



THE RELATIONSHIP OF BREASTFEEDING MOTHERS' HYGIENE BEHAVIOR WITH THE INCIDENCE OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

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Abstract

Staphylococcus aureus (*S.aureus*) is a pathogenic bacterium that can be isolated from breast milk and can cause various infections including pneumonia, sepsis, skin lesions, and food poisoning in infants. This bacterium is present in humans and does not cause any symptoms, but it can serious infections such as sepsis and even death. In nursing mothers, This bacterium is associated with mastitis (breast infection) and abscesses of breasts that require medical attention. The purpose of this study was to determine the factors of breastfeeding behavior with the incidence of MRSA. This research was an analytical observational with a cross-sectional approach to breastfeeding mothers in the South Tangerang area. The sampling technique used purposive sampling on 47 people—data collection using questionnaires and Vitek-2 examination for MRSA. Hygiene behavior in breastfeeding mothers in the good category 27 (57.4%). Four (8.5%) breastfeeding mothers were positive for MRSA. There was no relationship between hygiene behavior in breastfeeding mothers and MRSA ($p=1,000$). Hygiene behavior in breastfeeding mothers in South Tangerang was in a good category. There were 8.5% of breastfeeding mothers are MRSA-positive. Hygiene behavior in breastfeeding mothers can prevent the transmission of MRSA to infants.

Keywords: hygiene behavior; breastfeeding mother; MRSA

1. Introduction

Methicillin-Resistant *Staphylococcus aureus* (MRSA) is a type of *S.aureus* resistant to many antibiotics from the beta-lactam antibiotic group (Guo et al., 2020) . People who are carriers of MRSA can continue to have MRSA infections (Syahniar et al., 2020). Skin that is not intact, such as when there is a blister or cut, is a frequent site of MRSA infection. These bacteria are present in humans and do not cause symptoms but can

cause severe conditions such as sepsis and even death. In nursing mothers, this bacterium is associated with mastitis (infection of the breast) and breast abscess and requires medical attention (CDC, 2022).

More than half of the adult population is colonized with *S.aureus*. About 15% of the human population carries *S.aureus* in the anterior nostril during their lifetime. Asia has the highest prevalence rates of healthcare-associated methicillin-resistant *S.aureus* and community-associated methicillin-resistant *S.aureus* worldwide (Chen & Huang, 2014) . According to a recent meta-analysis, neonates

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colonized with MRSA were 24 times more likely to develop MRSA infection than neonates who were not colonized. However, only a subset of infants colonized with MRSA developed a symptomatic infection (Schuetz et al., 2021).

Hygiene behavior in breastfeeding mothers is also a determinant of the success of exclusive breastfeeding, including washing hands before breastfeeding and not cleaning the nipples after breastfeeding (L et al., 2017). The phenomenon today is that most mothers do not do hygiene in preparation before breastfeeding their babies and do not know or understand how to do hygiene. This makes germs stick to the mother's breast, which is a source of transmission to the baby because when breastfeeding, the mother is more often in contact with the baby's mouth, which can cause infection. When breastfeeding, MRSA in the mother's nose can move to the baby's nose (Safitri et al., 2009).

Babies get breast milk through the nipple. The breast opening that emits milk is an easy place for bacteria to multiply so that it can cause infection (Gari et al., 2020a). In order to prevent the entry of bacteria, breastfeeding mothers must know the correct breastfeeding technique. Giving will affect milk production, which starts from the time and correct breastfeeding technique. Improper breastfeeding will result in sore nipples due to blisters, resulting in the mother's reluctance to breastfeed and other postpartum problems. Another problem in breastfeeding is breastfeeding in one position, so milk production is not optimal. This study aims to determine the characteristics of hygiene behavior in breastfeeding mothers on the incidence of MRSA.

2. Method

This research was a cross-sectional study involving breastfeeding mothers who have babies aged 0-6 months in the South Tangerang area. A purposive sampling of 47 respondents was used in the study. It was conducted between July and August 2022. Data collection using a questionnaire and nasal swab. Questionnaire about the hygiene behavior of mothers while breastfeeding, which includes hygiene in breastfeeding there are five questions, namely 1) Have you washed your hands with running water, soap, or hand sanitizer before breastfeeding? 2) Have you washed your hands with running water, soap, or hand sanitizer after breastfeeding? 3) Do you regularly change your bra (BH)? 4) Do you constantly change your bra

(BH) after showering in the morning and evening? 5) and breastfeeding hygiene behavior category is \geq mean, because the curve results show not normal.

Do you always apply breast milk after breastfeeding? and breastfeeding techniques, namely 1) Is the body of the mother and baby parallel, the baby's stomach is attached to the mother's stomach? 2) Is the baby's chin pressed against the breast? 3) Is the baby's mouth wide open and pressed against the breast? 4) Is the baby's lower lip wide open while feeding? 5) Does the baby suck slowly and deeply, sometimes stopping to swallow? and the correct breastfeeding position category is \geq mean.

The mother and baby's nose swab was taken using a sterile cotton swab by inserting it into the nose about 2 cm deep and then rotating it 360° for about 3 seconds. The swab was inserted into the Amies transport medium. All specimens were brought to the laboratory of the Faculty of Medicine and Health, University of Muhammadiyah Jakarta, at room temperature for isolation. Specimens were grown on Mannitol Salt Agar media. The bacterial isolates that grew, which caused the media color to turn yellow, were then sent to the Sulianti Saroso Hospital Laboratory for MRSA examination. *S.aureus* identification and MRSA examination using the VITEK®2 System (BioMérieux, Marcy l' Etoile, France). The data were analyzed descriptively to determine the demographic characteristics of the respondents, breastfeeding hygiene behavior and breastfeeding position—data analysis using SPSS version 22 and fisher exact test.

3. Result and Discussion

Forty-seven women feeding their 6-month-old infants were respondents in this study. Breastfeeding hygiene behavior in South Tangerang is in the wrong category, as many as 19 (40.4%) while the good behavior is 28 (59.6%). The wrong breastfeeding position was 43 (91.5%), and the correct position was 4 (8.5%). Maternal age <20 years and >35 years were 7 (14.9%), 20-35 years were 40 (85.1%). The youngest mother is 16 years old, and one person is the oldest, 42 years old. Elementary-Junior High School education is 5 (10.6%) and Senior High School-University 42 (89.4%). In this study, it was reported that there were two mothers with elementary education and two mothers with master's education. Most mothers were 34 (72.3%) unemployed and 13 (27.7%) working mothers. The highest parity in range 1 was 11 (36.2%) and

found parity > 1 as many as 30 (63.8%). Infants aged 0-1 months were 17 (36.2%) and > 1 month there were 30 (63.8%). Most types of delivery were normal, 24 (51.1%) and the rest by cesarean section, as many as 23 (48.9%). The variable in the wrong breastfeeding position was found in 1 (33.3%) MRSA-positive mothers and 3 (6.8%) MRSA-positive mothers. Most of the birth attendants were doctors, 30(63.8%) and 17(36.2%) assisted by midwives. The place of delivery was mostly in the hospital; as many as 33 (70.2%), the remaining 14 (29.8%) gave birth at the Public Health Center/ Maternity Hospital/ Clinic.

Table 1. Characteristics of mothers' hygiene behavior of breastfeeding against MRSA in South Tangerang

Variable	Frequency	Persentase
Breastfeeding hygiene behavior		
Bad	20	42.6
Good	27	57.4
Methicillin-Resistant Staphylococcus aureus (MRSA)		
Negative	43	91.5
Positive	4	8.5
Breastfeeding Position		
Wrong position	3	6
Correct position	44	93.6
Mother's age		
< 20 years and >35 years	7	14.9
20-35 years old	40	85.1
Education		
Elementary-Junior High School	5	10.6
Senior High School-University	42	89.4
Jobs		
Does not work	34	72.3
Working	13	27.7
Parity		
1	17	36.2
>1	30	63.8
Baby's Age		
0-1 month	17	36.2
> 2 months	30	63.8
Baby's Birth Weight		
≥2500 Gramm	45	95.7
<2500 Gramm	2	4.3
Baby's Gender		
Girl	29	38.3
Boy	18	61.7

This study found that mothers with poor breastfeeding hygiene behavior had 2 (10%) positive MRSA and 2 (7.4%) negative breastfeeding hygiene behaviors. The results of statistical tests obtained a p-value= 1, meaning there is no relationship between the hygiene behavior of nursing mothers and MRSA (Table 1). The results of statistical tests obtained a p-value= 0.239, meaning there is no relationship between breastfeeding position and MRSA (Table 2).

Table 2. Relationship of breastfeeding hygiene behavior with MRSA

Breastfeeding hygiene behavior	Methicillin-Resistant Staphylococcus aureus (MRSA)				p-value
	Negative		Positive		
	n	%	n	%	
Bad	18	41.9	2	50	1.00
Good	25	58.1	2	50	
Total	43	91.5	4	8.5	

From the study's results involving 47 respondents, 4 (8.5%) respondents were positive for MRSA. Another study found 6% and 1.6% MRSA in mothers and infants in pairs (Matok et al., 2021). S. aureus transmission in infancy mainly occurs from parents to children. The low number of respondents who had MRSA in this study may be influenced because this study did not include hospitalized respondents. As reported by various studies, the high prevalence of MRSA is generally found in hospitals, reaching 50% (Shuping et al., 2017; Zhou et al., 2020).

The behavior of breastfeeding hygiene in mothers who have babies in South Tangerang is in a good category. This good behavior indeed cannot be separated from the understanding of the mother's knowledge of breast care during pregnancy which is easily obtained either from social media or from MCH books. Proper breast care and hygiene during the puerperium and breastfeeding period can prevent the occurrence of breast milk damming, stimulate milk production, and maintain personal hygiene during this period. This is in line with the findings of Jaizatul (2018) that mothers who maintain personal hygiene do not find bacterial infections (Mufidah, 2018).

The behavioral diagnosis of the Lawrence Green concept is influenced by three factors, namely predisposing factors, which include knowledge and traditions of attitudes towards health (level of education, adopted value system, economic level), and enabling factors which include the availability of health facilities and infrastructure and the three reinforcing factors originating from attitudes and behavior of religious leaders, community leaders and health workers (Notoatmodjo, 2007). The older a person gets, the more mature they think and act, so their knowledge increases. The level of knowledge is also influenced by a person's level of education (Sulistiyowati et al., 2017).

The position of breastfeeding the baby correctly influences the success of breastfeeding. The problem that is often found is nipple pain/blisters due to errors in breastfeeding technique; the baby does not suck the nipple until the areola of the breast. If the baby only sucks the nipple, a little milk comes out because there is no emphasis on the baby's gums on the lactiferous sinus (Bahiyatun, 2009). In this study, it was reported that the mother's position in breastfeeding was mainly correct, but it was found that mothers who breastfed babies with the correct position were positive for MRSA. Babies get breast milk through the nipple. The breast opening that emits milk is an easy place for bacteria to multiply so that it can cause infection (Gari et al., 2020b). Previous studies have found that transmission of *S. aureus* to infants may be due to the presence of *S. aureus* in the areola and is acquired through breastfeeding (Lindberg et al., 2004; Schaumburg et al., 2014).

In breast milk, many bacteria can cause vertical transmission from mother to baby. Many studies have shown *S. aureus* as the most common potential pathogen detected in breast milk (de Almeida et al., 2020). *S. aureus* is the most common bacterial pathogen isolated in breast milk and can cause a wide variety of infections, including pneumonia, sepsis, skin lesions, and food poisoning in infants (Li et al., 2018). *S. aureus* in breast milk can be caused by secondary contamination from milk donors' skin, breast, and nasal cavities, health workers, or unsterile equipment conditions (Novak et al., 2000). MRSA can be passed from mother to premature baby through contaminated breast milk, even without infection in nursing mothers (Behari et al., 2004).

The limitations of this study are the small sample size and only examining healthy breastfed infants. Suggestions for future researchers to further examine the impact of breastfeeding hygiene behavior not only on healthy babies but also on sick babies, is there a difference. In addition, it is also necessary to strengthen education for pregnant women about the impact of MRSA on the hygiene behavior of breastfeeding mothers, especially during the antenatal care period, which is a preparatory class during the postpartum period.

4. Conclusion and Suggestion

Hygiene behavior in breastfeeding mothers

in South Tangerang is in the good category. There are 8.5% of breastfeeding mothers who are MRSA-positive. Hygiene behavior in breastfeeding mothers can prevent the transmission of MRSA to infants.

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