E-ISSN: 3025-6437
International Health Sciences Journal
Vol. 1, Issue 1 (2023), June

Factors Related to Acute Respiratory Infection Among Toddlers

Sanches Evi Durimalang[1], Shinta Novelia[1]*, Rukmaini[1], Maudy Lila Kartika[2], Amrita Shrestha[3]

[1] Midwifery Undergraduate Program, Faculty of Health Sciences, Nasional University, Indonesia

[2]Master of Midwifery Department, Faculty of Medicine, Padjadjaran University, Indonesia
[3]Prince of Songkla University, Thailand

Submission: 17-01-2023; Accepted: 24-03-2023; Published: 30-06-2023

Abstract

Background: Acute Respiratory Infection (ARI) is the main cause of child morbidity and mortality in the world. ISPA disease is the first most common disease experienced by the group of toddlers at the Menteng District Health Center at the MTBS poly.
Objective: to determine the factors associated with the incidence of ARI in toddlers at the Menteng District Health Center, Central Jakarta in 2017.
Methodology: This type of research is an analytic survey with a cross-sectional design. The population in this study were all mothers of toddlers who visited the MTBS polyclinic at the Menteng District Health Center with a total sample of 83 respondents who were taken by accidental sampling technique. Data collection was carried out using a questionnaire, observation of KMS (Health Card) and medical records. Univariate and bivariate data analysis using the chi square statistical test with a confidence level of 95% ($\alpha = 0.05$).
Results: The study showed that there was a relationship between nutritional status (p=0.030) and mother's knowledge (p-value 0.021) with the incidence of ARI in toddlers. Meanwhile, the variables of immunization status (p=0.120), exclusive breastfeeding (p=1) and mother's education (p=0.401) did not have a significant relationship with the incidence of ARI in toddlers.
Conclusion: There is a significant relationship between the nutritional status of under-nourished toddlers and the low knowledge of toddler mothers and the incidence of ARI in toddlers at the Menteng District Health Center, Central Jakarta in 2017. It is recommended that medical staff on duty at the Menteng District Health Center be able to provide counseling to the public regarding the importance of paying attention to the nutritional status of toddlers, as well as providing education about ARI to the public, especially all mothers of children under five.

Keywords: ARI, Toddlers, Mother's knowledge, Nutritional status.

**Correspondence: Shinta Novelia, Midiwifery Undergraduate Program, Faculty of Health Sciences, Nasional University, Jakarta, Indonesia, email: shinta.novelia@civitas.unas.ac.id*

Introduction

Acute Respiratory Infection (ARI) is a major cause of morbidity and mortality from infectious diseases in the world with a mortality rate of ARI worldwide reaching 4.25 million each year[1]. Acute Respiratory Infection is an acute infectious process that lasts for 14 days, caused by microorganisms and attacks one or more parts of the airways from the nose to the alveoli and the surrounding organs such as the sinuses, ear cavities, and pleura[2]. The World Health Organization (WHO) predicts that the incidence of ARI in developed countries is around 5 million people or 0.05%, while in developing countries it reaches 151 million people or 0.29%[3] aged 12-59 months with a prevalence of 25.8%[4]. The incidence of ARI in Indonesia causes 15 million deaths every year under the age of 5 years[5].

The incidence of ARI in toddlers can provide a more severe and worse clinical picture, because generally the incidence of ARI in toddlers is the first infection event in the life cycle and in conditions that have not optimally formed the immune system in the toddler's body when compared to adults. This situation explains that ARI can attack the host if the body's resistance decreases. Toddlers are a group that has an immune system that is still susceptible to various diseases[6]. Death in patients with ARI occurs if the disease has reached the degree of severe ARI or the infection has reached the lungs, if the disease has spread to the lungs and the child does not receive treatment and proper treatment, then the child can die[7]. One of the health indicators is the toddlers Mortality Rate (*AKABA*), Dinas DKI Jakarta Province Health in 2015 reported that there were 136 toddlers who died before reaching the age of 5 years or 0.95 per 1,000 live births[8]. Characteristics of the population with the highest incidence of ARI occurring in the 1-4 year age group, namely 25.8%[9].

The incidence of ARI in toddlers is influenced by many factors, both directly and indirectly. Several factors cause the high incidence of ARI in toddlers, which intrinsic factors and extrinsic factors. Intrinsic factors include age, gender, nutritional status, exclusive breastfeeding status, immunization status. Extrinsic factors include the physical condition of the home environment, including occupancy density, air pollution, type of house, ventilation, cigarette smoke, fuel use, as well as behavioral factors, both knowledge and attitudes of the mother[10].

A 2010 study suggested that toddlers with poor nutritional status would be more easily affected by ARI or at 2.5 times greater risk of experiencing ARI because their body's resistance to various viruses was weak[11]. Other research on ARI also explained that the incidence of ARI was 4 times greater in toddlers who do not get exclusive breastfeeding compared to toddlers who get exclusive breastfeeding. ISPA is not only due to the toddler's immune factor but also other factors such as the toddler's mother[12].

Parental education influences the incidence of ARI in toddlers, where lack of parental education causes some ARI cases to go unnoticed by parents so they are not treated[13]. Knowledge is closely related to education where it is hoped that someone with higher education will also have broader insights or knowledge, but it should be

understood that someone with low education does not necessarily mean that he has low knowledge[14]. The high incidence of ARI is also caused by factors in the physical environment of the house, behavioral factors, individual factors and socioeconomic factors[15].

The results of a preliminary study conducted by researchers at the Menteng District Health Center in April 2017 found 321 cases of ARI in toddlers. Disease data at the IMCI polyclinic at the Menteng District Health Center in 2016 showed that ARI was the first disease most commonly experienced by the toddler group. Based on the description above, the authors are interested in conducting research on factors related to the incidence of ARI in toddlers.

Method

1. *Research design*

This study used an analytic survey method with a cross sectional design.

2. *Setting and samples*

This research was conducted at the Menteng District Health Center, Central Jakarta in June 2017. The research sample was mothers of toddlers who visited the MTBS out clinic patient at the Menteng District Health Center, Central Jakarta. The inclusion criteria were mothers and toddlers who lived in the Menteng District Health Center, Central Jakarta, and mothers who had children aged 18 months to 59 months who came to visit the MTBS poly at the Menteng District Health Center. Exclusion criteria are mothers who have toddlers aged less than 18 months and more than 59 months.

3. *Measurement and data collection*

The sampling technique uses the accidental sampling method. The number of samples in this study was taken using the Slovin formula which after calculations was obtained 83 samples. The research instrument in this study was a questionnaire consisting of structured statements to collect data about mothers' education and knowledge about ARI in toddlers. In collecting data on nutritional status, immunization status, exclusive breastfeeding using medical record instruments and or toddler KMS books at the Menteng District Health Center, Central Jakarta. Determination of the nutritional status of children under five uses a standard guide instrument for assessing the nutritional status of children aged 0-59 months according to body weight/age.

4. *Data Analysis*

Data analysis used univariate analysis and bivariate analysis with the chi square test. Data processing using the help of SPSS software.

Results

Univariat Analysis

Table 1
Distribution of the frequency of ARI events in toddlers at the Menteng District Health Center in 2017

Variable	Category	Frequency (f)	Percentage (%)
Incidence of ARI	Yes	58	69.9
	No	25	30.1
Nutritional Status	Good	50	60.2
	Less	33	39.8
Immunization Status	Complete	74	89.2
	Not Complete	9	10.8
Exclusive Breastfeeding	Yes	39	47
	No	44	53
Level of Education	High	44	53
	Low	39	47
Mother’s Knowledge	Good	34	41
	Less	49	59

Table 1 shows that out of a total of 83 respondents, the majority of toddlers experienced ISPA 58 (69.9%). The majority of toddlers had good nutritional status (60.2%); the majority of toddlers had complete immunization status (89.2%). The majority of toddlers did not get exclusive breastfeeding (53%), the majority of mothers had a high level of education (53%), but the majority also had insufficient knowledge, which consisted of 49 respondents (59%).

Bivariate Analysis

Table 2
Relationship between Nutritional Status, Immunization, Exclusive Breastfeeding, Mother's Education, and Mother's Knowledge ARI Incidents in Toddlers at the Menteng District Health Center in 2017

Variable		Incidence of ARI				Total		*P-Value**
		No		Yes				
		f	%	f	%	f	%	
Nutritional Status	Good	20	40.0	30	60.0	50	100	0.030
	Less	5	15.2	28	84.8	33	100	
Immunization Status	Complete	20	27	54	73	74	100	0.120
	Not Complete	5	55.6	4	44.6	9	100	
Exclusive Breastfeeding	Yes	12	30.8	27	69.2	39	100	1
	No	13	29.5	31	70.5	44	100	

Level of Education	High	11	25	33	75	44	100	0.401
	Low	14	35.9	25	64.1	39	100	
Mother's Knowledge	Good	15	44.1	19	55.9	34	100	0.038
	Less	10	20.4	39	79.6	49	100	

**Uji Chi-Square*

Table 2 shows that of the 50 respondents with good nutritional status, 30 toddlers experienced ARI (60.0%) and out of 33 respondents with undernourished status, 28 toddlers experienced ARI (84.8%). The results of the Chi Square test obtained p = 0.030 so that there WAS a significant relationship between the nutritional status of toddlers and ARI.

The incidence of ARI in toddlers at the Health Center in Menteng District in 2017. Out of the 74 respondents with complete immunization status, 54 respondents (73%) experienced ARI and 4 respondents (44.6%) of 9 respondents with incomplete immunization status. P value = 0.120 so there is no relationship between immunization status and the incidence of ARI.

Out of the 44 respondents with a non-exclusive breastfeeding pattern and experienced ARI, 31 experienced ARI (70.5%) and out of the 39 respondents with an exclusive breastfeeding pattern, 27 toddlers experienced ARI (69.2%). The value of p = 1 which means there was no relationship between exclusive breastfeeding and the incidence of ARI. Out of the 44 respondents whose mothers had a high level of education and their toddlers had ARI, 33 respondents (75%) and from 39 respondents with a low level of education, 25 respondents experienced ARI (64.1%). P value = 0.401 which means there was no relationship between mother's education and the incidence of ARI.

Out of the 49 respondents with a low level of knowledge, there were 39 mothers (79.6%) whose toddlers had ARI and of the 34 respondents with a good level of knowledge, 19 respondents (55.9%) had ARI. The value of p = 0.038 which means that there is a significant relationship between the knowledge of mothers of toddlers and the incidence of ARI in toddlers at the Menteng District Health Center, Central Jakarta in 2017.

Discussion

The results of the study showed that there was a significant relationship

between the nutritional status of toddlers and mother's knowledge of the incidence of ARI at the Menteng District Health Center in 2017. This was in line with a 2015 study which stated that there was a significant relationship between nutritional status and the risk of ARI in toddlers in Citeurep village16.

The incidence of ARI in toddlers can also be caused by the mother's lack of knowledge about disease, disease prevention and how to maintain health17. Apart from that, the results of the study also showed that 30 toddlers (60%) had good nutritional status but experienced ARI. Nutritional status can occur due to other factors that can cause ARI in toddlers such as inappropriate breastfeeding, air pollution, socioeconomic status and LBW.

In line with the results of Maramis' research (2013) that there is a relationship between the level of knowledge and the treatment of ARI in toddlers at the Bahu City Health Center in Manado14. Knowledge is the result of human sensing or the result of knowing objects that have different levels, including in terms of the ability of parents to prevent disease. ARI both in prevention and in treatment19. This needs to be considered by the community, especially mothers of toddlers to be willing to actively add insight regarding the development of their toddlers.

Meanwhile, the variables of immunization status, exclusive breastfeeding, and mother's education did not have a significant relationship with the incidence of ARI in toddlers. The results of this study are in line with research in 2015, which stated that there was no significant relationship between immunization status and the incidence of ARI in toddlers at the Pringapus Health Center, Semarang Regency. provide and enhance the body's resistance or immunity. Thus, the complete basic immunization given is not to provide direct immunity to ISPA, but only to prevent factors that can lead to ISPA.

Factors that influence the incidence of ARI are closely related to increased body resistance, so even though they have received complete basic immunization, if there is one of the factors, such as host immune status, host genetic factors, poor nutritional status will interfere with the toddler's immune system, so he is susceptible to disease.

ARI is influenced by the living environment or in the house because one interacts with the other, if one or several family members have health problems, it will

affect other family members. In the opinion of the researcher as a recommendation for future researchers to be able to dig deeper into the relationship between immunization status and the incidence of ISPA19.

This study also found that exclusive breastfeeding was not associated with the incidence of ARI at the Menteng District Health Center. Although no significant relationship was found, efforts still need to be made to overcome the large number of children under five who are not exclusively breastfed in order to prevent other diseases that arise besides ARI. Efforts that can be made include socializing the importance of exclusive breastfeeding for toddlers' immunity, providing education to toddler mothers to give breast milk at the beginning of the baby's life up to the age of 6 months without additional complementary foods.

This research is also in line with the results of a 2013 study which showed that there was no relationship between education level and ISPA care in toddlers at the Bahu City Health Center in Manado14. In this study, although the majority of mothers had higher education, the majority had less knowledge. Researchers assume, meaning that educational status does not guarantee the knowledge possessed by a person.

Limitation

This study did not examine other variables such as living environment factors and PHBS behavior.

Conclusion

There is a significant relationship between the poor nutritional status of toddlers and the low knowledge of mothers with toddlers and the incidence of ISPA in toddlers at the Menteng Sub-District Health Center, Central Jakarta in 2017. It is recommended that medical staff working at the Menteng Sub-District Health Center be able to provide counseling to the community about the importance of paying attention to the nutritional status of toddlers, as well as provide education about ISPA to the public, especially all mothers of toddlers.

Ethical Considerations

This research has been reviewed by the ethical commission.

Conflict of Interest

There is no conflict of interest in this study.

Author contribution

SED compiled and designed the research, conducted analysis and interpreted the data and drafted the manuscript. SED, SN, and R are involved in the analysis, interpretation of data. SN, R, and MLK critically reviewed the manuscript. All authors read and approved the final manuscript.

References

1. Najmah. Epidemiologi penyakit menular. Jakarta: CV. Trans Info Media; 2016.
2. Kemenkes RI. Profil data kesehatan Indonesia. Jakarta: Departemen Kesehatan Republik Indonesia; 2012.
3. WHO. MDG 4 reduce child mortality [Internet]. 2013. Tersedia di http://www.who.int/topics/millennium_development_goals/child_mortality/en/
4. Kemenkes RI. Profil kesehatan Indonesia 2013. Jakarta: Kementrian Kesehatan RI; 2014.
5. Suoth S. Hubungan status gizi dan status imunisasi dengan kejadian infeksi saluran pernapasan akut pada anak balita di Wilayah Kerja Puskesmas Ratatotok. E-Jurnal UNSRIT. 2016; 3(2).
6. Probowo S. Penyakit yang paling umum pada anak. Jakarta: Majalah Kesehatan; 2012.
7. Sinaga P, Lubis Z dan Siregar MA. Hubungan status gizi dan status imunisasi dengan kejadian infeksi saluran pernafasan akut (ISPA) pada balita di wilayah Kerja Puskesmas Soposurung Kecamatan Balige Kabupaten Toba Samosir tahun 2014. Gizi, Kesehatan Reproduksi dan Epidemiologi. 2014; 1(1).
8. Kemenkes RI. Profil kesehatan Provinsi DKI Jakarta. Jakarta: Kemenkes RI; 2015.
9. Kemenkes RI. Riset kesehatan dasar. Jakarta: Balitbang Kemenkes RI; 2013.
10. Andriani M dan Defita AP. Hubungan pengetahuan dan sikap ibu terhadap kejadian ispa pada balita di Wilayah Kerja Puskesmas Tigo Baleh Bukittinggi tahun 2014.

Jurnal Ilmu Kesehatan Afiyah. 2014; 2(1).

11. Gertrudis T. Hubungan antara kadar partikular (pm 10) udara rumah tinggal dengan kejadian ISPA pada balita disekitar pabrik semen PT Indocement Citeurep Tahun 2010 [Tesis]. Depok: Fakultas Kesehatan Masyarakat Universitas Indonesia; 2010.
12. Widarini NP dan Sumasari NL. Hubungan pemberian ASI eksklusif dengan kejadian ISPA pada bayi. Jurnal Ilmu Gizi. 2010; 1(1).
13. Pramayu AP. Hubungan konsentrasi pm 10 dalam ruang kelas dengan gangguan ISPA siswa SD Kecamatan Cipayung Kota Depok Tahun 2012 [Tesis]. Depoko: Universitas Indonesia Depok; 2012.
14. Maramis PA, Ismanto AY, dan Babakal A. Hubungan tingkat pendidikan dan pengetahuan ibu tentang ispa dengan kemampuan ibu merawat balita ISPA pada balita di Puskesmas Bahu Kota Manado. Jurnal Keperawatan. 2013;1(1).
15. Warjiman, Anggraini S, Sintha KA. Faktor-faktor yang mempengaruhi kejadian ISPA pada balita di Puskesmas Alalak Selatan Banjarmasin. Jurnal Keperawatan Suka Insan. 2017; 2(1).
16. Lestari NP. Faktor risiko yang berhubungan dengan kejadian ISPA pada bayi dan balita di wilayah kerja Puskesmas Purwoyoso Semarang tahun 2013. 2016.
17. Notoadmodjo. Metodologi penelitian kesehatan edisi revisi. Jakarta: Rineka Cipta; 2012.
18. Machmud R. Pneumonia balita di indonesia dan peran kabupaten dalam menanggulanginya. Padang: Andalas University Press; 2006.
19. Maryunani A. Ilmu kesehatan anak dalam kebidanan. Jakarta: CV. Trans Info Media; 2010.
20. Agustyaningsih, E. Faktor- faktor yang berhubungan dengan Kejadian ISPA pada balita usia 1-4 tahun di wilayah kerja Puskesmas Pringapus Kecamatan Pringapus Kabupaten Semarang. Semarang. Stikes Ngudi Waluyo; 2016.
21. Layuk RR. Faktor yang berhubungan dengan kejadian ISPA pada balita di Lembang Batu Suwu [Skripsi]. Makasar: FKM Univeritas Hasanudin; 2012.