



## The Identification of Factors Causing Acute Respiratory Infection (ARI) of Under-Fives in Community Health Center Work Area in North Jayapura Sub-District

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### Abstract

Acute Respiratory Infection (ARI) is an acute infection of the upper and lower respiratory tract of organs. This infection is caused by the virus, fungi, and bacteria that begin with fever and one or more symptoms such as throat pain, difficulty swallowing, flu, and wet or dry cough. Riskesdas (Basic Health Research) categorizes Papua province in five highest areas with the infectious disease of air such as ARI and Pneumonia. Based on the annual data of Jayapura Public Health office of disease prevention and control sector reported that ARI was included in ten highest types of infectious diseases in Jayapura city suffered by under-fives. This research aimed to identify the factors caused by the IRA in the Community Health Center work area in North Jayapura Sub-district, Jayapura City, Papua Province. A descriptive quantitative method with cross-sectional research design was used in this study. Sample of 100 under-fives in the Community Health Center of North Jayapura Sub-district were selected for this study. The technique was purposive sampling and the data collections were questionnaires and observation (done in the respondent's houses). The results showed that the causes of ARI were from the under-fives, family, and environment. Smoking behavior of family is the biggest causative factor of ARI.

**Keywords:** Causative Factors, IRA, Under-Fives

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### 1 Introduction

Acute Respiratory Infection (ARI) is an acute infection of the upper and lower

respiratory tract of organs. This infection is caused by viruses, fungi, and bacteria begun by fever and symptoms such as sore throat, difficulty swallowing, flu, and wet or dry cough.

The rates of morbidity and mortality are quite high, especially for under-fives. World Health Organization (WHO) says that the IRA is one of the most common causes of death in developing countries. It is estimated the death of under-fives reach 4 million from 15 million. In 2014, the number of cases was around 20-30% and in 2015 increased to 63.45% [1].

The factors of IRA are caused by the lack of knowledge of mothers on how to take care of their under-fives, non-exclusive breastfeeding, cigarette smoke, and the physical condition of the house because of low family income. Moreover, The IRA cases to the under-fives are caused by two intrinsic factors (sex, age, birth weight, immunization status, nutritional status, and breastfeeding status and extrinsic (house area, air ventilation or lighting, room temperature, source of smoke, smoking history, the number of families, and family history of respiratory illnesses [2].

The basic health research categorizes Papua province in the five highest infectious diseases of air such as IRA and Pneumonia. The Period Prevalence of the five highest provinces is East Nusa Tenggara 41,70%, Papua 31,10%, Aceh 30,00%, West Nusa Tenggara 28,30%, and East Java 28,30%. According to the Research and Development of Health ministry of the Republic of Indonesia, the prevalence of IRA is based on the diagnose of health workers. It is found that symptoms of IRA were decreasing in the provinces in 2018. Papua 31,10% in 2013 decreased around 10-15%, but it was still in the second position as the highest IRA case after East Nusa Tenggara [3].

Based on the annual reports of Jayapura health office, preventions and control sector (P2P), IRA is included into ten types of the highest infectious diseases in Jayapura diseases suffered by under-fives. The number of the residents in Community Health Center in North Jayapura is 48.985 people with 4.899 children under-fives. There are 6.991 cough and 6.387 IRA cases. The number of people in the Imbi community health center is 11065 with 1107 under-fives, and 656 cough and 612 IRA cases. Also, 16007 people in the community health center in Tanjung Ria with 1601 under-fives, 2740 cough cases, and 2467 IRA cases. The researcher decided to research to identify the causative factors of IRA in community health

centers (Imbi and Tanjung Ria), and north Jayapura because the increase of IRA cases increasing to under-five in the community health center of north Jayapura.

## 2 Materials and Methods

This research used descriptive quantitative and cross-sectional research design to identify the causative factors of IRA disease to under-fives in the Community Health Center in North Jayapura Sub-district. The research was done in three locations of community health centers: north Jayapura sub-district and Jayapura city (Imbi and Tanjung Ria). The research was done from June to August 2019. Under-fives (0-5 years old) were the subjects of this research who suffered from the IRA. The data collection technique used questionnaires and observation. The questionnaires were used to seek data related to characteristics of under-fives, family, and environment by asking questions to their parents. The observation was also used by going to each house of parents or families who had agreed about the research.

The research characteristics of under-fives (initials, age, sex, birth weight, immunization status, and exclusive breastfeeding status), Parents (parents' initial, age, latest education, occupation, and income), and environment (number of a family member in a house, smoking history, family history of diseases of respiratory problems, house area, ventilation, room temperature, and other sources of smoke). The measuring instrument used in this study was the Hygrometer (measure the temperature and room humidity of the family's house), Luxmeter (measure the amount of light intensity in the respondent's houses), and Rollmeter (measure the area of a house based on SNI03-173). The minimum area of four adults is 36m<sup>2</sup> or 9m<sup>2</sup> / person. After the observation was done, the results of the research were presented in the form of numerical data and it was analyzed using descriptive analysis and univariate statistics including mean, median, and mode.

## 3 Results and Discussion

Based on the research done in the Community Health Center of North Jayapura

sub-district, 100 toddlers were researched and they were divided into 40 IRA under-fives from Imbi, 35 IRA from north Jayapura, and 25 IRA from Tanjung Ria. Factors caused by IRA were identified through characteristics: under-fives (initials, age, sex, birth weight, immunization status, and exclusive breastfeeding status). The parents (parents' initials, age, latest education, occupation, and income). Environment (the number of families in the houses, smoking history, family history of diseases of respiratory problems, house area, ventilation, room temperature, and other sources of smoke). The results of this research are shown through the tables 1.

Table 1. Frequency distribution based on the characteristics of under-fives

Characteristics of Under-fives	Frequency	Percentage (%)
Age (months)	0 - 12	25
	13 - 36	38
	37 - 60	37
Sex	Male	51
	Female	49
Birth weight	Birth weight	3
	No birth weight	97
Immunization status	Complete	97
	Incomplete	3
Breastfeeding exclusive	Exclusive	93
	Non-exclusive	7
Total	100	100.0

Based on the research results of table 1, most of the under-fives (13-36 months) suffered from the IRA because they have infected and contacted with the environment and the other sufferers. It also found that most males were easy to get IRA than the females because of behavior differences and environment between them. The males spent more time outside of the house so that it risked them to interact with others [4].

The result of the identification of low birth weight of under-fives 3% had IRA because of incomplete anti-immune substances, maturation of organs, and other organs that have not been complete yet. It causes under-fives to get complications and infection easily. Thus research also found that 97% of normal birth weight suffered IRA because of family or environmental factors [5].

The results of under-fives of immunization status are found incomplete basic immunization

3% and basic immunization 97%. The toddlers who got complete immunization, their parents must maintain the food intake and have healthy environmental conditions. The other factors were the under-fives themselves, family history of the disease, and unhealthy environment. When their immune system is weak, the infection easily attacks their bodies. By giving complete basic immunization, it helps them to protect themselves from dangerous diseases because it stimulates their immunity so that they can be protected. When they have incomplete immunization (not measles immunization), they will have a high risk of 1,6 times suffer from respiratory disorders than the complete immunization status [6].

Table 2. Frequency distribution based on family characteristics of toddlers

Family characteristic	Frequency	Percentage (%)
Age of Father (years)	18 - 25	10
	26 - 35	45
	36 - 45	33
	>45	12
Education of Father	ES	7
	JHS	12
	SHS	73
	Associate Degree	2
	Bachelor	6
Occupation of Father	Civil Servant	9
	INAF/IP	7
	Private worker	67
	Entrepreneur	3
	Farmer	2
	Fisherman	9
	other	3
Age of Mother (Years)	18 - 25	23
	26 - 35	40
	36 - 45	33
	>45	4
Education of Mother	ES	13
	JHS	25
	SHS	49
	Associate Degree	3
	Bachelor	10
Occupation of Mother	Civil Servant	13
	INAF/IP	1
	Private worker	4
	Housewives	82
Family income	Low	29
	Medium	38
	High	33
Number of family	= 3 people	17
	>3 people	83
Smoking history	Yes	85
	No	15
Respiratory disorder	Yes	12
	No	88
Total	100	100.0

The results of non-exclusive breastfeeding status to IRA under-five was 7%. Even though the percentage is low but breastfeeding is important to maintain the immune system of the under-fives. Exclusive breastfeeding helps to protect them from allergies and maintain their health optimally. It against many kinds of diseases especially for respiratory disorders that contains immune substances to be able to protect them from infections of bacteria, virus, fungi, and parasite [6].

The results of IRA disease based on the characteristics of parents such as education, occupation, and income of parents influenced the health condition of under-fives. The results of this research are strengthened research done by Mahendra & Farapati in 2018 The Relationship Between the Physical Condition of the House and Upper Respiratory Tract Infection in Toddlers in Surabaya. It was found that the age, jobs, and income of parents influence the under-fives' health [2].

Based on the results of environment observation, it is found that families lived in the same house >3 people were 83%. The under-fives lived with parents in boarding houses of 3 to 5 people in a room. Besides, there were two generations of families who lived in a house of 6 to 10 and even 20 people. The number of people did not meet the standards >9m<sup>2</sup> and it influences the health of the children if someone suffers IRA [7].

The results of the identification of the cause of IRA disease toward family smoking behavior became the main cause of the IRA. 85% of families of the under-fives especially the fathers were active smokers. Their smoking habit made their children indirectly became passive smokers because they breathed cigarette smoke that contains hazardous materials. Passive smokers have a greater risk than active smokers, especially the children who are susceptible to exposure to cigarette smoke because their immune system is still weak. The results of this study are strengthened by the research conducted by Tazinya et al. (2018) in a Kamerun hospital compared to the smoking and nonsmoking families. The active smoker families were more likely to spread ARI than non-smokers. A research conducted by Lebuan & Somia, (2017) found that family members who smoke in the room had a great influence of

ARI disease to the children. A research conducted by Ahyanti & Duarsa, (2016) to pada Health Polytechnic student of the Ministry of Health, Tanjungkarang to the IRA patients showed the relation between smoking and IRA were exist [8] [9] [10].

Family smoking history of respiratory disorder such as Tuberculosis, Pneumonia, and IRA that can be transmitted the disease to under-fives. The results were in line research conducted by Dongky & Kadrianti, (2016) Mawardi, (2014) about Relationship between Physical Conditions of Houses and Occupancy Density of Pulmonary TB in community health center Dadahup, Dadahup sub-district, Kapuas distric in 2014 [11] [12].

Table 3 Frequency distribution based on environmental characteristics of under-fives

Characteristics of the environment		Frequency	Percentage (%)
House area	>8mm <sup>2</sup> (MS)	72	72.0
	<8mm <sup>2</sup> (NMS)	28	28.0
Lighting / Ventilation	MS	75	75.0
	NMS	25	25.0
Room temperature	MS	76	76.0
	NMS	24	24.0
Sources of smoke	Landfills smoke	1	1.0
	No smoke	81	81.0
	Firewood smoke	18	18.0
	Industrial waste	0	0.0
Total		100	100.0

\*MS = Meet the standards, NMS = not meet the standards \*, \*\*TPA = Landfills\*

The environment determines the spread of the IRA to the toddlers. The house area should meet the standard of SNI 03-173 with 4 adults 36m<sup>2</sup> or 9m<sup>2</sup>/ person. But, it did not meet the standard of 28%. A bedroom cannot be used more than 2 people except toddlers even though this research met the standard 72% of the house area but the toddlers still had IRA because of the environment and family factor [13].

Ventilation is an effort to have a good atmosphere to make people healthy. In general, home ventilation assessment can be compared between ventilation area and floor area of the house by using Rollmeter. The area of the house meets the requirements is 10-20% from floor

area and lighting meet standards with a minimum intensity of  $\geq 60$  lux. Based on the results of the research, the number of respondent's houses ventilation did not meet the requirements because the percentage was 25% even though it was in a small amount. However, the family should pay attention to the surrounding environment include ventilation to get sufficient light and oxygen level. The house conditions will not be humid. Poor ventilation is caused by a lack of light and a decrease in oxygen levels. Thus affecting toddlers and families of respiratory problems such as ARI, pneumonia, and tuberculosis [7].

According to Jayapura City Health Profile data, the average temperature in Jayapura City is around 30 °C, a minimum of 29 °C, and a maximum of 31.8 °C. Based on the results, the room temperature did not meet the standards 24% and it caused the IRA for under-fives. The increase in temperature room was caused by expelling body heat to increase humidity due to moisture from the inhalation. Room temperature is closely related to the density of occupancy, the more residents in the house, the free oxygen level in the room decreases  $<20.7\%$  and increased the free CO<sub>2</sub>  $> 0.04\%$  so that the immune system of people is decreasing. A narrow room will make out of breath and easily [14].

The last factor is the source of the smoke. It is found that 18% of traditional cooking from wood. The children suffered from the IRA because of the furnace adjacent to the bedrooms or inside the house. Each house should have kitchen smoke vents because when they are cooking, there will be a combustion process. When the wood is burnt, the charcoal contained in wood reacts to oxygen and turns into carbon dioxide if the combustion is successful. But, if it is not successful, it will cause a lot of smoke. This research is the same as Fahimah et al, (2014) in south Cimahi community health center and Leuwi Gajah Cimahi City. The results showed that there is a relationship between kitchen smoke holes of respiratory problems in toddlers. The result also supported by Hugo et al, 2014 stated that the presence of kitchen smoke is a disturbing factor and is one of the causes of ARI in toddlers [15] [16].

#### 4 Conclusions

The factors that cause IRA to under-fives in three work areas of the community health center of the Jayapura sub-district were the characteristics of the under-fives, family, and environment. The main cause factor was smoking behavior in the family. These factors can be prevented by having an awareness in the family about the danger of smoking for themselves or the environment. Socialization about health education and environmental modification should be done to create a child-friendly, clean, and healthy life.

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#### 6 Conflicts of Interest

The authors declare no conflict of interest.

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