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Analysis of Diarrhea, Acute Respiratory Infection (Ari), And Hepatitis with the Nutritional Status of Children in Children in Indonesia (Riskesdas Data 2018)

By

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Abstract

The prevalence of malnutrition in children under five in Indonesia is quite high. The disease is one of the factors that play a direct role in nutritional status. Diarrhea and ART are diseases that are often found in toddlers and are one of the reasons toddlers are brought to health services. Diarrhea is the most common disease in toddlers and ARI is the second most common disease after diarrhea. Hepatitis is a disease that can cause liver damage. The prevalence of hepatitis in Indonesia in toddlers aged less than 1 year is 0.45% and in toddlers aged 12-59 months is 0.36%. This figure is not high enough. However, it should be noted that hepatitis in toddlers exists and prevention must be done to maintain the health of the liver an important organ for the body. Methods the research design is an observational analytic with a cross-sectional research design. This research used secondary data obtained from the 2018 Riskesdas data with the sample used being toddlers aged 0-59 months in Indonesia. Results, there was a significant relationship between diarrhea and the nutritional status of toddlers (p-value = 0.001; OR= 1.191), ARI also showed a significant relationship with the nutritional status of toddlers (p-value = 0.001; OR= 1.192). However, hepatitis did not show a significant relationship with the nutritional status of children under five (P Value = 0.892). In conclusion, there is a relationship between diarrheal disease and ARI with nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia and there is no relationship between hepatitis and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia.

Keywords: Nutritional Status, Diarrhea, ARI, Hepatitis

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Introduction

Nutritional status is a condition caused by a balance between the intake of nutrients from food and the need for nutrients needed for the body's metabolism. Nutrients are substances that are found in food and are needed by the body for metabolic processes that are useful for body growth, maintenance of body tissues, biological processes, healing of diseases, body resistance, transportation by blood to reach targets and produce energy (Ministry of Health) (Republic of Indonesia, 2017).

Human health is one thing that is very important to maintain. One of the most basic things that affect human health is nutritional status, nutritional status is a condition for human health that is influenced by diet, adequacy of nutrients, and metabolic integrity or the condition of the body to digest nutrients in food. Normal nutritional status is obtained by balancing food consumption and normal use of nutrients in the body (Sulfianti et al., 2021).

Inadequate nutritional intake can cause problems in the growth and development of children. Lack of nutrients if not handled properly will increase the risk of morbidity and mortality in children (Septikasari and Akhyar, 2016). Lack of nutritional intake can cause several fundamental changes such as muscle growth will be hampered due to lack of protein intake so that children cannot grow optimally. In addition, the lack of energy due to insufficient intake of carbohydrates causes children to become lazy and often feel tired so their productivity decreases. Malnutrition at the time of the fetus and toddler age greatly affects the growth and development of the brain, this can cause permanent disruption of brain function, which causes impaired thinking ability (Ministry of Health of the Republic of Indonesia, 2017).

Anthropometry is a method used to assess size, proportion, and body composition as a reference for assessing the nutritional status and growth of children. Assessment of nutritional status with a weight-for-age index (BB/U) describes relative weight compared to the child's age so that (BB/A) is very suitable for use in the age range 0-60 months which is used to assess children with very low body weight (severely underweight), underweight, normal weight and the risk of being overweight (Ministry of Health RI, 2020). Malnutrition status in children is one of the problems in Indonesia. The incidence of being underweight in Indonesia has increased every year. The national prevalence of underweight toddlers in 2007 was 18.4%, 17.9% in 2010, and 19.6% in 2013 (Riskesdas, 2013). According to Riskesdas data for 2018, the prevalence of underweight in toddlers is 20.2%. From these data, there is an increase in the number of underweight in Indonesia every year. An increase in the prevalence of underweight needs special attention to study the causes of the problem and how to fix the problem of underweight (Riskesdas, 2018).

Several factors influence nutritional status and cause nutritional problems. Illness is a factor that has a direct role in nutritional status (Sulfianti et al., 2021). Based on 2019 data, infectious diseases are the biggest contributor to death and malnutrition in the age group 29 days – 11 months (Ministry of Health RI, 2020). Infectious diseases will cause inflammation or inflammation which produces cytokines that suppress appetite, this can make children not want to eat and malnutrition will occur (Paulsen et al., 2017). Several diseases disrupt the absorption of food in the intestine and the emergence of nausea and vomiting when food is forced to enter, this causes it to be difficult for children to get nutrition from food which results in nutrients not being able to enter the body and cannot be used by the body so that the body will lack nutrients (Suwito, 2016).

Diarrhea is a disease that is often found in toddlers. Diarrheal disease in the form of defecation disorders is characterized by bowel movements more than 3 times a day with the consistency of liquid stools, which may be accompanied by blood and/or mucus. This disease can cause nutrients not to be absorbed by the body and cause dehydration due to loss of a lot of fluids, this can be fatal, namely, children can be malnourished and can even cause death (Indah Wasliah, Syamdarniati, 2020). According to Riskesdas data for 2018, the prevalence of diarrhea in Indonesia in toddlers aged less than 1 year is 9%, and in toddlers aged 12-59 months is 11.5%. This figure makes diarrhea the most common disease at that age (Riskesdas, 2018).

Acute Respiratory Infection (ARI) is a disease that attacks the upper and lowers respiratory tract. ISPA is a disease that often occurs in toddlers and is one of the reasons toddlers are brought to the health center or hospital (Karundeng, 2016). The prevalence of ISPA in children aged 0-59 months is very high in Indonesia. According to the 2018 Riskesdas data, ISPA ranks 2nd after diarrhea as the most common disease in toddlers aged 0-59 months with a prevalence in toddlers less than 1 year of 7.4% and toddlers aged 12-59 months of 8% (Riskesdas, 2018). Hepatitis is a disease that can cause liver damage due to inflammation or inflammation of the liver. The liver is a very important organ for the human body. The liver has a very important role in the metabolism of food and drugs for the body. The liver also functions in producing glucose from glycogen and the production of plasma proteins to regulate fluid balance in the body (Tus Saleha Siddiqui, Parkash, and Hashmi, 2021). The liver also functions in the digestive process by producing bile which functions to break down fat, if there is damage to the liver it will affect the production of bile which is disrupted and causes impaired absorption of fat. The role of the liver is very important, so every human being needs to maintain a healthy heart. The prevalence of hepatitis in Indonesia in toddlers aged less than 1 year is 0.45% and in toddlers aged 12-59 months is 0.36%. This figure is not high enough. However, it should be noted that hepatitis in toddlers exists and prevention must be done to maintain the health of the liver an important organ for the body. (Nasser et al. , 2019).

Researchers used toddlers aged 0-59 months as respondents based on several things, namely in newborns there will be a change of residence that was previously in the mother's stomach which was very sterile, and then moved to an external environment that is susceptible to exposure to microorganisms. The biggest cause of infant death in Indonesia is neonatal death and two-thirds of neonatal deaths in the first week because the baby's immune system is still very low (Trijayanthi Utama et al., 2015). In toddlers aged 0-59 months the immune system is still in the process of developing. The innate immune system is still in the process of developing and the lack of immunological memory causes an inadequate adaptive immune system. This will make toddlers susceptible to disease due to exposure to microorganisms (Heinonen et al., 2019).

Rapid evaluation of nutritional status is urgently needed for the prevention and early detection of malnutrition or excess in toddlers. Assessment of nutritional status using the BB/U index is very easy for the community and health workers to do. An easy-to-do BB/U index will play a major role in the faster evaluation and early detection of nutritional status. The role of early detection related to nutritional status in toddlers can provide appropriate treatment to improve the quality of nutritional status to support the development and growth of toddlers (Rinninella et al., 2017). The BB/U index is very sensitive to even slight changes, such as illness and eating patterns, so the BB/U index is useful for knowing the nutritional state and growth and development of toddlers during examinations or the acute phase ((Utami, 2016).

From the problems in this background, the researchers analyzed diarrheal disease, ISPA, and hepatitis with nutritional status according to weight/age in toddlers aged 0-59

months in Indonesia based on the 2018 Riskesdas data analysis. Based on the description of the background above, the formulation of the research problem this, "Is there a relationship between diarrheal disease, ISPA, and hepatitis with nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia according to the 2018 Riskesdas data?"

Research purposes to determine the relationship between diarrheal disease, ISPA, and hepatitis with nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia.

Method

This research is a follow-up study of basic health research (Riskesdas) in 2018. The research design used was observational analysis with a cross-sectional research design. The design of this study aims to determine the relationship between the independent variables (Diarrhoea, Acute Respiratory Infections, and Hepatitis) to the dependent variable (nutritional status according to weight/age). In a cross-sectional study, data or sample collection was only carried out once at a certain time without any follow-up or repeated measurements, according to what was done by Riskesdas.

The data was taken from the 2018 Riskesdas activities. Some of the data components needed are diarrheal disease, ISPA, hepatitis, and nutritional status according to the weight of funds per age (BB/U). The 2018 Riskesdas data came from 34 Provinces, 416 Regencies, and 98 Cities in Indonesia, conducted in April - May 2018. The data was then utilized and further analyzed at the Faculty of Medicine, the University of Lampung from August to December 2022.

The population in the 2018 Riskesdas is all households representing 34 provinces. The target population in this study was toddlers aged 0-59 months in Indonesia. The 2018 Riskesdas sample used the 2018 Susenas sample framework which was carried out in March 2018 using linear systematic probability proportional to size (PPS) sampling, with Two Stage Sampling. The number of samples of toddlers aged 0-59 months in the 2018 Riskesdas was 93,620 people.

Inclusion criteria for toddlers aged 0-59 months are data on weight, age, and diagnoses of Diarrhea, ISPA, and Hepatitis. Exclusion criteria, incomplete data on samples such as not available from one or more data on Diarrhea, ISPA, Hepatitis, and body weight and age. The dependent variable is nutritional status according to body weight per age, the independent variable is Diarrhea, Acute Respiratory Infection (ARI), and Hepatitis.

The research instrument used the 2018 Riskesdas Individual Questionnaire. The questionnaire was taken on data on diarrhea, ISPA, hepatitis, and nutritional status. The diarrhea variable is found in the 2018 Riskesdas individual questionnaire, sheet 2, Block A with item codes A13 and A14. The ARI variable is found in the 2018 Riskesdas individual questionnaire, the first sheet, Block A with item codes A01 and A02. The hepatitis variable is contained in the 2018 Riskesdas individual questionnaire, sheet 2, Block A with item code A12. Nutritional status varies according to weight/age found in the 2018 Riskesdas individual questionnaire, sheet 22, Block L with item code L02.

Data collection used the 2018 Riskesdas data obtained from the Health Development Policy Agency (HDPA) by submitting a request for data through a letter requesting the use of data to the Health Development Policy Agency (HDPA) in the form of a research proposal, cover letter, variable request sheet, and request letter for data use. Then confirm via HDPA

email to ensure that the files are complete for further processing. The application files are scientifically reviewed by the scientific commission and the data management laboratory. Through a series of scientific review processes, to get a reply email then make a payment and send proof of payment along with a letter requesting data requests to HDPA in Jakarta. As requested, raw data (raw data) is sent and a statement letter on the use of data has been signed by the Secretary of the Health Development Policy Agency (HDPA) via email. The data were then analyzed at the Faculty of Medicine, University of Lampung.

Ethics approval by the Ethics Commission Team of the Faculty of Medicine, University of Lampung with number 3794/UN26.18/PP.05.02.00/2022, dated 27 October 2022.

Results

The 2018 basic health research (Riskesdas, 2018). The distribution of nutritional status according to weight/age based on age group characteristics is as follows.

Table 1. *Distribution of Toddlers in Indonesia by Age Group according to 2018 Riskesdas data*

Toddler Age Category	Frequency	
	n	%
≤ 12 months	16.672	20.00
13-48 months	50.817	60.90
49-59 months	15.904	19.10
Total	83.393	100.00

Table 1 shows that the number of toddlers aged 0-59 in Indonesia based on nutritional status according to weight/age is 83.393 toddlers. toddlers with an age group less than equal to 12 months totaling 16.672 (20%) toddlers. age group 13-48 months totaling 50.817 (60.90%) toddlers and the age group 49-59 months totaling 15.904 (19.10%) toddlers. The frequency distribution of nutritional status according to weight/age based on sex characteristics is as follows.

Table 2. *Distribution of Toddlers in Indonesia by Gender according to the 2018 Riskesdas*

Category	Frequency	
	n	%
Man	43.335	52.00
Woman	40.058	48.00
Total	83.393	100.00

In table 2 it can be seen that the distribution of male sex is more than female in toddlers aged 0-59 months in Indonesia. The number of male toddlers is 43.335 (52%) and the number of female toddlers is 40.058 (48%).

The nutritional status assessment uses the BB/U index, which describes the relative weight compared to the child's age. This index is used to assess babies with very underweight, underweight, normal weight, and the risk of being overweight (Utami, 2016). Researchers grouped nutritional status according to weight/age into abnormal weight if the Z-score was less than -2 SD and normal weight if the Z-score was more than -2SD to less than +1 SD. An overview of nutritional status according to weight/age in toddlers aged 0-59 months is as follows.

Table 3. *Distribution of Nutritional Status according to Weight/U in Toddlers aged 0-59 Months in Indonesia 2018 Riskesdas data*

Variable	Category	Frequency	
		n	%
Nutritional status	Abnormal Weight	15.695	18.80
	Normal Weight	67.698	81.20
	Total	83.393	100.00

In table 3 it can be seen that there are 67.698 (81.20%) toddlers aged 0-59 months who have normal weight and there are 15.695 (18.80%) toddlers aged 0-59 months who have abnormal weight. Diarrhea is a disorder of defecation/defecation characterized by defecation more than 3 times a day with the consistency of liquid stools (Indah Wasliah, Syamdarniati, 2020). The incidence of diarrhea in children aged 0-59 months in Indonesia is shown in the following table.

Table 4. *Distribution of Diarrhea in Toddlers aged 0-59 Months in Indonesia, 2018 Riskesdas data*

Variable	Category	Frequency	
		n	%
Diarrhea	Diarrhea	10.439	12.50
	Non-Diarrhea	72.958	87.50
	Total	83.393	100.00

In table 4 it can be seen that 10.439 (12.50%) toddlers aged 0-59 months in Indonesia experienced diarrhea and 72.954 (87.50%) toddlers aged 0-59 months in Indonesia did not experience diarrhea. Acute respiratory infection (ARI) is an infection that attacks the upper respiratory organs and lowers respiratory organs that lasts less than 14 days (Karundeng, 2016). The distribution of ARI in children aged 0-59 months in Indonesia is as follows.

Table 5. *Distribution of ARI Disease in Toddlers Age 0-59 Months in Indonesia 2018 Riskesdas Data*

Variable	Category	Frequency	
		n	%
ISPA	ISPA	24.034	28.8
	Non-ARI	59.359	71.2
	Total	83.393	100.00

Table 5 shows that out of 83.393 toddlers aged 0-59 months in Indonesia. 24.034 (28.80%) toddlers aged 0-59 months have a history of ARI in the last 1 month and as many as 59.359 (71.20%) toddlers aged 0-59 months have no history of ARI. Hepatitis is an inflammation of the liver caused by infection or non-infectious agents that can damage liver cells (Siswanto, 2020). An overview of hepatitis in toddlers aged 0-59 months in Indonesia is as follows.

Table 6. *Distribution of Hepatitis in Toddlers aged 0-59 Months in Indonesia 2018 Riskesdas data*

Variable	Category	Frequency	
		n	%
Hepatitis	Hepatitis	269	0.30
	Non-Hepatitis	83.124	99.70
	Total	83.393	100.00

In table 6 it can be seen that as many as 269 (0.30%) toddlers aged 0-59 months in Indonesia were diagnosed by doctors as having hepatitis in the last 1 year. Meanwhile, as many as 83.124 (99.70%) children aged 0-59 months in Indonesia did not have a history of hepatitis. The 2018 Riskesdas diagnosed cases of diarrhea in neonates if, in the last 1 month, the respondent had been diagnosed with diarrhea by a health worker or if he had experienced symptoms of diarrhea in the form of defecating more than 6 times a day with the consistency of loose or liquid stools. Apart from neonates, the diagnosis of diarrhea cases is if, in the last 1 month, the respondent has been diagnosed with diarrhea by a health worker or answers that he has defecated more than 3 times with the consistency of soft or liquid stools (Riskesdas, 2018). Diarrhea can cause the food that enters the body cannot be absorbed and is excreted again through the feces. Diarrhea can also cause excess fluid and electrolyte expenditure so if diarrhea lasts a long time it can cause dehydration (Maidarti and Anggraeni, 2017).

Table 7. *Relationship between Diarrhea and Nutritional Status of Weight/Ulature in Toddlers aged 0-59 months in Indonesia Riskesdas 2018 data*

	Nutritional Status according to BB/U					
DIARRHEA	**Abnormal**		**BB Normal**		**Total**	**P-Value OR 95% CI**
	n	**%**	**n**	**%**		
Diarrhea	2.218	21.20	8.221	78.80	10.439	0.001
Non-Diarrheal	13.477	18.50	59.477	81.50	72.954	1.191 1.13-1.25
Amount	15.695	18.80	67.698	81.20	83.393	

Analysis of the relationship between diarrheal disease and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia is shown in table 7 shows that as many as 21.20% of toddlers who had a history of diarrhea in the last 1 month had abnormal weight. Meanwhile, toddlers who did not have a history of diarrhea and had abnormal weight were 18.50%. In this study, the relationship between diarrheal disease and the incidence of abnormal weight in toddlers aged 0-59 months in Indonesia showed a significant relationship with a p-value = 0.001 ($p<0.05$). This relationship is clarified by the odds ratio value of 1.191 which means that toddlers who suffer from diarrhea are 1.191 times more at risk of having abnormal weight than toddlers who do not suffer from diarrhea. ARI is a respiratory infection that attacks the upper respiratory organs or lower respiratory organs that lasts less than 14 days. Diagnosis of ARI according to Riskesdas 2018 is if, in the last 1 month, you have been diagnosed with ARI by a health worker or have had a fever with cough for less than 2 weeks, runny nose or stuffy nose and/or sore throat (Riskesdas, 2018 (Riskesdas, 2018).

Table 8. *The relationship between ISPA and the nutritional status of BB/U in toddlers aged 0-59 in Indonesia, 2018 Riskesdas data*

	Nutritional Status according to BB/U					
ISPA	**Abnormal BB**		**BB Normal**		**Total**	**P-Value OR 95% CI**
	n	**%**	**n**	**%**		
ISPA	4.992	20.80	19.042	79.20	24.034	0.001
Non-ARI	10.703	18.00	48.656	82.00	59.359	1.192 1.14-1.23
Amount	15.695	18.80	67.698	81.20	83.393	

Bivariate analysis to assess the relationship between ARI and nutritional status according to weight/age in toddlers aged 0-59 months shown in table 8 shows that 20.80% of toddlers who have a history of ARI in the last 1 month have abnormal weight. Meanwhile, 18.00% of toddlers do not have a history of ARI and have abnormal weight. The table shows the results of a p-Value of 0.001 (p <0.05) which means that there is a significant relationship between ARI and the incidence of abnormal weight. This relationship resulted in an odds ratio of 1.192 which indicated that toddlers suffering from ISPA were 1.192 times more at risk of having abnormal weight compared to toddlers who did not suffer from ISPA.

Hepatitis occurs due to an inflammatory process that causes damage to liver cells. Damaged liver cells will affect the physiological functions of the liver such as disturbed production of bile salts so that fat digestion will be disrupted. Hepatitis is caused by viral infections, drugs, toxins, metabolic disorders, and abnormalities in the antibody system (Siswanto, 2020). In the 2018 Riskesdas, a diagnosis of hepatitis is if a toddler in the last 1 year has been diagnosed with hepatitis through a blood test by a doctor (Riskesdas, 2018).

Table 9. *Correlation Between Hepatitis and Nutritional Status for Children Aged 0-59 Months in Indonesia Riskesdas Data 2018*

Hepatitis	Nutritional Status according to BB/U				Total	P-Value OR 95% CI
	Abnormal BB		BB Normal			
	n	%	n	%		
Hepatitis	52	19.30	217	80.70	269	0.892
Non-Hepatitis	15.643	18.80	67.481	81.20	83.124	- -
Amount	15.695	18.80	67.698	81.20	83393	

An analysis of the relationship between hepatitis and nutritional status according to weight/age in children aged 0-59 months in Indonesia is shown in Table 9. It shows that 19.3% of children with a history of hepatitis in the last 1 year have abnormal weight. Meanwhile. toddlers who did not have a history of hepatitis and had abnormal weight were 18.80%. The statistical test results in this study showed a p-Value of 0.892 (p> 0.05). which means that there was no significant relationship between hepatitis and the nutritional status of children under five according to weight/age.

Discussion

Malnutrition status in toddlers is one of the problems in Indonesia. Every year in Indonesia the incidence of below-normal weight namely, underweight and very underweight, has increased (Riskesdas. 2018). Illness is one of the factors that play a direct role in the nutritional status of children under five. Diarrhea and ARI are the most common diseases in toddlers and are one of the reasons toddlers are taken to hospitals or health centers (Karundeng. 2016). Hepatitis is a disease that can damage the liver due to inflammation in the liver. In 2018 the prevalence of hepatitis in children aged less than 1 year in Indonesia was 0.45% and at the age of 12-59 months was 0.36%. This figure is not high enough. However, it is necessary to pay special attention that hepatitis in toddlers exists and needs prevention to maintain the health of the liver (Riskesdas. 2018).

Nutritional status is one of the factors that affect human health. Nutritional status is a condition caused by a balance between the intake of nutrients from food and the need for

nutrients needed for the body's metabolism. Inadequate nutritional intake can cause problems with the growth and development of toddlers (Kementerian Kesehatan Republik Indonesia. 2017). Lack of nutrients will affect the immune system and a weak immune system will increase the risk of infection. Toddlers with inadequate nutritional intake often experience recurrent infectious diseases. This infection will increase the risk of increasingly severe malnutrition. Poor nutritional status combined with infection can cause growth delays (Septikasari and Akhyar. 2016). One of the assessments of nutritional status is using weight/age parameters. These parameters can assess changes in body weight in a short time and describe nutritional status at the time of measurement (Ministry of Health of the Republic of Indonesia. 2017). This study shows the results that toddlers aged 0-59 months in Indonesia who have abnormal weight are 18.80% and toddlers who have normal weight are 81.20%. This data is in line with the results of research conducted by Toby. Anggraeni and Rasmada in 2021 with the results that 22.80% of toddlers were underweight or abnormally weight. Meanwhile. 73.50% of toddlers have normal weight and 3.70% of toddlers are overweight (Anggraeni, Toby, and Rasmada. 2021). Research conducted by Kurniawati and Martini in 2016 also stated that toddlers who had less or abnormal weight were 26.30% and toddlers who had normal weight were 73.70% (Kurniawati and Martini. 2016). The data shows that toddlers who experience abnormal weight are less than those with normal weight.

In this study, 12.50% of toddlers aged 0-59 months had diarrhea and 87.50% of toddlers aged 0-59 months did not have diarrhea. This research is by research that analyzed the incidence of diarrhea in toddlers based on the 2017 Indonesian Demographic and Health Survey (IDHS) which stated that 14% of toddlers experienced diarrhea and 86% of toddlers did not experience diarrhea (Muqiit and Nooraeni. 2020). In the research conducted by Adila in 2021 using Riskesdas data in 2018 for toddlers aged 24-59 months. it showed consistent results that toddlers who experienced diarrhea were 11.90% and toddlers who did not have diarrhea were 88.10% (Adila. 2021). The data shows that the prevalence of toddlers who experience diarrhea in Indonesia is lower than toddlers who do not experience diarrhea.

The diarrheal disease can have an impact on inhibiting the process of growth and development and can cause death in toddlers. Diarrheal disease is the second leading cause of death in toddlers after pneumonia. Every year diarrhea causes the death of two billion children in the world and as many as 525.000 cases of diarrhea die at the age of five. If diarrhea is not treated seriously. toddlers who experience diarrhea are a group at high risk of death (Sari and Sartika. 2021). The prevalence of ARI in toddlers aged 0-59 months in Indonesia according to this study is 28.80%. Meanwhile. Toddlers who did not experience ISPA were 71.20%. This data is from research conducted by Adila in 2021 using Riskesdas 2018 data which stated that toddlers aged 24-59 months in Indonesia experienced ARI by 25.10% and toddlers who did not experience ARI by 79.40% (Adila. 2021). This research is also in line with the research conducted by Himawati and Fitria in 2020 in Sampang which showed the results that 9.20% of toddlers who experienced ARI and toddlers who did not experience ARI 90.80% (Himawati and Fitria. 2020). The results of this study indicate that the number of toddlers who experience ARI is lower than the number of toddlers who do not experience ARI.

The results of these data indicate that the prevalence of ISPA in toddlers aged 0-59 months is quite high at 28.80%. This relatively high number is influenced by the fact that in infants the innate immune system or the adaptive immune system is still in the process of developing so the chances of children being infected and the severity of the disease increase. ISPA is the most common disease in children and is the reason for coming to the hospital or health center for inpatient or outpatient care. ARI is divided into non-pneumonic ARI or known in the community as cold cough and pneumonia ARI if there are symptoms of coughing cold

accompanied by shortness of breath and increased respiratory frequency. The incidence of cold cough in toddlers in Indonesia is estimated to be 3 to 6 times per year (Purnama. 2016).

The results of this study showed that 0.30% of toddlers aged 0-59 months in Indonesia had hepatitis and 99.70% of toddlers did not have hepatitis. This is to the WHO report regarding the prevalence of hepatitis B in toddlers in Indonesia in 2020 which shows the prevalence rate of hepatitis B in toddlers is 1.30%. This prevalence shows a higher number than the results of the research that researchers got. The prevalence of hepatitis of 1.30% is a high figure and makes Indonesia the country with the highest incidence of hepatitis in ASEAN. (Rizaty. 2022).

Based on bivariate analysis. it showed that there was a significant relationship between diarrheal disease and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia (p=0.001; OR = 1.191; CI = 1.13 - 1.25). Several previous studies stated that there is a significant relationship between diarrhea and nutritional status in toddlers in Indonesia as in a study conducted at Prof. Dr. RD Kandou General Hospital in 2015 (P=0.001). Then, research conducted at the Pacar Keling Health Center in Surabaya City stated that toddlers who suffer from diarrhea are 4.30 times more at risk of having abnormal nutritional status than toddlers who do not suffer from diarrhea (P=0.001; OR=4.30), and in research conducted at Dr. Soetomo Hospital in 2022 showed a significant relationship (P=0.017 The relationship between diarrhea and nutritional status can be explained based on the fact that diarrhea accompanied by decreased appetite and decreased absorption of nutrients in the digestive tract can cause nutritional deficits. I and cause poor nutritional status. Poor nutritional status can increase the severity. duration and incidence of diarrhea episodes (Sampul. Ismanto and Ponandg. 2015; Kurniawati and Martini. 2016; Wolayan et al., 2020).

This study is by the theory that diarrhea causes food intake to be unable to be absorbed due to an increase in osmotic pressure in the digestive tract which causes a shift of water and electrolytes into the intestinal lumen resulting in an increase in the contents of the intestinal lumen and fluid and electrolyte excretion through the feces. (Maidarti and Anggraeni. 2017). Food that cannot be absorbed causes the nutrients in food cannot be used by the body so the body will lack nutrients. Expenditure of water and electrolytes due to increased osmotic pressure will cause dehydration. In infectious diarrhea. toxins produced by pathogens cause bloating. nausea and vomiting. This condition causes toddlers to have no appetite and the effects of vomiting prevent food from entering the body. This is what causes diarrhea to affect the nutritional status of toddlers (Suwito. 2016).

Diarrhea for a long time in toddlers can cause malnutrition toddlers to get worse. Malnutrition that lasts a long time without being balanced and intervened with appropriate intake will cause failure to thrive (Sutarto. Mayasari and Indriyani. 2018). This was proven in research conducted in the work area of the Way Urang Health Center, South Lampung Regency, on toddlers aged 24-60 months which stated that 62.5% (P = 0.004) of toddlers suffering from diarrheal disease and experiencing failure to thrive in the form of stunting (P = 0.004) (Sutarto et al. . 2021).

The results of this study indicate that there is a significant relationship between diarrheal disease and nutritional status in toddlers in Indonesia. Diarrheal disease in toddlers will cause the food that enters the digestive system cannot be absorbed by the body so toddlers will lack nutrients. The diarrheal disease will be accompanied by excess fluid expenditure which can cause dehydration. In addition. a decrease in appetite will occur in toddlers due to the effects of nausea and weakness. If this mechanism is not intervened quickly and adequately. it will result in under-fives being malnourished and failing to thrive. However, if diarrhea is

diagnosed early related to the cause of diarrhea then adequate intervention is carried out and nutritional and fluid needs are met then the incidence of malnutrition and failure to thrive in toddlers due to diarrhea can be prevented.

Diarrhea has a close relationship with the nutritional status of toddlers. Therefore, the role of the government, parents, and the community in preventing diarrheal disease is very influential in reducing diarrhea. Health promotion regarding the causes of diarrhea symptoms and early treatment of diarrhea by the Ministry of Health, especially the puskesmas should be launched more seriously so that public and parents' awareness of diarrheal diseases will increase. Good environmental sanitation from public awareness will also reduce the prevalence of diarrheal disease in the environment. Not only that, the role of parents is the first defense for toddlers from diarrheal diseases. parents must always care about nutrition intake and toddler growth and development so that toddlers' immune systems are good and avoid diarrhea.

The results of the analysis show that there is a significant relationship between ARI and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia. Toddlers who have ARI are 1.192 times more at risk of having abnormal weight than toddlers who don't have ARI (p= 0.001; OR=1.192). Several previous studies supported this research which showed that there was a significant relationship between ARI and nutritional status. such as research on toddlers in the North Buton Regency (P=0.004) (Irma et al.. 2021). In research using Riskesdas 2018 data. it showed a significant relationship between ARI and nutritional status according to height/age in toddlers aged 24-59 months (P=0.001; OR=2.90) (Adila. 2021). Then. in a study conducted at the Tompaso Health Center. Minahasa Regency showed a significant relationship between ISPA and nutritional status in toddlers (P=0.003). The results of the previous statement stated that ARI will trigger an inflammatory response and cause various kinds of symptoms. This causes a decrease in appetite and malnutrition occurs in toddlers. Toddlers who experience malnutrition will cause a decrease in body immunity which will affect the body to fight pathogens and will exacerbate the condition of ARI in toddlers (Giroth, Manoppo, and Bidjuni. 2022).

This study is following the theory put forward previously regarding the effect of ARI on nutritional status. ARI occurs due to an infection in the respiratory tract. The infection causes an inflammatory response that produces cytokines in the form of interleukin-6 (IL-6) and C-reactive protein (CRP) which play a role in suppressing appetite through central nervous system pathways in the hypothalamus (Paulsen et al. . 2017). Inflammation that occurs also plays a role in the secretion of hsRC protein which has an impact on GH hormone resistance. Resistance to GH hormone causes growth to be disrupted because GH hormone functions as a body growth controller (DeBoer et al. . 2017). Inflammation causes inhibition of the function of IGF-1 which acts as a mediator of the GH hormone for the growth of muscle and bone cells in the body (Abbas, Lichtman, and Pillai. 2016).

In this study, the results showed that there was a significant relationship between ISPA disease and nutritional status according to weight/age in toddlers in Indonesia. ISPA is a disease that often occurs in toddlers and the incidence of ISPA in toddlers often recurs because the immune system in the toddler's body is still very low and there is a lack of awareness from parents about healthy living behaviors. ISPA disease can cause an inflammatory response that can cause children to have no appetite. The inflammatory response produces cytokines that can suppress growth hormone which can inhibit the growth of toddlers. Inadequate food intake because toddlers have no appetite and inhibition of growth hormone due to an inflammatory response can cause abnormal nutritional status in toddlers. The active role of parents is very important to prevent toddlers from experiencing malnutrition. Parents must provide adequate

nutritional intake for toddlers. Initiate early breastfeeding for newborns and provide breast milk until 2 years of age by adding complementary foods after 6 months of age. In addition. parents must give vaccines to toddlers to avoid various diseases. Parents must also apply healthy living behaviors and always protect toddlers from factors that can cause toddlers to get sick.

The results of the analysis of the relationship in this study showed that there was no relationship between hepatitis and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia (p = 0.892). The results of this study were supported by research conducted by Sahin in 2016 regarding chronic hepatitis B and nutritional status in toddlers which stated that there was no significant relationship between chronic hepatitis B and nutritional status in toddlers (p= 0.102). This is because if the patient is diagnosed with hepatitis early and their nutritional needs are monitored and given as needed. the nutritional status of toddlers affected by chronic hepatitis B will be good so that the incidence of malnutrition in hepatitis patients can be avoided. The incidence of abnormal nutritional status can be influenced by other factors such as low socioeconomic status and low parental education level (Şahin. 2016).

In a study conducted at 3 children's hospitals in the Berlin region of the State of Germany. the results conflicted with this study. The results of this study showed that toddlers with chronic hepatitis B or chronic hepatitis C showed impaired growth (Gerner et al. . 2012). The theory explained by Siddiqui, Perkash, and Syeda states that malnutrition often occurs in hepatitis patients who have liver cirrhosis. Liver cirrhosis in Asian countries is caused by hepatitis B and hepatitis C. Liver cirrhosis will have an impact on bile salt deficiency so that the digestion of fat in the body will be disrupted. Disruption of fat digestion causes a lack of fat intake and an increase in leptin resulting in the effect of nausea and a feeling of fullness which causes a decrease in appetite. Cirrhosis of the liver will also increase the occurrence of sarcopenia and portal hypertension (Tus Saleha Siddiqui. Parkash and Hashmi. 2021). Hepatitis that lasts a long time will cause chronic inflammation by increasing the secretion of High-sensitivity Creative Protein (hsRC) protein and inhibiting Insulin Growth Factor-1 (IGF-1) thus causing disruption of growth hormone as a growth hormone (Abbas. Lichtman and Pillai. 2016).

The results of this study indicate that there is no significant relationship between hepatitis and nutritional status in toddlers in Indonesia using Riskesdas 2018 data. In this study, the data used did not specifically divide the etiology or type of hepatitis between toddlers so hepatitis in this study was non-specific related to the etiology or type of hepatitis in infants. Meanwhile. according to Gerner et al (2012), toddlers who suffer from chronic hepatitis B or chronic hepatitis C have abnormal nutritional status.

The research data taken from the 2018 Riskesdas data did not explain the duration of hepatitis in toddlers. so the results of this study could not distinguish between chronic and acute hepatitis in toddlers. Meanwhile. the theory put forward by Siddiqui, Perkash, and Hashmi (2021) states that toddlers who experience cirrhosis of the liver due to long-lasting hepatitis often experience nutritional status problems in the form of malnutrition. Cirrhosis of the liver in the Asian region is generally caused by hepatitis B or hepatitis C which lasts a long time (chronic).

In this study. researchers used the parameter weight/age to determine the nutritional status of toddlers. The weight/age parameter is effectively used to determine the nutritional status of toddlers in the acute phase because changes in body weight are very volatile. In the opinion of researchers. the weight/age parameters in this study were less effective in

determining the nutritional status of toddlers with hepatitis using the 2018 Riskesdas data. This is because the diagnosis of hepatitis according to the 2018 Riskesdas data is if the toddler has a history of hepatitis in the last 1 year. The history of hepatitis in the last 1 year is a long period. Meanwhile. the weight/age parameter is effective for assessing nutritional status in the short-term or the acute phase. Meanwhile. within 1 year there may be a possibility of changes in weight or improvement in nutrition in toddlers. Weight/height parameters are more suitable for determining the nutritional status of toddlers.

This study used a cross-sectional study design that looked at the relationship between hepatitis and the nutritional status of toddlers at one time and found no relationship between hepatitis and nutritional status. If this study uses a cohort study design. the relationship between hepatitis and nutritional status is likely to have a significant relationship because the cohort study design will observe and follow the course of hepatitis in infants. up to a certain period. This is following the opinion of Siddiqui. Perkash and Hashmi (2021) state that hepatitis that lasts a long time will cause poor nutritional status. However. other factors can influence the incidence of malnutrition status such as the mother's education level. child birth weight and birth spacing (Kuntari. Jamil and Kurniati. 2016).

Health promotion is one way that must be promoted actively and effectively by the government to overcome the incidence of hepatitis. Health promotion is carried out with the hope of increasing knowledge and changing behavior in the implementation of hepatitis management so that the community understands special protection measures. immunization for toddlers and ways of prevention for themselves and others. People who are aware of and understand hepatitis can prevent the transmission of hepatitis to other people. In addition to improving health promotion. the government must ensure that the public gets the hepatitis vaccine. especially for high-risk groups and newborns. The Hepatitis vaccine is one way to prevent hepatitis. People who have been given the hepatitis vaccine must remain vigilant and need efforts from the community to avoid behaviors that are at risk of causing hepatitis.

In this study. there were several limitations in conducting research. including the use of secondary data. causing researchers not to know directly the situation when collecting data. so that a lot of information is limited for processing research data. The etiology of hepatitis and the long duration of suffering from hepatitis so that the hepatitis data is not specific to the type of hepatitis and includes acute or chronic hepatitis.

Conclusion

The prevalence of abnormal weight. diarrhea. ARI and hepatitis in children aged 0-59 months in Indonesia were 18.80%. 12.50%. 28.80%. 0.30%. respectively. There is a significant relationship between diarrheal disease and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia with a P-Value of 0.001. Toddlers who experience diarrhea are 1.191 times more at risk of experiencing abnormal weight than toddlers who do not experience diarrhea (OR=1.191; 95% CI=1.13-1.25).

There is a significant relationship between ARI and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia with a P-Value of 0.001. Toddlers who experience diarrhea are 1.192 times more at risk of experiencing abnormal weight compared to toddlers who do not experience diarrhea (OR = 1.192; 95% CI = 1.14-1.23). There is no relationship between hepatitis and nutritional status according to weight/age in toddlers aged 0-59 months in Indonesia with a P-Value of 0.892.

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