Contents lists available at IOCS

Science Midwifery

journal homepage: www.midwifery.iocspublisher.org

The Relationship Between Cigarette Smoke Exposure With Acute Respiratory Infections (ARI) And Stunting In Bima 2022

Nurul Qamarya [1], Zahratul Hayati [2]
[1, 2,] Akademi Kebidanan Surya Mandiri Bima

ARTICLE INFO

Article history:
Received Sept 01, 2022
Revised Sept 25, 2022
Accepted Sept 28, 2022

Keywords:
Exposure to Cigarette Smoke
ARI
Stunting

ABSTRACT

This type of research is quantitative, using a cross sectional approach. The population in this study were all mothers who had toddlers in the working area of the Puskesmas in Bima City. The number of samples is 100 mothers who have toddlers. The sampling technique used purposive sampling. Collecting data using a questionnaire, univariate and bivariate data analysis with Chi Square statistical test.The results obtained from this study were that most of the toddlers experienced Upper Acute Respiratory Infections (ARI) (ARI), namely (86%), Toddlers who experienced stunting, namely (6%). Toddlers who are exposed to cigarette smoke and have ARI are 75.6% and those who are not exposed to cigarette smoke and have ARI are 94.5%. The results of the chi square test obtained a P value of 0.006 meaning that there is a relationship between exposure to cigarette smoke and the incidence of ARI in toddlers. The results of the Odds Ratio (OR) 95% CI = 0.178 means that toddlers who are exposed to cigarette smoke are 0.178 times more likely to experience ARI than toddlers who are not exposed to cigarette smoke. Toddlers who are exposed to cigarette smoke and experience stunting are 13.3% and those who are not exposed to cigarette smoke and experience stunting are 0%. The results of the chi square test obtained a P value of 0.007 meaning that there is a relationship between exposure to cigarette smoke and the incidence of stunting in toddlers with Odds values Ratio (OR) 95%CI = 0.867 means that toddlers who are exposed to cigarette smoke have a 0.867 times greater chance of experiencing stunting than those who are not exposed to cigarette smoke. Toddlers who experienced ARI and also experienced stunting were 2.3% and those who did not experience ARI but experienced stunting were 28.6%. The results of the chi square test obtained a P value of 0.003 which means that there is a relationship between toddlers who have or are currently experiencing ARI with stunting. The Odds Ratio (OR) 95%CI = 0.060 means that toddlers with ARI have a 0.060 times greater chance of experiencing stunting than those without ARI. The results of this study are expected to be able to improve health behavior in the family and community environment as well as become the government's foothold in health promotion about smoke-free areas in order to realize the improvement and improvement of children's health status.

Corresponding Author:
Nurul Qamarya
Akademi Kebidanan Surya Mandiri Bima
Kota Bima - Nusa Tenggara Barat

INTRODUCTION

The World Health Organization (WHO) shows that the mortality rate for children under five in the world in 2013 was 45.6 per 1,000 live births and 15% of them were caused by Acute Respiratory Infections (ARI). Data from WHO in 2012, stated that ARI or pneumonia is a disease that often affects children under five, namely 78% of children under five who come to visit health services with the incidence of ARI. The incidence of ARI among children under five in developing countries is estimated at 0.29 children each year and in developed countries as many as 0.05 children each year. The number of children under five who are hospitalized with the incidence of ARI is 12 million every year. Acute Respiratory Infections (ARI) are the single largest infectious cause of death in children worldwide. Acute Respiratory Infections (ARI) killed 808,694 children under 5 years of age in 2017, accounting for 15% of all deaths of children under five years of age.

The 2030 Sustainable Development Goals (SDGs) target, related to the ARI program, is to reduce the under-five mortality rate due to pneumonia (from 44 to 32 per 1000 live births). Based on the results of Riskesdas 2018 it is known that the prevalence of ARI according to diagnosis reaches 4.4%, while based on symptoms and diagnoses of health workers, the prevalence reaches 9.3%, lower than in 2013 which reached 25.0%.

Nusa Tenggara Barat (NTB) provincial data in 2020 showed that the number of children under five who experienced pneumonia was 11,735 cases (37.3%), and data from the Bima City Health Department in 2020 listed the number of Pneumonia numbers of 320 children under five from 17,808 children under five (1.79%), although the incidence of pneumonia seemed small. however, this number must be controlled in order to increase the child's life expectancy.

ARI and stunting are known to be diseases and developmental disorders, one of which is cigarette smoke, because they can interfere with the absorption function of children's nutrition, congenital abnormalities and low birth weight. Smoking is a habit of society, especially men, which is inevitable. Active smokers and passive smokers are both at risk of various kinds of diseases, both old, young and children who are exposed to cigarette smoke. Common causes of Acute Respiratory Infection (ARI) are viruses and bacteria. However, several other factors such as season, weather/temperature, dust, pollution, exposure to cigarette smoke, use of air conditioning, anemia, vitamin A, allergies, hypothyroidism, diabetes, smoking are also predisposing factors for the incidence of ARI.

METHOD

This type of research is an analytic survey conducted with the main objective of determining the relationship between cigarette smoke exposure and the incidence of ARI and Stunting. Using a cross sectional study approach. The research subjects were all mothers who had toddlers in the working area of the Puskesmas. Taking the subject by means of purposive sampling. A total of 100 respondents. Data were obtained by distributing questionnaires to mothers of children under five to be filled in accompanied by research enumerators. Data analysis in this study was carried out univariate and bivariate using the chi-square test. This research was conducted in 5 health centers in Bima City, West Nusa Tenggara Province in 2022.

RESULTS AND DISCUSSION

General Data

1. Frequency Distribution of Age Category Mothers who have children under five

Table 1. Frequency Distribution of Age Category Mothers who have children under five

Age	F	%
< 20 years	0	0
20-35 years old	48	48
> 35 years old	52	52
Total	100	100

In table 1, it can be seen that from 100 respondents, most of them were >35 years old, namely 52 people (52%), and a small portion aged 20-35 years, 48 people (48%).

2. Frequency Distribution of Education Level of Mothers who have children under five

Table 2. Frequency Distribution of Education Level of Mothers who have children under five

Education	F	%
SD	3	3
Middle School (SMP-SMA)	73	73
College	24	24
Total	100	100

In table 2 it can be seen that out of 100 respondents, most of the education levels are SMP-SMA, namely 73 people (73%), and a small portion with an elementary education level, namely 3 people (3%).

3. Frequency Distribution of Number of Parity Mothers who have children under five

Table 3. Frequency Distribution of Number of Parity Mothers who have children under five

Parity	F	%
Primipara	3	3
Multipara	73	73
Grandemultipara	24	24
Total	100	100

In table 3, it can be seen that out of 100 respondents, most of them had multipara parity, namely 73 people (73%), and a small proportion with primiparous parity 3 people (3%).

4. Distribution of the Frequency of Cigarette Smoke Exposure in children under five

Table 4. Distribution of the Frequency of Exposure to Cigarette Smoke in Under-fives

Cigarette Smoke Exposure	f	%
Exposed	45	45
Not Exposed	55	55
Total	100	100

In table 4 it can be seen that out of 100 respondents, most were not exposed to cigarette smoke, namely 55 people (55%), and a small proportion were exposed to cigarette smoke as many as 45 people (45%).

Special Data

ARI incidence in children under five

Table 5 . Distribution of ARI incidence in children under five

ARI	f	%
ARI	86	86
No ARI	14	14
Total	100	100

In table 5 it can be seen that out of 100 respondents, most of them had Upper Respiratory Tract Infection (ARI) as many as 86 people (86%), and a small portion did not have Upper Respiratory Tract Infection (ARI) as many as 14 people (14%).

6. Distribution of the Frequency of Stunting in Toddlers

Table 6 . Distribution of the Frequency of Stunting in Toddlers

Stunting	f	%
Stunting	6	6
No Stunting	94	94
Total	100	100

In table 6 it can be seen that out of 100 respondents, most of them did not experience stunting, as many as 94 people (94%), and a small proportion experienced stunting as many as 6 people (6%).

7. The relationship between exposure to cigarette smoke and the incidence of Acute Respiratory Infection (ARI) in Toddlers

Table 7 . Relationship between exposure to cigarette smoke and the incidence of Acute Respiratory Infection (ARI) in Toddlers

Cigarette Smoke Exposure	ARI				Total		P value	OR (95% CI)
	ARI		No ARI					
	N	%	n	%				
Exposed	34	75.6	11	24.4	45	100%	0.006	0.178 (0.046-0.686)
Not Exposed	52	94.5	3	5.5	55	100%		
Amount	86	86.0	14	14.0	100	100%		

Based on table 7 , it can be seen that toddlers who are exposed to cigarette smoke and have ARI are 75.6% and those who are not exposed to cigarette smoke and have ARI are 94.5%, there is a difference in the proportion in the incidence of ARI between those exposed and not exposed to cigarette smoke by 18.9%. The results of the chi square test obtained a P value of 0.006, meaning that there is a relationship between exposure to cigarette smoke and the incidence of ARI in children under five.

The results of the Odds Ratio (OR) 95% CI = 0.178 , meaning that toddlers who are exposed to cigarette smoke are 0.178 times more likely to experience ARI than toddlers who are not exposed to cigarette smoke. ARI is a respiratory tract infection that lasts for 14 days. Acute Respiratory Infection (ARI) is a disease that is often found in toddlers and children ranging from mild to severe ARI. Severe ARI if it enters the lung tissue will cause pneumonia. Pneumonia is an infectious disease that can cause death, especially in children (Jalil, 2018). (1) Data from WHO in 2012, states that ARI or pneumonia is a disease that often affects children under five, namely 78% of children under five who come to visit health services with ARI incidence. ARI can be caused by various organisms, but the most common are infections caused by viruses and bacteria. Viruses are the most common cause of acute upper Acute Respiratory Infections (ARI) (ARI) such as rhinitis, sinusitis, pharyngitis, tonsillitis, and laryngitis. Almost 90% of these infections are caused by viruses and only partially caused by bacteria (Tandi, 2018)(2). Children who are often and always exposed to cigarette smoke in the house/room where the air circulation is not good will greatly affect the health of the child. The child will experience an infection in the respiratory system and make it easy for the child to suffer from diseases and developmental disorders.

According to the assumption of researchers, various kinds of content and substances contained in cigarettes or cigarette smoke, can cause disturbances in the body. Like the carbon monoxide contained in cigarettes, it will be carried through hemoglobin into the body's muscles which will result in a lack of oxygen, and inhibition of nutrient absorption. Nicotine which is a colorless oily liquid is able to inhibit a person's hunger and enter the body so that it can contaminate the lungs and other contents. So that children who are always passive smokers from their parents will feel the effects of the chemical smoke distribution, suffer from infections, respiratory problems and growth and development.

8. The Relationship of Cigarette Smoke Exposure with Stunting Incidents in Toddlers

Table 8. Relationship of Cigarette Smoke Exposure with Stunting Incidence in Toddlers

Cigarette Smoke Exposure	Stunting				Total		P value	OR (95% CI)
	Stunting		No Stunting					
	n	%	n	%				
Exposed	6	13.3	39	86.7	45	100%	0.007	0.867 (0.773-0.972)
Not Exposed	0	0	55	100	55	100%		
Amount	6	13.3	94	14.0	100	100%		

Based on table 8 it can be seen that toddlers who are exposed to cigarette smoke and experience stunting are 13.3% and those who are not exposed to cigarette smoke and experience stunting are 0%, there is a difference in the proportion of stunting between toddlers who are exposed to cigarette smoke and those who are not exposed to 13, 3%. The results of the chi square test obtained a P value of 0.007 which means that there is a relationship between exposure to cigarette smoke and the incidence of stunting in toddlers.

The results of the Odds Ratio (OR) 95% CI = 0.867, meaning that toddlers who are exposed to cigarette smoke are 0.867 times more likely to experience stunting than those who are not exposed to cigarette smoke. The results of this study showed that of 45 children under five who were exposed to cigarette smoke, a total of 13.3% were stunted. According to the researcher's assumptions, exposure to cigarette smoke can be one of the factors causing stunted child growth, because the substances contained in cigarette smoke will affect the absorption function and hemoglobin in the blood so that it will cause malnutrition and are at risk for stunting.

As mentioned by the Head of the Indonesian Pediatrician Association (IDAI) Youth Task Force, Dr. Bernie Endyarni Medise, Sp.A (K), MPH, "Cigarette smoke interferes with the absorption of nutrients in children, which in turn will interfere with their growth and development." Smoking behavior in parents is estimated to affect stunting children in two ways. The first is through cigarette smoke of smoking parents which has a direct effect on children's growth and development. The second effect of smoking behavior, which can be seen from the side of the cost of shopping for cigarettes, makes parents reduce the "ration" of spending on nutritious food, health funds, education and of course complete nutrition when the mother is pregnant. (3) The Center for Social Security Studies at the University of Indonesia (PKJS-UI) led by Teguh Dartanto, has conducted a study that proves the effect of cigarette consumption on poverty and stunting in Indonesia. This study using longitudinal datasets (1997 – 2014) from the Indonesian Family Life Survey (IFLS) proves that smoking behavior has an impact on children's stunting conditions which are shown in height and weight, it is also explained that children who live at home with smoking parents Chronic or transient smokers tend to have slower growth in weight and height than children living with non-smoking parents.

The study also confirmed that children living with non-smoking parents grew 1.5 kg heavier and 0.34 cm taller than those living with active smoking parents. This shows that active smokers tend to have a probability of short or stunted children. Taking into account the genetic and environmental factors of the child, there was also strong and statistically consistent evidence that children whose parents smoked had a 5.5% higher probability of experiencing stunting. **compared to children living with non-** smoking parents .(4) In line with the results of Sari 's research (2020) shows that there is a relationship between parental smoking behavior and the incidence of stunting in toddlers aged 2-5 years so that smoking behavior in parents will have a direct and indirect impact on the child's growth process. ARI and stunting are known to be diseases and developmental disorders, one of which is cigarette smoke, because they can interfere with the absorption function of children's nutrition, congenital abnormalities and low birth weight. Smoking is a habit of society, especially men, which is inevitable. Active smokers and passive smokers are both at risk of various kinds of diseases, both old, young and children who are exposed to cigarette smoke. Common causes of Acute Respiratory Infection (ARI) are viruses and

bacteria. However, several other factors such as season, weather/temperature, dust, pollution, exposure to cigarette smoke, use of air conditioning, anemia, vitamin A, allergies, hypothyroidism, diabetes, smoking are also predisposing factors for the incidence of ARI. (5)

9. Relationship between ARI Incidence and Stunting Incidence in Toddlers

Table 9. Relationship between ARI incidence and stunting in children under five

ARI	Stunting				Total		P value	OR (95% CI)	
	Stunting		No Stunting						
	n	%	n	%					
ARI	2	2.3	84	97.7	86	100%		0.060	
No ARI	4	28.6	10	71.4	14	100%	0.003	(0.010	to
Amount	6	13.3	94	14.0	100	100%		0.367)	

Based on table 9, it can be seen that toddlers who experience ARI and experience stunting are 2.3% and those who do not experience ARI but experience stunting are 28.6%, there is a difference in the proportion between ARI patients and non-ARI stunting who experience stunting 26.3%. The results of the chi square test obtained a P value of 0.003 which means that there is a relationship between toddlers with ARI and the incidence of stunting.

The results of the Odds Ratio (OR) 95% CI = 0.060, meaning that toddlers with ARI have a 0.060 times greater chance of experiencing stunting than those without ARI.

From the research results contained in table 9, it can be seen that a number of 2.3% of children who have or are experiencing Upper Acute Respiratory Infections (ARI) (ARI) also experience stunting, and the 95%CI (OR) value = 0.060 means that toddlers with ARI have a chance of 0.060 times more likely to experience stunting than those without ARI. This is in accordance with the results of a study conducted by Himawati (2020) which stated that the incidence of ARI was associated with *stunting* (p = 0.029) and OR 3,115 (95% CI 1,079-8,994). However, after controlling for maternal nutritional status during pregnancy, history of infant weight at birth, completeness of child immunization, history of diarrhea and drinking water sources, ARI was not significantly associated with *stunting* (p > 0.05), although the OR value was high.

In this study, the OR value obtained was quite low but it can be concluded that the incidence of ARI in children under five contributed to the incidence of *stunting* , by 0.06 times. Theoretically and several sources from research results state that many factors cause children to experience stunting, including the lack of nutritious food intake, infectious diseases, and the social environment. According to the researchers' assumptions, exposure to cigarette smoke in children can cause infections that can directly affect the condition of Upper Acute Respiratory Infections (ARI) (ARI) in children which causes stunted growth and development of children which of course will affect the process of absorption of nutrients in the body system which causes children to be malnourished and attacked by other infectious diseases are also at risk of stunting.

According to research conducted by Agustina Swastika Sahitarani et al, (2020) regarding the frequency and duration of infectious diseases against stunting, 30% of children suffer from stunting, with 21% having a history of ARI, 31% having a history of diarrhea, and 12% having a history of pneumonia within a period of time. certain (6). This is supported by the theory of Merryana Adriani (2014) that iron deficiency can cause immune system disorders. Babies who are often sick, may experience failure to thrive due to loss of appetite. Babies who are well fed, but often suffer from infectious diseases, can also suffer from malnutrition. (7)According to the researcher's assumption that there is a relationship between a history of ARI disease and the incidence of stunting in toddlers, it can be seen from the results of the study of toddlers who have a history of ARI disease who also experienced stunting in the amount of 2.3% and supported by research results showing a relationship between children with ARI and children who experienced Stunting with a P value of 0.003. Basically, children who are malnourished will have low body

resistance to infectious diseases such as diarrhea and ARI, which affects children's cognitive development and inhibits growth.

CONCLUSION

The results of this study are expected to be able to improve health behavior in the family and community environment as well as become the government's foothold in health promotion about smoke-free areas in order to realize the improvement and improvement of children's health status.

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