shorter durations due to several factors: first, anatomical factors, where delayed lactogenesis occurs; second, obese mothers may have complications such as diabetes mellitus or polycystic ovary syndrome (PCOS) leading to delayed lactogenesis. Third, obese mothers tend to be in low economic status; fourth, dissatisfaction with body image increases concerns and makes mothers less likely to breastfeed. Additionally, mothers who smoke have significantly lower breast milk production.[12]

c. Maternal Knowledge and Attitude

Mothers' attitudes towards breastfeeding also impact the duration. Those who perceive breastfeeding as healthier, easier, and more comfortable will breastfeed longer than those who perceive breastfeeding as restrictive, uncomfortable, and troublesome.[11]

d. Hospital Regulation Factors

Hospital regulation is proven to increase the duration and exclusivity of breastfeeding include early breastfeeding initiation, rooming-in, and providing exclusive breastfeeding. Clinicians' breastfeeding motivation can also directly influence mothers' breastfeeding behavior.[13]

e. Social Factors

Maternal employment negatively affects breastfeeding behavior. Returning to full-time work outside the home is associated with shorter breastfeeding durations, while longer maternity leave is positively related to breastfeeding duration. Support from close individuals also contributes to breastfeeding success.[14,15]

Benefits of Exclusive Breastfeeeding

Maternal educational level and knowledge about the benefit of exclusive breastfeeding is one of most important the factors affecting breasfeeding practice.

a. **Benefits of Exclusive Breastfeeding for Babies**

The primary antibodies in breast milk,

secretory IgA (sIgA), provide immune protection by inhibiting the attachment or penetration of pathogens into the gastrointestinal (GI) tract and by phagocytosis or cytotoxicity of pathogens. Additional secretory antibodies, such as IgM and IgG, depend on maternal exposure to pathogens before and provide specific immune protection to the environment for the baby.[16] The beneficial gut microbiome produced from breastfeeding protects babies from pathogenic bacteria and has also been associated with decreased rates of asthma and obesity in children. This microbiome is a function of the interaction between human breast milk microbiota, such as Bifidobacteria and Lactobacilli, and oligosaccharides that serve as fuel for these bacteria; these components are resistant to digestion and have important antimicrobial activity. A healthy microbiome promotes intestinal barrier integrity and inhibits competitive pathogen binding, thus preventing inflammatory responses. Additionally, gut microbiota contributes to the regulation of gene expression affecting metabolism and fat deposition. Breastfeeding can also help reduce the risk of neonatal infection, diarrhea and vomiting, sudden infant death syndrome (SIDS), obesity, and also cardiovascular disease in adulthood.[17]

b. **Benefits of Exclusive Breastfeeding for Mothers**

Breastfeeding can provide benefits directly and in the long term for mothers, especially if recommendations for exclusivity and duration are met. These benefits can strengthen motivation or commitment to breastfeeding. Reasons for initiating breastfeeding include reducing postpartum bleeding in mothers, reducing the size of the uterus back to its original condition, facilitating positive metabolic changes, assisting postpartum weight loss, reducing stress, as well as delaying ovulation. Reasons for continuing breastfeeding include increasing postpartum weight loss, prolonging lactational amenorrhea, reducing visceral adiposity, reducing the risk of type 2 diabetes, reducing the risk of cardiovascular disease, reducing the risk of breast cancer, and also reducing the risk of ovarian cancer.[18]

Factors Affecting Breastfeeding Practice among Mothers with Hospitalized Neonates

Factors affecting breastfeeding practice among mothers with hospitalized neonates include planned pregnancy, healthcare provider support to ensure breastfeeding to babies separated from their mothers during hospitalization, medical interventions (provision of artificial feeding to premature babies in the NICU), and family support. The mother's psychological status before pregnancy also has a significant influence on breastfeeding duration. Breastfeeding by the mother and her family is associated with higher rates of exclusive breastfeeding and longer durations of exclusive breastfeeding. According to research, the lower the birth weight of premature babies, the longer it takes for babies to adapt to direct breastfeeding after discharge from the hospital. The risk of discontinuing breastfeeding increases when neonates are given formula milk. Mothers of babies who received breast milk during hospitalization are more likely to continue breastfeeding directly after discharge from the hospital. The latest NICU setup in the United States is more equipped to accommodate family needs in the family rooms (Single-Family Room, SFR). According to a study, SFR strengthens breastfeeding because of advances in breastfeeding training provided to families by clinical professionals, allowing mothers to receive sufficient expert assistance.[20]

In one study interviewing mothers and nurses in the NICU, barriers encountered by

Table 1 Recommendation for Enteral Feeding Advancement[21-22]

Period	High Risk <28weeks <1000g		Moderate Risk 28-31weeks 1000-1250g		Low Risk 28-31weeks 1251-1499g	
	Yorkshire United Kingdom	Cipto Mangunkusumo Hospital Indonesia	Yorkshire United Kingdom	Cipto Mangunkusumo Hospital Indonesia	Yorkshire United Kingdom	Cipto Mangunkusumo Hospital Indonesia
1stday Trophic Feeding	<10ml /kg /day For 48 hours	<5ml /kg /day	<10 ml /kg /day For 24 hours	<10 ml /kg /day	<30ml /kg /day	10-15ml /kg /day
Next days Advancement	Max 30 ml /kg /day	10-20 ml /kg /day	Max 30 ml /kg /day	20-30 ml /kg /day	Max 30 ml /kg / day	20-30 ml /kg /day
End target Full enteral Volume	180 ml /kg /day	150 ml /kg /day	180 ml /kg /day	150 ml /kg /day	180 ml /kg /day	150 ml /kg /day

Table 2 Composition of Preterm and Full-Term Breas Tmilk[15]

Component (unit/kg/day)	Preterm Breast Milk			Full-term Breast Milk	Estimated Nutritional Requirements
	Week 1	Week 2	Week 4		
Energy (kJ)	504	504	504	504	504
Fluid Volume (ml)	180	180	180	190	150
Protein (g)	3.9	3.4	2.8	2.4	3.5
Sodium (mEq)	4.0	2.7	1.8	2.0	3.5
Calcium (mg)	53	46	42	47	160-200
Phosphorus (mg)	25	27	23	26	80-100

nurses were reported. Nurses felt they lacked knowledge and experience in promoting breastfeeding and did not receive specific education on breastfeeding preterm babies, such as how often mothers should express breast milk and when mothers should start expressing breast milk after birth. The recommended enteral feeding advancement for preterm babies is demonstrated in Table 1. Equipment for storing breast milk in the unit was considered insufficient. The time for mothers to send breast milk was insufficient because the NICU only accepted breast milk from families twice a day (07.00–08.00 and 13.00–14.00). And ultimately, nurses were not fully aware of the benefits of breastfeeding. They argued that formula milk had more balanced and superior nutrition than breast milk in improving nutrition and weight gain in premature babies.[19] This argument, however, is not the accurate. Composition of premature breast milk meet the nutritional requirement for preterm babies, as shown in Table 2.

From the mother's perspective, the main barriers to breasfeeding in the NICU include inadequate knowledge on how to increase lactation or how to properly store breast milk, inadequate support to breastfeed and maintain successful lactation, small and unsatisfactory volume of breast milk, and also limitations in visitation time and the timing of breast milk delivery in the NICU.[19] There are several ways to increase breast milk production in order to promote breastfeeding practice. Education on breastfeeding since the antepartum period is of utmost importance. Mothers should be assisted in expressing breast milk 1-6 hours after delivery, with a frequency of expressing 8-10 times/day. Mothers should also be taught to gently massage both breasts before pumping for 1-2 minutes and to pump both breasts for 10 minutes while massaging the hard/full areas in the breast. Healthcare provider should also encourage mothers to prolong the duration of kangaroo mother care. [23,24]

In addition to inadequate support and limitations in visitation time, NICU hospitalization can be a significant barrier to breastfeeding due to several other factors including mother-infant separation, maternal stress and anxiety, and maternal and/or infant clinical conditions.[6-8] Summary of factors affecting breastfeeding practice among mothers with hospitalized neonates is depicted in Figure 1.

Most neonates hospitalized in NICUs receive parenteral nutrition during the first days of life. Accumulated evidence indicates that the bioactive components of breast milk provide specific protection against morbidity through various mechanisms during different periods of inpatient care in the NICU. Additionally, breastfeeding plays a crucial role in cognitive development, leading to productive adulthood. Therefore, it is crucial to identify factors affecting breastfeeding

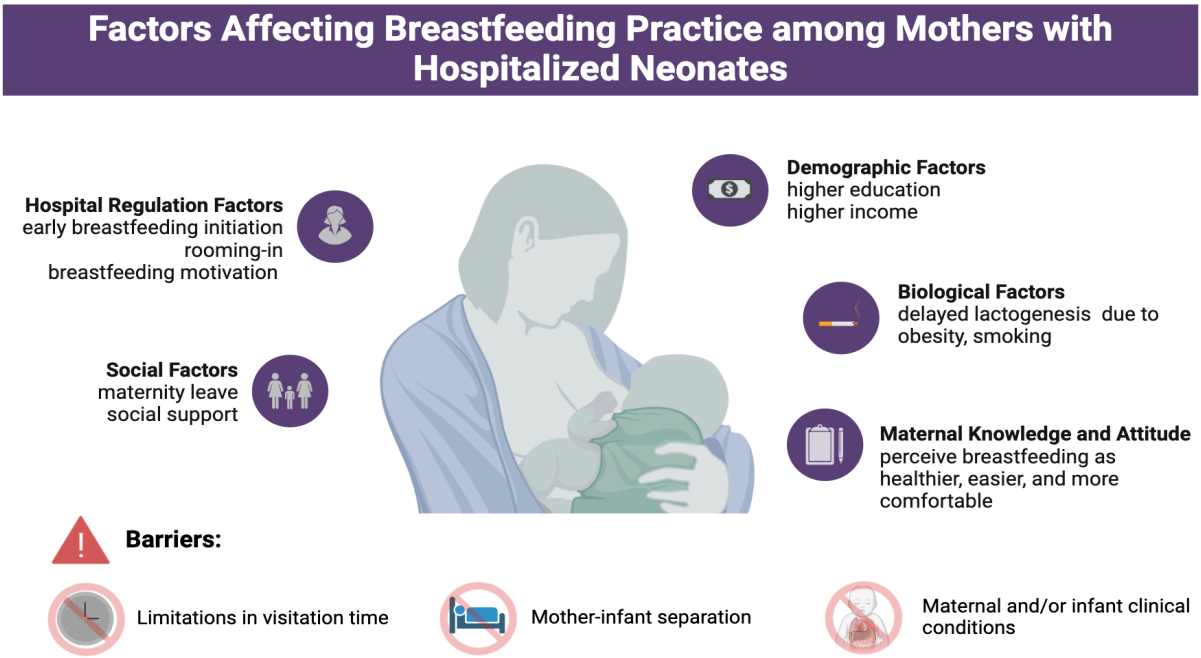

Figure 1 Factors Affecting Breastfeeding Practice Among Mothers with Hospitalized Neonates

in order to promote breastfeeding practice among mothers with hospitalized neonates. Prenatal consultation and providing the assistance for breastfeeding immediately after giving birth is crucial to promote a higher rate of exclusive breastfeeding.[25]

This review covers a wide range of factors that influence breastfeeding practice, including as socio-economic, cultural, psychological, and medical issues, offering a comprehensive perspective. By incorporating the most recent findings, the review becomes a reflection of current knowledge and practices, ensuring its relevance and up-to-dateness. This review provides a full understanding of the issue by taking into account aspects from other disciplines such as psychology, medicine, and sociology. This information can be used to develop more comprehensive interventions. This review can also offer practical and effective insights for healthcare practitioners, policymakers, and caregivers, encouraging improved breastfeeding practices among moms with hospitalized neonates. However, this review may have limitations due to the reliance on published studies, which could result in the omission of significant unpublished or grey literature that could provide more valuable information. Restricting the review to articles published in English and Indonesian languages might also exclude valuable studies published in other languages, leading to an incomplete understanding. While aiming for comprehensiveness, the review might still miss some specific factors or nuances due to the vastness of the topic. This could limit the depth of analysis on certain aspects. Nevertheless, this review can be positioned as a valuable contribution to the existing literature about breastfeeding practice among mothers with hospitalized neonates.

Conclusion

Factors affecting breastfeeding practice among mothers with hospitalized neonates include planned pregnancy, medical interventions, and family support. NICU hospitalization can be a significant barrier

to breastfeeding due to inadequate support, visitation time, mother-infant separation, maternal stress and anxiety, and clinical conditions.

Conflict of Interest

The authors declare no conflicts of interest.

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