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EXCLUSIVE BREASTFEEDING AND RECURRENT PNEUMONIA AMONG UNDER-FIVE CHILDREN IN PADANG, INDONESIA

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ABSTRACT

Background: Pneumonia remains an important cause of morbidity and mortality among children under five. Exclusive breastfeeding during the first six months of life is recommended as a protective nutrition practice, although local evidence is needed to inform community nursing services. Aim: This study examined the association between exclusive breastfeeding history and recurrent pneumonia among under-five children attending Ambacang Community Health Center, Padang, Indonesia. Methods: A quantitative analytic study with a cross-sectional design was conducted from March to August 2024. The study included 78 mothers of children aged 1–5 years, recruited by accidental sampling from a population of 427 mothers recorded in 2023. Data were collected through interviewer-administered questionnaires. Univariate analysis described recurrent pneumonia and exclusive breastfeeding; the association was tested using the chi-square test at a significance level of 0.05. Results: Of the 78 children, 43 (55.1%) were classified as having a high/recurrent pneumonia score and 35 (44.9%) as low. Forty-five children (57.7%) had not been exclusively breastfed, while 33 (42.3%) had. A high/recurrent pneumonia score was recorded for 36 children (46.2% of the total sample) with a history of non-exclusive breastfeeding and 7 (9.0%) with a history of exclusive breastfeeding. The association was statistically significant (reported $p=0.000$; appropriately expressed as $p<0.001$). Conclusion: Non-exclusive breastfeeding history was associated with a higher frequency of the study-defined recurrent pneumonia category. Community health nurses should strengthen practical breastfeeding counselling and follow-up. The cross-sectional design and non-probability sampling do not establish causality or population-level estimates.

INTRODUCTION

Pneumonia is an acute infection of lung parenchyma that can cause cough, difficult or rapid breathing, and impaired oxygen exchange. It remains a major preventable cause of illness and death in children, particularly in settings where undernutrition, incomplete immunization, household air pollution, and barriers to timely healthcare coexist. The World Health Organization (WHO) identifies undernutrition, including inadequate breastfeeding, as a factor that increases children's vulnerability to pneumonia. Prevention therefore requires integrated action that combines adequate nutrition, immunization, reduced exposure to indoor air pollution, hygiene, and timely diagnosis and treatment (1,2).

Breastfeeding is a key component of early-life nutrition and infection prevention. WHO and UNICEF recommend exclusive breastfeeding for the first six months, followed by appropriate complementary foods from six months while breastfeeding continues to two years or beyond. Exclusive breastfeeding

means that an infant receives breast milk only, without other liquids or foods, including water, except oral rehydration solution or drops/syrups of vitamins, minerals, or medicines (3,4). Breast milk provides nutrients and immunological components that support mucosal defense and may reduce susceptibility to common infections. WHO specifically recognizes breastfeeding as a protective measure against pneumonia and notes that it may also reduce illness duration (1,3).

Evidence from epidemiological studies supports an association between suboptimal breastfeeding and childhood pneumonia. A systematic review and meta-analysis by Lamberti and colleagues found that breastfeeding exposure was associated with reduced pneumonia morbidity and mortality among children younger than two years (5). A more recent umbrella review synthesizing 12 systematic reviews and meta-analyses, encompassing 270 primary studies, reported that non-exclusive breastfeeding was associated with increased odds of pneumonia among children under five (pooled OR 2.34; 95% CI 1.89–2.78) (6). In Indonesia, a case-control study in a high-prevalence area reported that non-exclusive breastfeeding was associated with childhood pneumonia (OR 7.95; 95% CI 3.52–17.94), alongside incomplete immunization, indoor air pollution, low birth weight, and wasting (7). These findings underline that breastfeeding operates within a broader network of children, household, and environmental determinants.

Despite this evidence, local assessment remains important because breastfeeding practices, health service access, exposure to household risks, and pneumonia case patterns vary across communities. The 2023 Indonesia Health Profile reported national pneumonia case-detection coverage of 36.9%, while West Sumatra's reported coverage was 29.9% (8). The source thesis records 427 pneumonia cases among under-five children in the Ambacang Community Health Center catchment area in 2023 and 43 cases from January to March 2024. These local figures provided the rationale for examining maternal feeding history in this service setting. The figures are reproduced from the original study document and should be checked against the underlying Puskesmas register before publication.

From a nursing and public-health perspective, breastfeeding support is not limited to providing information. Nurses and other primary-care professionals can assess feeding challenges, support early initiation and correct attachment, address perceived insufficient milk supply, involve family members, and connect mothers with continuing lactation support. A local association between breastfeeding history and recurrent pneumonia may help prioritize counselling during antenatal care, postnatal visits, immunization sessions, and integrated community health posts. However, breastfeeding should not be interpreted as the only determinant of pneumonia, and prevention programs must also address immunization, nutrition, indoor air quality, and timely care seeking (1,7).

Although previous Indonesian studies have examined breastfeeding and childhood pneumonia, findings from a specific primary-care catchment area can contribute contextual information for local nursing practice. The present study focused on the relationship between exclusive breastfeeding history and the study-defined recurrent pneumonia category among children aged 1–5 years

attending Ambacang Community Health Center. The conceptual premise was that exclusive breastfeeding may strengthen early-life protection against infection, while recurrent pneumonia is also influenced by other children and environmental determinants. Because the study used a cross-sectional design and did not adjust for potential confounders, its findings are interpreted as an association rather than a causal effect.

The aim of this study was to determine the association between exclusive breastfeeding history and recurrent pneumonia among under-five children at Ambacang Community Health Center, Padang, Indonesia, in 2024. Specifically, the study described the distribution of the study-defined recurrent pneumonia category and exclusive breastfeeding history and tested the statistical association between these variables.

METHOD

Study design and setting. This quantitative analytic study used a cross-sectional design. Data were collected at Ambacang Community Health Center, Padang, West Sumatra, Indonesia. Each participant was interviewed once, and information on breastfeeding history and pneumonia history was obtained at the same assessment. The design therefore identifies an association but cannot establish the temporal sequence or causality.

Population and sample.

The source thesis defined the population as 427 mothers with children under five recorded at Ambacang Community Health Center. The final sample comprised 78 mothers. Participants were recruited using accidental (convenience) sampling among mothers attending the maternal and child health service during the data-collection period. The inclusion criteria were willingness to participate, having a child aged 1–5 years, and being cooperative during the interview. The stated exclusion criterion was not attending the health center during the research period. The thesis describes a sample-size calculation using a population of 427, a Z value of 1.96, an assumed proportion of 0.50, and an absolute precision of 0.10; the resulting sample was 78.

The independent variable was exclusive breastfeeding history, classified as exclusive breastfeeding when the child received breast milk only from birth to six months, and non-exclusive breastfeeding when any other food or drink was introduced before six months. The dependent variable was recurrent pneumonia, assessed using an 11-item questionnaire attributed in the thesis to Misnadiarly. The operational classification was a high score/category at ≥3 and a low score/category at <3. The thesis also attributes a one-item breastfeeding questionnaire to Sukmawati. Data were collected through interviewer-administered questionnaires. The original thesis does not provide sufficient detail on instrument item wording, validation procedures, reliability coefficients, or diagnostic verification from medical records; these details should be supplied by the authors if available.

Data collection and management. Primary data were obtained through interviews with mothers using the study questionnaires. Secondary data on the number of children with pneumonia were obtained from the health center's annual report. The thesis describes editing, coding, data entry, and cleaning before statistical analysis. It does not report interviewer training, duplicate data checks, missing-data handling, or procedures to reduce recall and interviewer bias.

Descriptive analysis was used to calculate frequency distributions and percentages for the recurrent pneumonia category and exclusive breastfeeding history. The association between the two categorical variables was examined using the chi-square test, with a significance threshold of 0.05. The thesis reports a p-value of 0.000; in accordance with statistical reporting conventions, this is presented as $p<0.001$. No adjusted analysis or effect estimate (such as an odds ratio with a confidence interval) was reported in the source thesis.

Ethical considerations. The source thesis supplied for manuscript preparation does not state the name of an ethics committee, approval number, or approval date, and it does not include a detailed description of written informed consent or participant confidentiality procedures. These details must be obtained from the original researcher and inserted before journal submission. No ethics approval number has been invented in this manuscript.

RESULTS AND DISCUSSION

Participant and variable distribution

A total of 78 mothers were included in the analysis. The source thesis reports the distribution of the study-defined recurrent pneumonia category and exclusive breastfeeding history as shown in Tables 1 and 2.

Table 1. Distribution of the recurrent pneumonia category among children (n=78)

Recurrent pneumonia category	Frequency (n)	Percentage (%)
High (score ≥3)	43	55.1
Low (score <3)	35	44.9
Total	78	100.0

Table 2. Exclusive breastfeeding history among children (n=78)

Breastfeeding history	Frequency (n)	Percentage (%)
Exclusive breastfeeding	33	42.3
Non-exclusive breastfeeding	45	57.7
Total	78	100.0

More than half of the children (43/78; 55.1%) were classified in the high recurrent-pneumonia category according to the questionnaire cut-off used in the thesis. In addition, 45 children (57.7%) had a history of non-exclusive breastfeeding. These figures describe the recruited sample and should not be interpreted as prevalence estimates for all children in the Ambacang catchment area because participants were selected through non-probability sampling.

Association between exclusive breastfeeding and recurrent pneumonia

The cross-tabulation is presented in Table 3. Among all participants, 36 children (46.2%) had both a history of non-exclusive breastfeeding and a high recurrent-pneumonia score, compared with 7 children (9.0%) who had been exclusively breastfed and had a high score. The chi-square test indicated a statistically significant association (reported p=0.000; reported here as p<0.001).

Table 3. Association between exclusive breastfeeding history and recurrent pneumonia category (n=78)

Breastfeeding history	High n (%)	Low n (%)	Total n (%)	p-value
Exclusive breastfeeding	7 (9.0)	26 (33.3)	33 (42.3)	
Non-exclusive breastfeeding	36 (46.2)	9 (11.5)	45 (57.7)	<0.001
Total	43 (55.1)	35 (44.9)	78 (100.0)	

Note: Percentages are calculated using the total sample (n=78), consistent with the source thesis. The p-value is from the chi-square test; the original output was recorded as 0.000 and is conventionally reported as p<0.001.

Principal finding. This study found a statistically significant association between exclusive breastfeeding history and the questionnaire-defined recurrent pneumonia category among children attending Ambacang Community Health Center. The proportion of the total sample classified as high/recurrent was greater among children with a history of non-exclusive breastfeeding than among those who had been exclusively breastfed. The direction of this finding is consistent with international evidence that optimal breastfeeding is associated with lower childhood pneumonia morbidity (5,6).

Comparison with previous evidence. The result is also consistent with an Indonesian case-control study by Sutriana and colleagues, which identified non-exclusive breastfeeding as an important risk factor for childhood pneumonia in a high-prevalence setting. That study reported an odds ratio of 7.95 (95% CI 3.52–17.94) for no or non-exclusive breastfeeding, while also identifying incomplete immunization, indoor air pollution, low birth weight, and wasting as relevant factors (7). The present study did not estimate an odds ratio and did not adjust for these factors; therefore, the magnitude of association should not be compared directly. The 2025 umbrella review by Abate and colleagues further supports the association, reporting pooled odds of pneumonia of 2.34 (95% CI 1.89–2.78) among children who were not exclusively breastfed (6).

Possible biological and behavioral explanations. Breast milk provides nutrients and immune components that contribute to infant host defence. The WHO identifies exclusive breastfeeding during the first six months as a protective measure against pneumonia and other common childhood illnesses (1,3). The present study, however, did not measure immunological mechanisms, breastfeeding duration beyond the six-month classification, or the timing of pneumonia episodes. Biological explanations are therefore contextual interpretations supported by external evidence, not mechanisms demonstrated by this dataset.

Implications for nursing and primary care. The findings support strengthening breastfeeding promotion and support as part of integrated child-health services. Nurses and midwives can provide consistent counselling during pregnancy and after birth, assess barriers to exclusive breastfeeding, support early initiation and effective milk transfer, and involve partners and family members in feeding decisions. At community health posts, follow-up should identify mothers who introduce

formula, water, or complementary foods before six months and offer practical, non-judgmental support. Pneumonia prevention should remain comprehensive and include routine immunization, adequate nutrition, reduction of household smoke exposure, hygiene, and early recognition of danger signs (1,7).

Several limitations should be considered. First, the cross-sectional design does not establish whether breastfeeding history preceded the pneumonia episodes or support causal inference, although breastfeeding generally occurs earlier in life. Second, accidental sampling may have introduced selection bias and limits generalizability. Third, breastfeeding history was reported retrospectively by mothers and may be affected by recall or social-desirability bias. Fourth, the recurrent-pneumonia outcome was based on an 11-item questionnaire, and a cut-off score rather than a clearly documented medical-record case definition; the exact questionnaire items and validation evidence were not available in the supplied thesis. Fifth, potential confounders, including immunization status, nutritional status, birth weight, age, household crowding, indoor air pollution, and household smoking—were not included in the reported analysis. Finally, the source did not provide an ethics approval statement, instrument reliability coefficients, or an adjusted effect estimate.

Further studies should use a clearly defined clinical or medical-record-based pneumonia outcome, distinguish first episodes from recurrent episodes, and report the timing and severity of episodes. Larger probability-based samples and multivariable analyses should account for immunization, nutritional status, birth weight, age, socioeconomic conditions, household air pollution, and parental smoking. Researchers should report questionnaire development, content validity, construct validity where relevant, reliability coefficients, interviewer training, missing-data procedures, and ethics approval. Prospective cohort studies could better clarify the temporal relationship between infant feeding and subsequent respiratory infections.

CONCLUSION

Among 78 mother–child pairs attending Ambacang Community Health Center, non-exclusive breastfeeding history was significantly associated with a higher study-defined recurrent pneumonia category ($p<0.001$). The finding supports strengthening breastfeeding counselling and follow-up within primary healthcare and community nursing services. Because the study was cross-sectional, used accidental sampling, and did not adjust for other pneumonia risk factors, the association should not be interpreted as proof that non-exclusive breastfeeding caused recurrent pneumonia. Further research using validated outcome measures and adjusted analyses is warranted.

AUTHOR CONTRIBUTION

Monna Widyastuti contributed research consept & design, revise the manuscript, research methodology, supervising research process. Maria Ulvani contributed collecting & analyzing

statistics, also writing. Rahmawati and Rahmiwati contributed editorial of manuscript. No contribution roles have therefore been assigned in this blinded draft.

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