Original article

Community trials on case management of acute respiratory infections (ARI) in rural villages

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ABSTRACT A community trial was conducted in two rural subdistricts in Subang, West Java, Indonesia, i.e., Cisalak as the intervention area and Sagalaherang as reference area. The study aimed to evaluate the usefulness new version of case management on acute respiratory tract infections (ARI). All babies born between January and December 1994 were enrolled in the study, and followed for 6 to 12 months. The field workers visited the babies every 2 weeks. They examined the babies and interviewed mothers about ARI symptoms, by using a pretested questionnaire. During that period 969 babies were born, 53.3% in Cisalak and 46.7% in Sagalaherang; 548 of them were followed for 12 months; however, only 263 among them had complete data. The morbidity of ARI increased with increasing age; there was no difference between those two study areas. The prevalence of ARI at the age of less than 3 months was 35.1% and 32.7%; between 4 to 6 months 49.9% and 45.3%; between 7 to 9 months 47.0% and 45.9% ; and between 10 to 12 months 53.7% and 50%, for Cisalak and Sagalaherang, respectively. Nevertheless, the mortality in Sagalaherang was higher than in Cisalak (118 per 1000 and 78 per 1000, respectively), and the pneumonia-related deaths were 64.8% and 52.5%, respectively. The age specific death rate for pneumonia was high among babies of less than 3 months of age, i.e., 68.5% and 57.2%, respectively. We conclude that mothers and primary health care workers in rural areas should be taught and encouraged to use case management of ARI, and monitoring and evaluation of the application is needed. **[Paediatr Indones 2001; 41:260-263]**

Keywords: ARI case management, morbidity, mortality

THE ARI PROGRAM IN INDONESIA WAS STARTED IN 1984, WITH the main aim to decrease the morbidity and mortality due to ARI especially in infant and underfive children. The goal of the program is to reduce the mortality caused by ARI by 33% in the year 2000, from 6 per 1000 underfive children to 4/1000. Since 1990 as all countries, the Indonesian Ministry of Health proposed to adapted the old ARI case management from the WHO, which was classified ARI as mild, moderate and severe ARI. In 1990 the WHO proposed a new ARI case management. This new case management classified ARI according to no pneumonia, pneumonia, and severe pneumonia for children of 2 months to less than 5 years and to no pneumonia and severe pneumonia for baby of less than 2 months.

The National policy on ARI consisted of two steps: (1) eradication activities was done in an integrated manner by placing primary health center as an eradication unit and referral point for the community and the hospital and (2) the eradication activities involve cross sectoral programs and the community and general. The morbidity and mortality of ARI in Indonesia is still high. According to the Household Survey 1992, 25.2% of mortality among infant of less than 1 year of age is caused by ARI.[1] In West Java the infant mortality rate in 1994 was 69.67 per 1000 live birth and 15.82% were caused by pneumonia.[2] The purpose of this study is to determine whether the implementation of ARI case management in rural areas can decrease ARI morbidity and mortality.

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Methods

This was an interventional community trial conducted from 1 January 1994 until 30 June 1995. The study took place in 2 subdistricts in Subang, e.i., Cisalak as the intervention area and Sagalaherang as the reference area; each area comprised 17 villages. All babies who were born between 1 January and 31 December 1994 were enrolled in the study, and followed until July 1995.

Before the study was started 2 cadres (voluntary women trained primary health care) from each village were recruited and trained as field investigators. The training program included technique to examine and count the respiratory rate and how to do interview and fill the questionnaires. For cadres from intervention area training about ARI case management using Department of Health Guidelines was added.

Each subject was visited regularly by cadre, the first visit was within three days after birth, and thereafter every 2 weeks up till 1 year. The cadre examined the baby, counted respiratory rate using ARI timer (UNICEF), measured weight and height, and interviewed mother using pretested questionnaires about several signs and symptoms during the preceding 2 weeks. In the intervention area cadres also applied ARI case management if needed, such as advice the mother to do a home care and to explain when is the best time to refer the sick child.

Results

There were 969 babies born during 1994, 508 (52.4%) in Cisalak and 461 (47.6%) in Sagalaherang. During 18 months 548 babies were followed up for 12 months, however only 263 babies were completely followed (27 observations).

The sex and birth weight distribution is shown in **Table 1**. The sex distribution in those two areas was similar, more baby boys than girls were born. The table also shows that in the intervention area the percentage of low birth weight was 1,5 times higher than in the control area.

ARI morbidity

The cumulative prevalence of ARI during one-year period, in Cisalak was 76.6% and in Sagalaherang was 75.0%. Ten babies in Cisalak and 2 babies from Sagalaherang suffered from pneumonia (2.6% and 0.6 %, respectively). **Table 2** shows that the cumulative prevalence of ARI increased with increasing age. The ARI incidence in Cisalak was 6.4/100 child-weeks and in Sagalaherang was 5.6/100 child-weeks, the difference was statistically significant (X^2: 8.40 ; $p > 0.05$; OR: 1.14).

TABLE 2. PREVALENCE OF ARI ACCORDING TO AGE

Age (months)	Cisalak (%)	Sagalaherang (%)
< 3	35.1	32.7
3-	49.9	45.3
6-	47.0	45.9
9- < 12	53.7	50.0

ARI mortality

During the one-year study 40 babies died in Cisalak and 54 in Sagalaherang. Thus the infant mortality rate (IMR) in Cisalak was 78/1000 and in Sagalaherang was 118/1000. Twenty-one (52.5%) of the death babies in Cisalak and 35 (64.8%) among the death in Sagalaherang were caused by pneumonia related symptoms. This result shows that the pneumonia mortality rate in intervention area was 12.3% higher than in the control area. The highest percentage in those two subdistrict were babies between 42 and less than 90 days (33.3% and 45.7%, respectively). The pneumonia associated mortality rate in Cisalak and Sagalaherang are 41.34/1000 and 75.92/1000, respectively.

The causes of death are listed in **Table 3**. One baby from Cisalak and 8 babies from Sagalaherang died of unclassified cause. The mother explained that their healthy babies were suddenly looked pale with blue spots in the body, usually during night, stopped crying and died. They said that "a ghost licked the baby with its tongue".

Table 4 shows the age distribution of infants died of pneumonia (by WHO classification). It can be seen that the total number of deaths in those two areas

TABLE 1. SEX AND BIRTH WEIGHT DISTRIBUTION (N=969)

Characteristics	Cisalak	Sagalaherang
Sex		
Boys	51.7%	51.3%
Girls	48.3%	48.7%
Birth weight (grams)		
< 2500	5.5%	3.9%
≥ 2500	94.5%	96.1%

were high in infants between 42 days and less than 6 months. The highest percentages in those two sub-districts was babies between 42 and less than 90 days (33.3% and 45.7%, respectively), and infants between 3 to 6 months, i.e., 23.8 and 28.6% respectively.

TABLE 3. CAUSES OF DEATH

Diagnosis	Cisalak		Sagalaherang	
	N	%	N	%
Asphyxia	11	28	2	4
Pneumonia	21	52	35	65
Sepsis	3	8	4	7
Convulsion	0	-	2	4
Sudden death	4	10	1	2
Tetanus neonatorum	0	-	1	2
Stillbirth	0	-	1	2
Unclassified	1	2	8	15

TABLE 4. DISTRIBUTION OF DEATH DUE PNEUMONIA ACCORDING TO AGE

Age	Cisalak		Sagalaherang	
	N	(%)	N	(%)
< 7 days	1	(4.8)	0	-
7 - < 28 days	3	(14.3)	4	(11.4)
29 - < 42 days	1	(4.8)	4	(11.4)
42 - < 90 days	7	(33.3)	16	(45.7)
3 - < 6 months	5	(23.8)	10	(28.6)
6 - < 9 months	3	(14.3)	1	(2.9)
9 - < 12 months	1	(4.8)	0	-

Discussion

Our findings on the cumulative prevalence of ARI in the 2 areas and those who suffered from pneumonia higher compared with studies conducted in Palembang[3] and East Java;[4] as well as with previous study conducted in Cikutra, an urban area in the Municipality of Bandung.[5] The ARI incidence in Cisalak was 6.4/100 child-weeks and in Sagalaherang was 5.6/100 child-weeks, the difference was statistically significant (X^2=8.40; p > 0.05; OR = 1.14). The incidence of ARI in Cisalak is similar to the that of previous study in Cikutra and the other studies conducted in developed[6] as well as in developing ountries.[7] Our study supported the Household Health Survey done by the Indonesian Ministry of Health, that pneumonia is second after perinatal conditions as the cause of death in Indonesian babies.[1]

Twenty-one (52.5%) of death in Cisalak and 35 (64.8%) in Sagalaherang were associated with pneu-

monia. This shows that the pneumonia mortality rate in intervention area was 12.3% higher than in the control area; this was similar to the results of a study conducted in Bangladesh. However, in the Bangladesh study the decrease is higher (28% and 32%, respectively), and statistically significant.[8] In that Bangladesh study the subjects were underfive children. Another study in Haryana, India found that after 2 years implementation of ARI case management the ARI mortality rate in intervention area decreased 26% compared to the control area.[9] The findings show that all studies found that implementation of ARI case management decreased the ARI mortality rate.

The pneumonia associated mortality rate in Cisalak and Sagalaherang were 41.34/1000 and 75.92/1000, respectively. These figures are greater than the mortality rate reported from Phillipines,[10] Pakistan,[11] and Andra Padesh, India.[12] Furthermore, our study showed that pneumonia associated mortality rate in the intervention study was significantly lower compared with that in the control study. This finding is similar with the study conducted in Pakistan[11] where the pneumonia mortality rate in controlled area almost 2.5 times higher compared with that in the control area (14.4/000 and 6.3/ 1000, respectively).

One baby from Cisalak and 8 babies from Sagalaherang died of unknown cause. The mother explained that their healthy babies suddenly looked pale with blue spots in the body, usually during night, stopped crying and then died. They said that "a ghost licked the baby with its tongue". The causes of those death are not easy to diagnosed by verbal autopsy; a sudden infant death syndrome (SIDS) was a possibility. Further study is needed to prove the cause of such deaths in rural communities.

We have shown that pneumonia was the main cause of infant's death in both areas. The pneumonia age specific death rate was high in babies of less than 3 months (57.2% and 68.5%, respectively), especially among the age between 42 - < 90 days.

We conclude that the implementation a good ARI case management, routine monitoring and evaluation cannot decrease morbidity but may reduce death due to pneumonia. The role of mothers, family and cadres for ARI case management implementation is of paramount importance.

Acknowledgments

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