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FACTORS RELATED TO THE RISK OF HOSPITAL MALNUTRITION ON PEDIATRIC PATIENTS AT RSUP DR. M. DJAMIL PADANG IN 2020

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ABSTRACT

Hospital malnutrition (HM) is malnutrition happened during hospitalization and has an impact on patient complications and mortality. This study aims to determine the factors associated with the risk of HM in pediatric patients at RSUP Dr. M. Djamil Padang in 2020. This study was an analytical research with the cross-sectional approach. The research was conducted at RSUP Dr. M. Djamil Padang Medical Records Section between February 2020 and December 2022. The data used is secondary data from the medical records. Bivariate analysis was conducted using the Chi- square test and Fisher's exact test. Logistic regression test was used for multivariate analysis. Statistical significance is determined if the p value <0.05. This research result showed that most of the patients were found in the age group <5 years and the main disease are lung disease. The risk factors for HM are STRONGkids scores, nutritional status, and length of stay. The prevalence of HM is 21.2%. The results of bivariate analysis showed multiple diagnoses (p=0.328), STRONGkids score (p=0.001), nutritional status (p=0.012), type of nutritional therapy (p=0.123), length of stay (p=0.001), and history of critical illness (p=0.607). The

results of the multivariate analysis test showed a STRONGkids score (OR=0.143) and length of stay (OR=0.222). According to the study's findings, STRONGkids score and length of stay are the dominant factors associated with HM in children.

ABSTRAK

Malnutrisi Rumah Sakit (HM) adalah malnutrisi yang terjadi selama perawatan di rumah sakit dan berdampak pada komplikasi dan mortalitas pasien. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang berhubungan dengan risiko HM pada pasien anak di RSUP Dr. M. Djamil Padang tahun 2020. Penelitian ini merupakan penelitian analitik dengan pendekatan cross-sectional. Penelitian dilakukan di Bagian Rekam Medis RSUP Dr. M. Djamil Padang pada bulan Februari 2020 sampai dengan Desember 2022. Data yang digunakan adalah data sekunder dari rekam medis. Analisis bivariat dilakukan dengan menggunakan uji Chi-square dan uji eksak Fisher. Analisis multivariat menggunakan uji regresi logistik. Signifikansi statistik ditentukan jika nilai p < 0,05. Hasil penelitian ini menunjukkan bahwa sebagian besar pasien terdapat pada kelompok usia < 5 tahun dan penyakit utamanya adalah penyakit paru. Faktor risiko HM adalah skor STRONGkids, status gizi, dan lama rawat inap. Prevalensi HM sebesar 21,2%. Hasil analisis bivariat menunjukkan adanya diagnosis ganda (p=0,328), skor STRONGkids (p=0,001), status gizi (p=0,012), jenis terapi gizi (p=0,123), lama rawat inap (p=0,001), dan riwayat penyakit kritis (p=0,607). Hasil uji analisis multivariat menunjukkan adanya skor STRONGkids (OR=0,143) dan lama rawat inap (OR=0,222). Berdasarkan temuan penelitian, skor STRONGkids dan lama rawat inap merupakan faktor dominan yang berhubungan dengan HM pada anak.

PENDAHULUAN

Pediatric patients need good nutrition in order to support medical therapy while preventing patients from suffering from hospital malnutrition during the treatment period, so it is important to provide a diet with food that contains sufficient energy and high protein quality in the healing process. (Suriadji et al., 2017) Malnutrition in children is defined as a conflict between nutritional intake and body requirements. (Joosten and Hulst, 2011) This condition can lead to malnutrition in children with acute or chronic illnesses which known as hospital malnutrition. Hospital malnutrition is associated with length of stay and disease complications. The risk of malnutrition is potentially high in children who are hospitalized which can be caused by several reasons, including increased energy requirements due to current illness, decreased appetite due to illness and the effects of drug use, and inadequate diet during the treatment period. (Beser et al.,

2018) The consequences of hospital malnutrition are increased infectious complications, extended length of stay, increased hospital costs, and higher morbidity and mortality rates. (Saunders and Smith, 2010; Hecht et al., 2015)

Every child who is hospitalized is at risk of experiencing hospital malnutrition. (Sidiartha, 2018) Research conducted at Dr. Sardjito, Yogyakarta in 2012 obtained a prevalence of hospital malnutrition of 27%. (Maryani, Prawirohartono and Nugroho, 2017) Hospital malnutrition in pediatric wards and pediatric surgical wards at Haji Adam Malik General Hospital, Medan, North Sumatra in 2014 was quite high namely 40.9%. (Novianti et al., 2017) The prevalence of hospital malnutrition found at Hasan Sadikin General Hospital, Bandung, West Java in 2016 was 9%. (Hafsah, Prawitasari and Djais, 2019) Research at Dr. M. Djamil found that the prevalence of hospital malnutrition was 16.3% in 2020. (Ardiansyah, 2020)

Based on previous research, there are several factors identified to be related to hospital malnutrition. Research conducted at RSUP dr. Sardjipto Yogyakarta received multiple diagnoses related to disease complications, thereby affecting the length of stay. (Maryani, Prawirohartono and Nugroho, 2017) Length of stay of more than 5 days is considered a risk factor for malnutrition. in 2019 at the Wangaya Hospital in Bali, it was shown that the length of stay of more than 7 days had an 8 times higher risk of experiencing hospital malnutrition. The condition of critically ill patients who generally require intensive care at the Pediatric Intensive Care Unit (PICU) has an impact on hospital malnutrition. (Indonesian Pediatrician Association, 2011) Research conducted at the PICU Sanglah Hospital Bali found 2.9 incidents of hospital malnutrition %. (Suriadji et al., 2017) Sick children generally have impaired ability to digest food, so the right choice of nutritional therapy can affect the patient's nutritional adequacy. (Moore, 1997) Research conducted by Syuhada et al in Jakarta in 2020 found a relationship between nutritional therapy and patient weight loss during hospitalization. (Syuhada et al., 2020)

Currently, several screening tools have been developed and implemented to detect the risk of hospital malnutrition for pediatric patients. Department of Pediatrics, RSUP Dr. M. Djamil used a modified STRONGkids screening method. The screening assesses the important factors that have an impact on nutritional status. Based on the final score assessment, patients are classified as low risk, moderate risk, and high experiencing hospital malnutrition. (Santos et al., 2020)

Assessment of malnutrition in pediatric patients when they have just entered the hospital is often neglected, even though this condition requires early diagnosis and immediate treatment to prevent patients from suffering from hospital malnutrition. (Department of Health of the Republic of Indonesia, 2007) Heterogeneity of data collected, different nutritional screening to classify status nutrition, as well as the place where it is implemented causes differences in the incidence of hospital malnutrition in Indonesia. For this reason, information is needed in the form of factors related to the risk of hospital malnutrition at RSUP Dr. M. Djamil Padang to carry out comprehensive management of pediatric patients.

METHOD

The type of research used is analytic with a cross-sectional approach. This research was conducted at the Medical Records Section of RSUP Dr. M. Djamil Padang. The population in this study were all inpatients at the Pediatrics Department of RSUP Dr. M. Djamil Padang in 2020 based on secondary data derived from patient medical records. The sampling technique used is simple random sampling with a minimum sample of 53 people. The inclusion criteria of this study were patients aged 1 month – 18 years and hospitalization ≥ 7 days. The study exclusion criteria were patients who did not have complete medical record data. Data analysis used the Chi-square test and Fisher's exact test for bivariate analysis. Logistic regression test was used for multivariate analysis. Statistical significance was determined if the p value <0.05.

RESULTS AND DISCUSSION

Table 1 Characteristics of Pediatric Patients

Characteristics	n	%
Age		
<5 years	42	63,6
>5 years	24	36,4
Sex		
Male	33	50
Female	33	50
Diagnosis		
Tumor and Malignancy	16	24
Neurology	14	21
Pulmonology	17	26
Gastroenterology and hepatology	8	12
Infection	7	11
Other (Cardiology, Metabolic, and Congenital)	4	6

The subjects of this study were pediatric patients who were in the Pediatric Inpatient Installation of RSUP Dr. M. Djamil Padang in 2020. The results showed that more than 50% of patients were aged <5 years. This is in line with Budiputri's 2020 study in Bali which found that the most child patients who were hospitalized were in the <5 year old group. (Budiputri, Suryawan and Dewi, 2020) Age is an important risk factor for malnutrition, because the smaller the age, the greater the risk of loss. weight is increasing. Children under 5 years require a higher calorie intake than older children, so they are at a higher risk of experiencing hospital malnutrition. Children under 12 months of age have the least risk of hospital malnutrition because they still depend on breast milk which is always available and has the calorie content according to the child's needs. (Miriawati et al., 2021)

Gender distribution of pediatric patients found that 50% of the patients were male and female. Research conducted by Salemi in America in 2018 showed that there were 50.1% of male patients and 48.9% of female patients. (Carvalho-Salemi et al., 2018) Results found in research conducted by Hafsah at Home Hasan Sadikin Hospital in Bandung in 2019 where there were more male patients (53%) than female patients (47%). (Hafsah, Prawitasari and Djais, 2019) Based on several existing studies, the comparison between male and female patients has value insignificant difference.

Based on the type of disease, in this study it was found that the most patients were patients with lung disease (26%). The results of this study are in line with research conducted by Miriawati in 2021 in Surabaya, where most of the diseases came from the pulmonary division (61%). (Miriawati et al., 2021) The most common lung disease found in this study was bronchopneumonia. Bronchopneumonia patients are mostly hospitalized due to shortness of breath due to infection. This situation results in increased energy requirements and protein catabolism in the muscles, while the patient's nutritional intake is inadequate. (Mehta et al., 2013)

Table 2 Distribution of Patients Based on Factors Associated with Hospital Malnutrition in Children

Characteristics	n	%
Number of Diagnosis		
Single	6	9,1
Multiple	60	90,9
Malnutrition Risk Screening Score (*STRONGkids*)		
Low Risk	32	48,5
Moderate Risk	24	36,4
High Risk	10	15,2
Nutritional Status		
Malnutrition	13	19,7
Under nutrition	17	25,8
Normal	36	54,5
Nutritional Status		
Oral	28	42,4
Enteral	28	42,4
Combination	10	15,2
Length of Stay		
7-14 days	32	48,5
14-30 days	24	36,4
>30 days	10	15,2
History of Critical Illness		
Yes	29	43,9
No	37	56,1

This study found that the distribution of patients with a primary diagnosis

without other diagnoses or complications was 9.1%, while patients with a primary diagnosis accompanied by other diagnoses or complications covered the majority, namely 90.9%. The same results were found in research conducted at RSUP Dr. Wahidin Sudirohusodo Makassar in 2016 where there were more patients with multiple diagnoses (59.5%) than single (40.5). Judging from the research above, it was found that there were similarities in the type of hospital where the research was conducted, namely a referral hospital so that it handled more severe cases.

Based on the STRONGkids score, patients with low risk (48.5%) are the most patients. The results of this study are different from previous research conducted by Ardiansyah at Dr. M. Djamil Padang in 2020 where patients with moderate risk based on the STRONGkids score were patients with the most subjects (55.1%). (Ardiansyah, 2020) Different results can be caused by different interpretations of the questions in the STRONGkids assessment. (Sidiartha, 2018)

The nutritional status of the patients in this study were 54.5% good nutrition, 25% less nutrition, and 19.7% bad nutrition. In line with research conducted by Juliarty in 2016 in Makassar, patients with good nutritional status had the highest percentage, namely 47.1%, followed by malnutrition 44%, and poor 8.9%. (Juliaty, 2016) Distribution of patients with this type of nutritional therapy oral and enteral had the same number of 28 patients (42.4%) and mixed nutrition therapy amounted to 10 patients (15.2%). Research conducted by Falahaini at Cipto Mangunkusumo Hospital Jakarta in 2018 found the highest proportion of enteral types of nutritional therapy for patients, namely 43.8%. (Falahaini, 2018) Research conducted by Villares et al. are the most patients with a percentage of 95%. (Moreno Villares, Varea Calderón and Bousoño García, 2017)

Based on the length of stay, this study found that most pediatric patients underwent an inpatient period of 14-30 days (48.5%). Previous research found the group with the longest length of stay, namely ≥7 to 30 days. (Ardiansyah, 2020) Research conducted by Hanzelina at Sanglah Hospital in Bali in 2021 found that pediatric patients who were treated for 7-14 days were the largest group. Differences in the length of stay are caused by various factors such as the degree of severity of the disease, the number of diagnoses, nutritional status which causes a longer length of stay. (Carvalho-Salemi et al., 2018; Sidiartha, 2018; Budiputri, Suryawan and Dewi, 2020) Pediatric patients who have undergone a period of treatment in the PICU or HCU Dr. M. Djamil Padang for ≥ 2 days as much as 43.9%. Research conducted at the PICU Sanglah Hospital in Bali in 2017 found an incidence of hospital malnutrition of 2.9%.

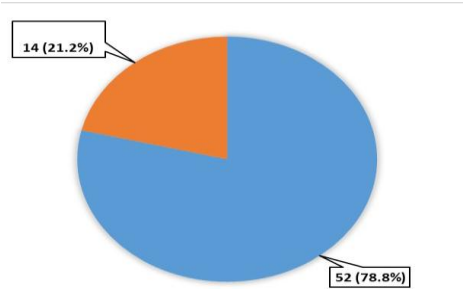

Figure 1 Prevalence of Hospital Malnutrition in Pediatric Patients at RSUP Dr. M. Djamil Padang Year 2020

Prevalence of hospital malnutrition in pediatric patients treated at RSUP Dr. M Djamil Padang in 2020 reached 21.2%. This is not much different from research conducted by Sidhiarta in 2018 of 30% at Sanglah Hospital Bali and Tommy et al in 2022 at Dr. Zainoel Abidin Banda Aceh at 29.3%. (Sidiartha, 2018; Tommy et al., 2022) Previous research conducted by Ardiansyah at RSUP Dr. M. Djamil Padang in 2020 obtained a prevalence of hospital malnutrition of 16.3%. (Ardiansyah, 2020) Differences in prevalence rates can occur due to different criteria used to define hospital malnutrition. Differences in background, ethnicity, and other patient characteristics may explain the different prevalence rates. Research conducted by Hartman et al stated that differences in the incidence of hospital malnutrition were caused by the heterogeneity of researchers and data collected, the existence of different definitions to classify nutritional status, as well as the institutions and countries where the research was carried out. (Hartman et al., 2012)

Table 3. Association between Number of Diagnosis, STRONGkids Score, Nutritional Status, Nutrition Therapy, Length of Stay, and History of Critical Illness with Hospital Malnutrition.

Variable		Non HM		HM		p
		N	%	N	%	
Number of Diagnosis	Single	6	100	0	0	0,328
	Multiple	46	76,7	14	23,3	
***STRONGkids* Score**	Low Risk	30	93,8	2	6,3	**0,001**
	Moderate Risk	18	75	6	25	
	High Risk	4	40	6	60	
Nutritional Status	Malnutrition	7	53,8	6	46,2	**0,012**
	Undernutrition	13	76,5	4	23,5	
	Normal	32	88,9	4	11,1	
Nutritional Therapy	Oral	25	89,3	3	10,7	0,123
	Enteral	21	75	7	25	
	Combination	6	60	4	40	
Length of Stay	7-14 days	31	96,9	1	3,1	**0,001**
	14-30 days	13	54,2	11	45,8	
	>30 days	8	80	2	20	
History of Critical Illness	Yes	22	75,9	7	24.1	0,607
	No	30	81,9	7	18,9	

In this study it can be seen that 90% of pediatric patients treated have more than one diagnosis, but no relationship was found between the number of diagnoses and hospital malnutrition. The same results were obtained in a study conducted by Maryani at RSUP Dr. Sardjito Yogyakarta in 2017. (Maryani, Prawirohartono and Nugroho, 2017) These results contradict research by Juliarty in Makassar in 2016 which found a correlation between multiple diagnoses and hospital malnutrition. Children who are treated longer generally have complex diagnoses and chronic diseases, so the risk of experiencing hospital malnutrition is higher. (Juliaty, 2016) Research results at the

Wangaya Bali Hospital in 2020 show that patients with multiple diagnoses have a 2.3 times the risk of experiencing hospital malnutrition. (Budiputri, Suryawan and Dewi, 2020) This is in line with the theory that chronic disease and the complexity of the disease affect appetite suppression, inhibit food absorption, and disrupt metabolic processes. (Moreno Villares, Varea Calderón and Bousoño García, 2017)

This study found a relationship between STRONGkids score and hospital malnutrition in pediatric patients (p = 0.001). A cross-sectional study was conducted on 500 inpatient children under 3 years in Egypt in 2019, and found that 37.8% of patients were at high risk based on STRONGkids. (Shaaban et al., 2019) The results of a study by Sidhiarta in 2018 in Bali were based on the STRONGkids score, the risk of hospital malnutrition in pediatric patients with good, poor, and poor nutrition was 3.4%, 18.2%, and 87.5% (p = 0.0001). (Sidiartha, 2018) The STRONGkids score was found higher in pediatric patients whose nutritional status is deteriorating and has a positive correlation with an increase in length of stay. This can confirm that the STRONGkids score can be a screening tool for pediatric patients. (Shaaban et al., 2019)

The results of the bivariate analysis showed that there was a significant relationship between nutritional status and hospital malnutrition with p = 0.012. Research by Campanozzi et al in Italy in 2009 found that the highest proportion of malnutrition was in children with poor nutritional status, and found a significant relationship between nutritional status at hospital admission and hospital malnutrition. (Campanozzi et al., 2009) Research by Campanozzi et al., 2009 Miriawati et al in Surabaya in 2021 found that 46.3% of patients with good nutritional status at the time of admission to the hospital experienced hospital malnutrition. (Miriawati et al., 2021) Children who are malnourished when admitted to the hospital are more at risk of losing BMI than with children with good nutritional status. However, patients with poor nutritional status usually receive special treatment compared to children who have good. Most incidences of hospital malnutrition do occur in patients with poor nutritional status, however, patients with good nutrition also have a risk of worsening during hospitalization, so attention is required for all patients during the treatment period. (MAC and GAP, 2017)

The results of the bivariate analysis showed that there was no significant relationship between the type of nutritional therapy and hospital malnutrition with p =

0.123. The high percentage of hospital malnutrition in the enteral and combination therapy is related to the severity of the disease experienced by patients requiring nutritional support. Research by Hanzelina at Sanglah Hospital in Bali in 2021 found that 14% of patients with this type of enteral nutrition therapy experienced hospital malnutrition. (Hanzelina, Sidiartha and Pratiwi, 2021) Research conducted by Syuhada et al. patients on liquid food and soft food are less in number than patients on regular food so the probability of experiencing hospital malnutrition is lower. This is caused by the more severe the degree of the patient's disease related to the nutritional therapy received. In general, the risk of children with oral nutrition therapy having a lower risk of hospital malnutrition than other types of nutritional therapy. (Syuhada et al., 2020)

This study found a relationship between length of stay and incidence of hospital malnutrition with a value of p=0.001. This is in line with research conducted by Sidhiarta

in 2016 and Budiputri in 2020. (Sidiartha, 2016; Budiputri, Suryawan and Dewi, 2020) The incidence of hospital malnutrition in patients with an inpatient stay of more than 14 days is higher than the hospital stay 7-14 days. These results are similar to a study conducted at Sanglah General Hospital in 2021, which found that the length of stay in pediatric patients with a decreased z-score was 11 days, while in the group without a decreased z-score, there was an average of 8 days (p=0.004). (Santhi, Sidiartha and Pratiwi, 2021)

An uncomfortable hospital environment for children accompanied by various medical procedures can cause stress in children and cause a lack of appetite and food intake. A decrease in appetite can also decrease because it is difficult for children to meet their families because they are hospitalized. Children often lose interest in consuming food that has been provided in the hospital, so that their calorie intake decreases. (Beser et al., 2018) In addition, the risk of children being exposed to nosocomial infections becomes higher with the length of treatment. Children who are treated longer generally have more complex diagnoses that can increase nutritional needs, use of energy for healing, and chronic diseases. In accordance with this study, it can be seen that 90% of patients treated for more than 7 days have more than 1 diagnosis, this will increase the risk of children experiencing hospital malnutrition. (Budiputri, Suryawan and Dewi, 2020)

The results of the bivariate analysis showed that there was no significant relationship between history of critical illness and hospital malnutrition with p=0.607. This is because hospital malnutrition is not only affected by critical illness, but also influenced by other things such as nutritional status and length of stay. Research by Suriadji at Sanglah Hospital in Bali in 2017 found that hospital malnutrition in pediatric patients who entered the PICU was 2.9%. When compared with hospital malnutrition as a whole, the prevalence is low. This is because most pediatric patients in the PICU experience acute illness, while chronic diseases are more related to hospital malnutrition. (Suriadji et al., 2017) Malnutrition found before surgery can also increase complications and length of stay in hospital after surgery surgical process. (Setiawati, 2021)

Table 4 Multivariate Results

No	Variabel	OR	95%CI	p
1	***STRONGkids* Score**	0,143	0,044–0,472	0,001
2	**Length of Stay**	0,222	0,066–0,748	0,015

Based on table 4, it can be seen after being analyzed using multivariate analysis with the Backward LR method, it is found that the most dominant variable and has an influence on hospital malnutrition in pediatric patients at RSUP Dr. M. Djamil Padang in 2020 is a STRONGkids score and length of stay.

CONCLUSION

Based on the results of the study, it was found that the majority of patients aged <5 years with the main disease was pulmonary disease. The prevalence of HM is 21.2%.

There is a significant relationship between the STRONGkids score, nutritional status, and length of stay with HM. The two most dominant variables are related and have an influence on hospital malnutrition in pediatric patients at RSUP Dr. M. Djamil Padang 2020 is a STRONGkids score and length of stay.

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