

Identification of Modifiable Risk Factors for Acute Respiratory Infection in Indonesian Children Under 5 Years of Age

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Country and Partners

This study was part of a larger AUCC-UPCD-CIDA Tier 2 Linkage Project conducted collaboratively by the School of Nursing, Memorial University of Newfoundland, and the Faculty of Nursing, University of Indonesia. The two study villages were located in West Java province, a rural area. The population of the two villages was 13,119, including 2,108 children under age 5. The majority of village men were farmers, fruit sellers, motorcycle drivers, or labourers, or had no permanent job.

The Study Problem and the Purpose of the Study

Acute respiratory infection (ARI), especially pneumonia, is a major cause of morbidity and mortality in Indonesian children under 5 years of age. Strategies related to immunization, case identification, and case management have been only partially effective in reducing ARI morbidity and mortality in developing countries. These approaches are expensive and may not be feasible in villages with limited access to health services and resources. Studies in other countries have identified a number of risk factors for ARI, including young age, malnutrition, incomplete immunization, population density, exposure to environmental tobacco and household smoke, and low maternal education. No studies had been done in Indonesia, however, and the studies that have been conducted have not focused on factors that might feasibly be modified. The research questions, therefore, were: 1. *What risk factors are associated with high frequency of ARI in young Indonesian children?* 2. *Which risk factors might be readily modified by families to reduce the incidence of ARI?*

Methods

The participants were parent-child dyads living in the study villages; all children were under 5 years of age. The local village health workers identified and made initial contact with potential participants. The researchers then met with them, at their convenience, and obtained written consent.

Data were collected using four questionnaires, written in the local language and administered verbally by the researchers. These concerned: (1) demographics; (2) history and health assessment (assessed immunization, body weight, vital signs, general appearance, and history of recent illness); (3) environmental assessment (assessed smoking and cooking habits, ventilation and handwashing facilities, and household design); and (4) use of health services (assessed use of services and responsibilities for decision-making). From the history obtained from the parent about episodes of ARI over the previous year, the children were categorized as having a high (more than six episodes) or low (six or fewer episodes) frequency of ARI.

Results

There were 120 parent-child dyads in the final convenience sample; the mean age of the children was 29.3 months (*range* = 3–60 months). Logistic regression showed that three variables were significant predictors for high (vs. low) frequency of ARI when other factors were controlled: (1) mother's education less than Grade 3 (OR = 1.19; CI = 1.03–1.37; $p = .0167$), (2) being carried on the mother's back when the mother was cooking, per each half-hour increase in carriage (OR = 2.11; CI = .96–4.6; $p = .0498$), and (3) having no ventilation for the stove (OR = 2.67; CI = 1.17–6.1; $p = .0378$). In bivariate analysis, two other variables were significantly different for high frequency of ARI: having four or more people share the bedroom with the child, and exposure to a large amount of kitchen smoke. These factors did not remain significant in regression, the latter being related to ventilation, being carried, and whether a window was open during cooking.

Almost half of the children (47.5%) were carried by their mothers in the kitchen, but the mothers could readily identify a person, usually a sibling or grandparent, who could take care of the child while she cooked. Households used either a kerosene stove (75.8%) or wood stove (24.2%), with 67.5% having ventilation for the stove. In 59.2% of the houses, the kitchen opened into the living room; only 64.2% of houses had at least one window that could be opened to clear kitchen smoke. The majority of the mothers (91.9%) could identify ways to improve ventilation while cooking. Few mothers (4.2%) said that it would be possible to separate a sick child from their other children, and only 35.2% could identify a strategy for reducing exposure to environmental tobacco smoke.

Immunization was incomplete for 30% of the children older than 12 months, and 67.5% of the children were underweight. Only 7.5% of households had no smokers. While not associated with higher risk for

ARI in this study, probably due to small sample size and lack of statistical power, these are important risk factors that could be modified through additional education and action.

Implications and Conclusions

The study identified key factors that could potentially be modified through a community-based intervention program. The findings led, as part of the larger project, to the development of a health-education program that emphasized reducing exposure to kitchen smoke (e.g., by improving ventilation and carrying children less when cooking) and other health promotion strategies (e.g., improving nutrition and immunization status, reducing contact with a sick child, and asking smokers to smoke away from the children).

Authors' Note

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