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The Modeling of Acute Respiratory Tract Infections (Rti) On Children 6-12 Months with Multinomial Logit Approach

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ABSTRACT

Acute (RTI) is a disease that most votes suffered by children both in develop countries and developed countries and have been able to and many of them need to go to the hospital because of the disease just emergency. Acute (RTI) is still an important health problem because the cause of the death of infants and children under five are quite high which is about 1 out of 4 death that happens. The purpose of this research examines the factors that affect the frequency of occurrenceAcute(RTI) on children 6-12 months with multinomial regression approach. The results of the study showed that the frequency of occurrence Acute(RTI) on children 6-12 months more often occurs in children who are not given breast milk, breast feeding partially or a predominan, on children with low birth weight /BBLR (< 2500 grams), on children who live with ≥ from 2, on children who get MPASI at age ≤ 6 months, on children with the status of immunization is not complete. Children are given breast milk partially suffered Acute(RTI) frequency with often and rarely higher compared with breast feeding by exclusion. The education level of the mother, shelter house, passive smoker status is not related to the frequency of OccurrenceAcute(RTI). In this research also in the get 62,2%-educated provides exclusive breast milk to her baby. Besides the dissemination of health officials about exclusive breastfeeding can also increase the knowledge of the mother about exclusive breastfeeding.

KEYWORDS: ACUTE (RTI), Multinomial Logit, Patterns Breast Feeding

1. INTRODUCTION

Acute (RTI) is one of the most common cause of death in children in developing countries. This acute respiratory tract infection cause 4 from 15 million expected death in children under the age of 5 years on each year and as many as two thirds of the death occurred on the baby in Indonesia is a disease that often occurs in children. Episodes of disease cough runny nose on infants in Indonesia are estimated to be 3 to 6 times per year [1]. Each year 40% - 60% from the visit in the Clinic is the disease patients Acute (RTI). All the death of infants, the proportion of deaths caused by Acute (RTI) is reached 20 - 30% [2]. According to [3], in East Java data overall pneumonia disease of 114.858, with the number of children under five patients with pneumonia receiving reported in East Java in 2006 as much as 98.050, which can be handled 93.215 (95.07%), compared to the year 2005 happened increase where the number of patients with pneumonia receiving on infants in the year 2005 of 89.410, get the handling of 62.629 (70.05%), however the percentage of infants who handled almost reach the target that has been determined namely reach 100% all patients, while diarrhea based on a report that recorded by means of the ministry of health of the government including in big ten existing disease [4]. From the data in the can from the working area of the clinic *Balong Panggang Gresik* obtained that the number of Acute (RTI) in baby aged 0-12 months on 2010 namely 694 cases. While the target of breast feeding on child age 0-6 months that currently only reach 32.44 % from target 80 %. Based on the result of observation and interview with health officials in the Clinic *Balong Panggang*, that communities *Balong Panggang* until this time is still difficult to get clean water to meet the needs of the water every day [4].

Acute (RTI) is a disease that most votes suffered by children both in developed and in progress and have been able to and many of them need to go to the hospital because of the disease just emergency [5]. According to [6], factors risk for acute (RTI) in infant age 0-4 months is birth weight (BBL), nutritional status, breast feeding, education mother, density shelter, state of ventilation smoke burning, smoke and the layout of the kitchen. Diseases of the respiratory tract on the infants and children can also give defect until on adulthood where found there is a relationship with the chronic obstructive pulmonary disease. Acute (RTI) is still an important health problem because the cause of the death of infants and children under five are quite high which is about 1 out of 4 death [7]. Each child is expected to experience 3-6 episodes Acute (RTI) each year. 40 % -60 % from the visit in the clinic is by disease Acute (RTI) [8]. Of all deaths caused by Acute (RTI) includes 20 % -30%. The death of the greatest general is due to pneumonia and on the old baby less than 2 months. Until this time the mortality Acute (RTI) that weight is still very high. Death is often caused because the patients come for treatment in severe condition and often accompanied by the complications of the complications and less nutrition [9].

Bad Breast feeding in Indonesia, limited food supplies in the household levels and limited access infants sick toward quality health services cause 5 million children suffered malnourished [10]. Especially in view of the still high number of

Acute (RTI)in Indonesian, especially in East Java [11]. Many prevention efforts to prevent the death of children under the age of five is shown that breast feeding is the most way to can decrease the death of children under the age of five but the scope of exclusive breastfeeding is still low [12].

The region Clinic *Balong Panggang Gresik* with geographically low land that is prone to the dangers of the flood because adjacent to the times Lamongan and Bengawan Solo River, besides that this region is difficult to get water sources. Moreover with the scope of exclusive breastfeeding is very low and the habit of society in providing MP-Breast Milk early on her baby [13]. This situation can be a risk factor for Acute (RTI). Based on that, this research examines the factors that affect the frequency of Occurrence Acute (RTI) on children 6-12 months based on the pattern of breastfeeding with on the Clinic *Balong Panggang Gresik* with multinomial regression approach.

2. METHODOLOGY

The type of the instrument that is done is the type of research analytically cohort studies [14]. The building blocks of this research is to cross-sectional. The sample in this research is the mother who has children aged 6-12 months dwelling place in the region of the puskesmas Balong Panggang Gresik, where the subject of this research must meet the criteria of inclusion and exclusion with the method Stratified Random Sampling [14] based on the pattern of breastfeeding.

The framework of the concept of the Occurrence Acute (RTI) finances on the following image.
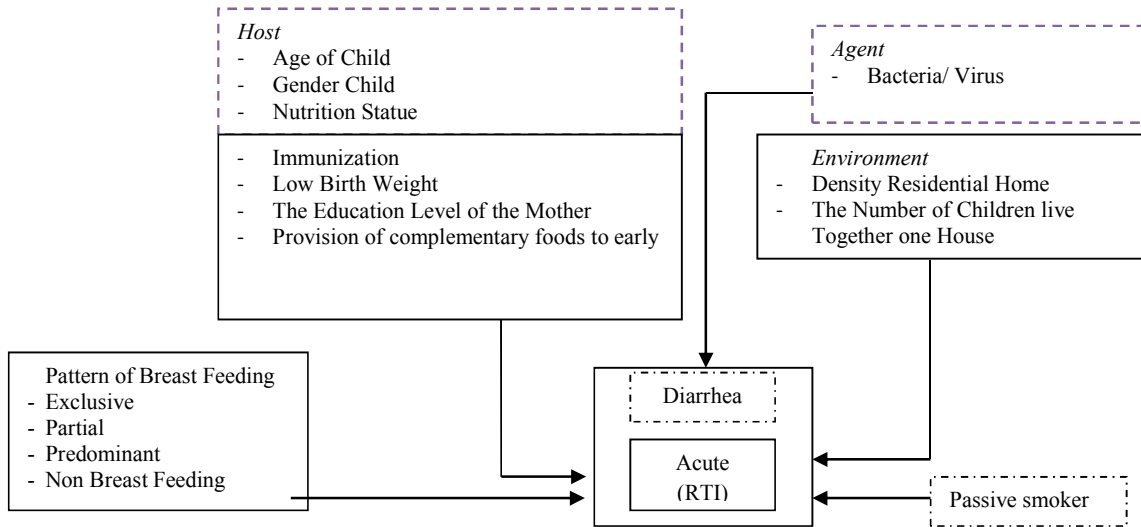

Figure 1 Conceptual Framework Application research Theory L, Green (Notoatmodjo, 2010) [11][13]

Analysis Techniques used logistic regression multinomial, namely dependent variables have a scale or multinomial polichotomous [15]. According to [15][16], regression model with nominal scale dependent variables three categories there coding is 0, 1 and 2. The variables Y standardized parameter become two logit function. Generally used Y=0 as comparison to form the logit function, will than Y=1 and Y=2, against Y=0. The form of logistic regression model with p variables predictors such as on the common.

$$\pi(x) = \frac{\exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p)}{1 + \exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p)}$$

Using logit transformation will be obtained two logit function as follows [15]:

$$G_1(x) = \ln\left[\frac{P(Y=1|x)}{P(Y=0|x)}\right] = \beta_{10} + \beta_{11} x_1 + \beta_{12} x_2 + \ldots\ldots + \beta_{1p} x_p = x^T \beta_1$$

$$G_2(x) = \ln\left[\frac{P(Y=2|x)}{P(Y=0|x)}\right] = \beta_{20} + \beta_{21} x_1 + \beta_{22} x_2 + \ldots\ldots + \beta_{2p} x_p = x^T$$

$$\beta_2$$

Based on both the logit function then obtained trichotomous logistic regression model as follows [15]

$$\pi_0(x) = \frac{1}{1 + \exp g_1(x) + \exp g_2(x)}$$

$$\pi_1(x) = \frac{\exp g_1(x)}{1 + \exp g_1(x) + \exp g_2(x)}$$

$$\pi_2(x) = \frac{\exp g_2(x)}{1 + \exp g_1(x) + \exp g_2(x)}$$

With $P(Y=j \mid x) = \pi_j(x)$ to j=0,1,2.

Maximum Likelihood Estimation (MLE) with Newton Raphson iteration parameter to estimate β. The resulting estimator is consistent and efficient estimator for a large sample size. To test the suitability of logistic regression and assess whether one or more independent variables that have not been entered into the model has an important role in the model used Pearson Chi-Square Test [15].

The value of the odds ratio is ψ used to show the tendency of a relationship variables X (predictors) against the variables Y (response). The interpretation of the odds ratio in the results of multinomial, assume that Y = 0 is the value of the control. Odds ratio result Y = j versus the results of Y = 0 to the value of covariate x=a versus x = b is [15]

$$OR_j(a,b) = \frac{P(Y = j|x = a)/P(Y = 0|x = a)}{P(Y = j|x = b)/(P(Y = 0|x = b)}$$

3. RESULTS AND DISCUSSION

Variable frequency distribution research, namely breast feeding, birth weight, the number of children under five in the family, status MPASI, education mother, mother economic social status, status of shelter house, passive smoker status, the status of the child immunization and the frequency of Occurrence Acute (RTI) presented in the following table.

Table 1. Research Variable Frequency Distribution

| | The frequency of Occurrence Acute (RTI) | | | | | | Total |
| Independent variables | Often | | Rarely | | Never | | |
	f	%	f	%	f	%	f
The pattern of breastfeeding							
Non Breast Milk	27	84.40	5	15.60	0	0.00	32
Partial	49	87.50	7	12.50	0	0.00	56
Predominan	1	3.60	23	82.10	4	14.30	28
Exclusive	0	0.00	2	5.40	35	94.60	37
Birth weight							
BBLR	30	66.67	10	22.22	5	11.10	45
BBLN	47	43.52	27	25.00	34	31.50	108
The number of infants							
> 2	56	65.12	17	19.77	13	15.10	86
< 2	21	31.34	20	29.85	26	38.80	67
MPASI < 6 month							
Yes	76	76.77	23	23.23	0	0.00	99
Not	1	1.85	14	25.93	39	72.20	54
Social Economy							
Less	61	56.48	27	25.00	20	18.50	108
Enough	16	25.40	10	15.87	37	58.70	63
Education							
Low	58	57.43	27	26.73	16	15.80	101
High	19	36.54	10	19.23	23	44.20	52
Home Shelter							
Crowded	74	80.43	14	15.22	4	4.35	92
According	3	4.918	23	37.70	35	57.40	61
Passive smoker							
No	67	78.82	15	17.65	3	3.53	85
Not	10	14.71	22	32.35	36	52.90	68
Immunization							
Incomplete	28	71.79	8	20.51	3	7.69	39
Complete	49	42.98	29	25.44	36	31.60	114

Table 1 shows that children who have low birth weight ($\leq$ 2500 grams) more often experienced Acute(RTI) (66.67%), low birth weight is 43,52 % experiencing Acute(RTI) frequency with often. The subject of the research stay together with maximum $\geq$ 2 infants more often experienced Acute(RTI) (65,12%), who lived together with less than 2 infants no 31,34% experiencing Acute(RTI) frequency with often. The subject of the research that has been getting MPASI $\leq$ 6 month more often suffer from OccurrenceAcute(RTI) (76,77%) compared with the frequency of rare or never experienced Acute(RTI). The subjects that have a low economic social status (< Rp1.133.000,-) more experienced Acute(RTI) frequency with which often

(56,48%) compared with the frequency of rare or never experienced Acute(RTI), while the status of the social economy which is enough (>Rp1.133.000,-) is 25.4% that attack Acute(RTI) frequency with often.

Children who have a mother with a low level of education the more experienced Acute(RTI) frequency with which often (57,43%) compared to attack Acute(RTI) frequency with rarely or never, mother with high level of education of mother is 36.54% experiencing Acute(RTI) frequency with often. Children who live in the shelter status more solid experience Acute(RTI) frequency with which often (80,43%) compared to attack Acute(RTI) frequency with rarely or never, and children who live with the appropriate house shelter is 4.91 % experiencing Acute(RTI) frequency with often. Children with passive smoker status of the more experienced Acute(RTI) frequency with which often (78,82%) compared to attack acute (RTI) frequency with rarely or never, and children with the status of not passive smoker no 14.71 percent experiencing Acute(RTI) frequency with often. Children with the status of immunization is not complete the more experienced Acute(RTI) frequency with which often (71,79%) compared to attack Acute(RTI) frequency with rarely or never, while the children with a complete immunization status is 42,98% experiencing Acute(RTI) frequency with often.

The influence of the variables the pattern of breastfeeding, birth weight, the number of infants, giving MPASI, socio-economic status, education mother, status of shelter house, passive smoker status, the status of the child immunization with occurrenceAcute(RTI) done with multinomial regression method both univariate and simultaneously. Analysis by univariate presented in the following table.

Table 2. The value of the p-value on the Test by Univariate

Independent variables	P value
1. The pattern of breastfeeding	0.000
2. Birth weight	0.009
3. The number of infants	0.000
4. MPASI< 6 months	0.001
5. Mothers Education	0.001
6. Social Economy	0.009
7. Home Shelter	0.000
8. Passive smoker	0.000
9. Immunization Status	0.002

Table 2 on the selection of univariate not obtained the variables with p value > 0.05 so that all variables can be included in the multinomial logistic regression modeling simultaneously. Follows the test result based on the value of the p-value presented in table 3.

Table 3 shows that from the 9 variables which are thought to be related to the frequency of Occurrence Acute (RTI) actually there are only four significantly by statistic with $\alpha = 0.1$ That is the pattern of breastfeeding, the number of infants, MPASI < 6 month old as well as the status of child immunization. Breast feeding patterns in children who are not given breast milk at the frequency of OccurrenceAcute(RTI) that only rarely Odds Ratio (OR) = 267.640 means that children who are not given breast milk will attack Acute(RTI) with rare frequency of 267 times higher than in children who were given breast milk exclusively. Analysts results in the variable giving MPASI $\leq$ 6 months in children with occurrenceAcute(RTI) which often shows p=0,000 with OR= $2x10^{11}$ means the frequency of OccurrenceAcute(RTI) often on children with the gift of MPASI $\leq$ 6 month of $2x10^{11}$ times higher compared with the gift of Acute> 6 months. Analysts results in the variable status of immunization is not complete in children with occurrenceAcute(RTI) which often shows p=0,059 shows the results are not significant OR= 473,998 means the frequency of OccurrenceAcute(RTI) which often in children with incomplete immunization status at risk of 473,998 times compared with the complete immunization status. While the status of immunization is not complete in children with occurrenceAcute(RTI) which rarely shows p=0,028 with OR=1085,769 means the frequency of OccurrenceAcute(RTI) is rare in children with incomplete immunization status at risk of CA. 1085 times higher compared with the complete immunization state. From the above model can be explained that the feeding patterns of breast milk most of the influence of the frequency of Occurrence Acute(RTI) on children age 6-12 months in the clinic Toasted *Balong Panggang Gresik*. The results of the analysis on the birth weight of children, the number of children under five in the family, education mother, socio-economic status, density shelter house, the status of such secondhand children with double logistic regression model all get the value p = > 0.05 so that the six variables said that there are no significant influence on Occurrence diarrhea. In the variable birth weight children, socio-economic status, passive smoker status children are statistically no significant influence but OR >1 means in the variable is also a risky frequency of Occurrence Acute(RTI) on children age 6-12 months in the clinic *Balong Panggang Gresik*.

Table 3. The value of the p-value and Prevalence Risk Simultaneously

The frequency of Occurrence Acute (RTI)	The variables Predictors	Estimator	P value	Prevalence of risk
The pattern of breastfeeding				
Often	Non Breast Milk	21.958	0.998	3×10^{10}
	Partial	35.877	0.997	4×10^{15}
	Predominan	18.835	0.998	2×10^{8}
Rarely	Non Breast Milk	5.590	0.000	267,640
	Partial	18.539	0,997	1×10^{8}
	Predominan	5.752	0,002	314,969
Birth Weight				
Often	BBLR	1.082	0.530	2.951
Rarely	BBLR	0.700	0.656	2.013
The number of infants				
Often	> 2	-2.892	0.146	0.055
Rarely	> 2	1.857	0.098	0.046
MPASI < 6 month				
Often	Yes	25.858	0.000	2x1011
Rarely	Yes	24.606	0.000	5x1010
Education				
Often	Low	-0.453	0.797	0.636
Rarely	Low	-1.037	0.518	0.355
Social Economy				
Often	Less	0.160	0.924	1.174
Rarely	Less	1.364	0.311	3.912
Home Shelter				
Often	Crowded	-4.455	0.470	0.012
Rarely	Crowded	-7.128	0.238	0.001
Passive smoker				
Often	No	5.241	0.250	188.866
Rarely	No	3.483	0.437	32.572
Immunization Status				
Often	Yes	6.161	0,059	473,998
Rarely	Yes	6.990	0,028	1085,769

4.   CONCLUSION

The results of the study showed that the frequency of OccurrenceAcute(RTI) on children 6-12 months more often occurs in children who are not given breast milk, breast feeding partially or a predominant, on children with low birth weight (LBW) (< 2500 g), on children who live with $\geq$ from 2, on children who get MPASI at age $\leq$ 6 months, on children with the status of immunization is not complete. Children are given breast milk partially suffered Acute(RTI) frequency with often and rarely higher compared with breast feeding by exclusion. The education level of the mother, shelter house, passive smoker status is not related to the frequency of OccurrenceAcute(RTI). In this research also in the get 62,2%-educated provides exclusive breast milk to her baby. Besides the dissemination of health officials about exclusive breastfeeding can also increase the knowledge of the mother about exclusive breastfeeding.

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