

CHAPTER I
INTRODUCTION



Background and Rationale

Each year, more than 14 million children die, and 30% of these deaths, or more than 4 million, are due to Acute Respiratory Tract Infection (ARI), most as a result of bacterial pneumonia. The World Health Organization (WHO) developed ARI case management for use in first-level health facilities to distinguish cases of pneumonia from other cases of ARI, to assess its severity and the need for referral to a higher-level health facility, and to make guidelines on giving antibiotic by using simple clinical signs. The clinical signs include tachypnea, cyanosis, inability to feed, and chest indrawing. The respiratory rate thresholds are 60 for infants less than 2 months of age, 50 for infants from 2 to 12 months old, and 40 for children aged 1 to 5 years (WHO, 1990).

The Indonesian National Household Health Survey in 1980 showed that ARI ranked first among the 10 causes of morbidity. Recognizing the magnitude of the problem, the Government of Indonesia has decided to accord high priority for the control of ARI in children to reduce infant and childhood mortality. In 1989, the implementation programme was started in 257 Health Centres. This expanded to 1700 Health Centres in 1992 (Budiarso, 1980; Ministry of Health Republic of Indonesia, 1989).

The usefulness of respiratory rate threshold to identify pneumonia is a critical aspect of the programme. Several factors other than age and presence of lower respiratory tract infection may affect the respiratory rate and its variability. These involve the method of counting (observation, auscultation, or monitor), duration and interval of counting, state of the child (awake, sleeping, feeding, calm or agitated), and gender, as well as associated non-respiratory condition such as fever, acidosis, dehydration, and malnutrition.

Several studies assessing the usefulness of respiratory rate threshold to identify pneumonia have been done. And pneumonia is occasionally diagnosed on clinical rather than radiological evidence. Studies in Papua New Guinea and the Gambia indicated that pneumonia could be diagnosed with high sensitivity and specificity if a child had a respiratory rate > 50 /minute or had chest indrawing (Shann et al., 1984; Campbell et al. 1988). Cherian et al. (1988) studied children in India and suggested that tachypnea should be defined as > 50 /minute in infants, but > 40 /m in children aged 12-35 months. All these studies diagnosed pneumonia on clinical rather than radiological grounds. Two studies in the United States used radiological evidence alone as proof of pneumonia; both concluded that tachypnea was the best predictor of pneumonia, but Leventhal (1982) did not define tachypnea, and Zukin et al. (1986) included only 18 children with pneumonia. Chest physical examination was found to be a sensitive screen for pneumonia in both studies.

Magnitude of ARI Problem in Indonesia.

Based on the 1990 survey, the population is 179.32 million with a growth rate of 3.0 percent per year. Children 0-4 years are 11.7% of the population. The infant mortality rate is 54/1000 live birth, while mortality rate of children 1-4 years old is 10.6/1000 (Ministry of Health Republic of Indonesia, 1992).

A prospective study on mortality conducted in 1982-1983 by the National Institute of Health Research and Development in 1 district in West Java revealed that pneumonia was responsible for 30.2% of deaths among infants and for 29.3% among children 1-4 years of age (Sosroamidjojo, 1984).

A National Household Health Survey in 1986 showed that from all causes of death, the mortality due to ARI was 13.4% in infants and 8.4% in children 1-4 years (Budiarso et al., 1987).

Data from ARI intervention study in West Nusa Tenggara in 1987 showed that infant mortality due to ARI before the intervention started was 28.2%, and in children 1-4 years of age the mortality was 27.9%. After the first year of intervention using the ARI case-management chart developed by the WHO, mortality decreased to 16.4% and 14.5% respectively (Kantor Wilayah Departemen Kesehatan Nusa Tenggara Barat, 1989).

The extent of morbidity is much greater than that of mortality. The National Household Health Survey in 1986 revealed that ARI accounted for 42.4% of total morbidity in infants and 40.6% in children 1-4 years of age (Budiarso et al., 1987).

Reported data from over 5000 Health Centres in 1986 showed that ARI was the leading cause of illness among infants (51%) and in children 1-4 years old (43.1%). Outpatient Department of several hospitals reported 40 - 64.5% of ARI among all paediatric consultations (Ministry of Health Republic of Indonesia, 1989).

Two recent studies showed different results with former studies. Morley et al. (1990) determined the RR in 1007 babies under 6 months old by auscultating the breath sounds or putting a warm hand gently on the baby's naked chest and simultaneously counting the respiratory rate 3 times for 15 seconds and getting the average. He found that the median respiratory rate for awake infants without respiratory illness is 58 breaths/minute with a 10th and 90th centile range of 36-80 breaths/minute. The mean and standard deviation (SD) of respiratory rate for awake infants seen in the hospital and at home is 61 (18) and 61(14) respectively, and 42(12) for sleeping infants. The respiratory rate when awake did not correlate with the presence of serious lower respiratory tract infection or the severity of the baby's illness.

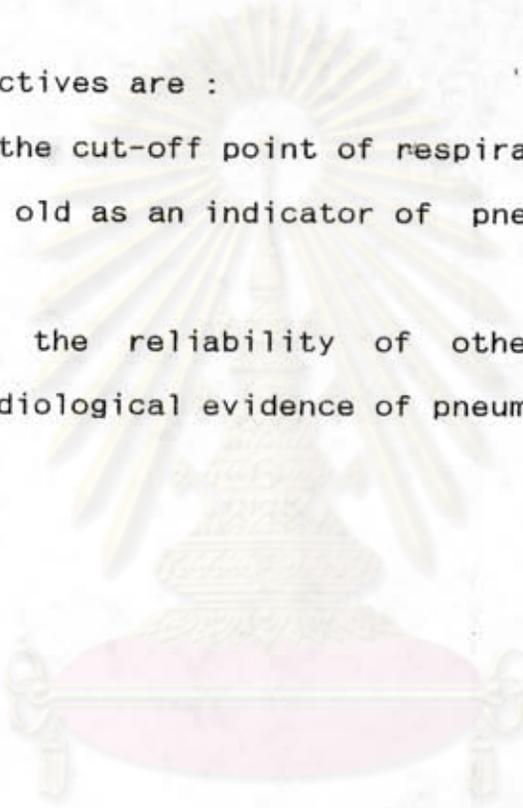
Harari et al. (1991) showed that the presence of either a respiratory rate > 50 /minute or chest indrawing or both signs in children between 8 weeks and 6 years of age was a good indicator of pneumonia with a radiological evidence. A more complex definition, as RR > 40 /minute in children over 12 months old and > 50 /minute in infants, showed little additional benefit.

These studies challenge the WHO definition of tachypnea. Since there was no study in Indonesia defining the threshold of fast breathing among children under 5 years old as a predictor of radiologically confirmed pneumonia, it is deemed appropriate to conduct this study.

OBJECTIVE

The objectives are :

1. To determine the cut-off point of respiratory rate in children under 5 years old as an indicator of pneumonia in a screening test.
2. To determine the reliability of other clinical signs in predicting radiological evidence of pneumonia.



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