



URINARY TRACT INFECTION WITH STUNTING AND NON-STUNTING IN RURAL AREA PANDEGLANG, BANTEN, INDONESIA 2021

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ABSTRACT

Urinary Tract Infections (UTIs) are bacterial infection that often occurs in childhood. Its occurrence depends on several predisposing factors and individual immunocompetence. Children with stunting have impaired immune function; therefore, early detection and prompt treatment of associated infections in children with stunting are critical.

This study aimed to identify the association between UTI incidence in stunting and non-stunting children in Banten. This cross-sectional study was conducted in Pandeglang Regency, Banten. The subject of this study was 120 children aged 6 to 72 months. Well-nourished children matched for age were selected for the control group. Data was collected by a questionnaire-guided interview, physical examination, and urinalysis examination.

Out of 120 respondents, 72 respondents (60%) were categorized as stunting and 26 respondents (21,67%) had UTIs. Out of the respondents who experienced UTIs, 15 respondents (12.5%) were categorized as severely stunted, and 5 respondents (4.17%) were categorized as stunted. There is an association between UTI and stunting.

ARTICLE INFO

Submitted: 07-01-2023

Revised: 01-02-2023

Accepted: 12-02-2023

Keywords:

Urinary tract infection; Stunting;
Children

INFEKSI SALURAN KEMIH DENGAN STUNTING DAN NON STUNTING DI KAWASAN PERDESAAN PANDEGLANG BANTEN INDONESIA 2021

ABSTRAK

Infeksi Saluran Kemih (ISK) adalah infeksi bakteri yang sering terjadi di masa kanak-kanak. Kejadian tersebut bergantung pada beberapa faktor predisposisi dan kekebalan individu. Anak dengan stunting mempunyai gangguan fungsi kekebalan tubuh, maka deteksi dini dan pengobatan yang tepat terkait infeksi pada anak dengan stunting sangat penting.

Penelitian ini bertujuan untuk mengetahui hubungan antara kejadian ISK pada anak stunting dan non-stunting di Banten. Penelitian cross-sectional ini dilakukan di Kabupaten Pandeglang, Banten. Subjek pada penelitian ini adalah 120 anak usia 6 sampai 72 bulan. Anak bergizi baik dengan usia yang cocok ditunjuk sebagai kelompok kontrol. Data dikumpulkan dengan wawancara yang dipandu kuesioner, pemeriksaan fisik, dan pemeriksaan urinalisis.

Dari 120 responden, 72 responden (60%) dikategorikan sebagai stunting dan 26 responden (21,67%) mengalami ISK. Dari responden yang mengalami ISK, 15 responden (12,5%) dikategorikan sangat pendek, dan 5 responden (4,17%) dikategorikan pendek. Penelitian ini menunjukkan bahwa terdapat hubungan antara ISK dengan stunting.

DOI: 10.55080/mjn.v2i1.57

Kata kunci:

Infeksi saluran kemih; Stunting;
Anak

INTRODUCTION

Urinary tract infections (UTI) are bacterial infection that often occurs in childhood. There are three primary forms of UTI: pyelonephritis, cystitis, and asymptomatic bacteriuria.¹ UTI is equally common in males and females during the first year of life and becomes more common in females after the first year of life. UTI affects around 1.7% of females and 8.4% of females under seven years. UTIs affect males and females equally during the first year of life, but after that age, most cases occur in females.² Most pediatric UTIs are caused by Gram-negative coliform bacteria from fecal flora colonizing the perineum, which enter and ascend the urinary tract.³

Stunting refers to impaired linear growth (length/height for age) in the first 1000 days, which fails to reach a height in adulthood and is a manifestation of malnutrition.⁴ Stunting occurs due to the accumulated impact of inadequate nutrition, poor health conditions, and inadequate care.⁵ According to WHO, the prevalence of stunting toddlers worldwide was 22.9% and caused 2.2 million deaths of toddlers worldwide.⁶ In Banten Province, where this study was conducted, there were 24.11% of stunting and in Pandeglang Regency, the stunting rate was 34.01%.⁷

It is known that there is a mutual interaction between stunting and infection; any kind of infection can worsen the nutritional status. On the other hand, stunting, even mild, may affect the immune system and compromise body defense against infection. Therefore, early detection and prompt treatment of associated infection in children with stunting are critical.⁸ In particular, stunting affects 12.6% of the global disease burden, of which infectious diseases are the most dominant.⁹

A study by Stewart et al. in children aged 6-24 months stated that children who suffer from infectious diseases experience disorders in their growth and development.¹⁰ On the contrary, the study result in Mimika Regency stated that there is no significant association between infectious diseases and stunting.¹¹ Based on the result of some previous studies, this study aimed to identify the association between UTI incidence in stunting and non-stunting children in Banten.

METHODE

Study Design

This cross-sectional study was conducted from April to October 2021 in Pandeglang Regency, Banten. A questionnaire-structured interview with each respondent and urinalysis examination was performed to collect data. This study had been approved by the Ethical Committee Research Institute YARSI University, (200/KEP-UY/BIA-IV/2021). Each respondent was asked for written consent after being provided information about the study.

Population and Sample

The study population was children who lived in Kaduagung Village and Labuan Health Center, Pandeglang Regency, Banten. A total of 120 samples were recruited using total sampling. Inclusion criteria were as follows: (1) Children aged 6 to 72 months old, (2) Willing to take a physical examination, and (3) Willing to take urinalysis examination. The next step was the interview guided by a questionnaire, underwent physical examination, and urinalysis examination. Data collection was performed by the authors assisted by community health workers, health workers from primary health services, and community leaders in the area.

Data Collection Method

A total of 25 questions in the questionnaire consisted of age, parent's education, occupation, family income, reproductive history (preterm birth, low birth weight), hand

washing habits, breastfeeding, and complementary feeding. Data on weight, height, head circumference, upper arm circumference, and urinalysis examination were obtained during the physical examination. A urine specimen for urinalysis examination was obtained by collecting the urine specimen midstream into a sterile container. The examination is based on the Clinical and Laboratory Standards Institute (CLSI) at RSUD Berkah Pandeglang.

A child is categorized as stunted if his height-for-age Z score is below – 2 standard deviations (SD) from the World Health Organization (WHO) Child Growth Standards median.¹² While UTI is a condition in which germs or microbes grow and multiply in the urinary tract in significant quantities or pyuria corresponding to the urine sampling method.¹³ In this study, a urinalysis examination was performed to determine the presence of UTIs. Urinalysis is a quick dipstick test for nitrite and leukocyte esterase and microscopic examination for white blood cells (WBC) and bacteria.¹⁴

Data Analysis

All collected data were analyzed based on chi-square test using Statistical Package for the Social Sciences (SPSS) version 18 for windows. Descriptive statistics of respondents' demographic profile, hygiene behavior, and mother's knowledge used a 95% confidence interval. A bivariate analysis was performed to determine the correlation between respondents who had UTIs and categorized with stunting and non-stunting. Any correlations with $p < 0.05$ were considered statistically significant.

RESULTS

The demographic characteristics of respondents are described in table 1. Most of the respondents were male (57%) and the average age was more than 24 months (54%). More than half of the mother's height was less than 150 centimeters (61%), and the majority of the respondent's weight was more than 8 kilograms (91%). Most of the respondent's mother's jobs were housewives (81.5%).

Table 1. Demographic Characteristics of Respondents

Variables	Frequency		% [95%CI]
	Stunting	Normal	
Gender			
Male	41	28	57%[34-23]
Female	31	20	42%[25-16]
Age			
< 12 months	11	5	13%[9-4]
12 - 24 months	20	19	31%[16-15]
>24 months	40	25	54%[33-21]
Mother's Height			
< 150 cm	45	28	61%[37-23]
≥ 150 cm	26	21	38%[21-16]
Baby's Height			
< 75 cm	43	25	57%[36-21]
≥ 75 cm	28	24	42%[23-19]
Weight			
< 8 kg	8	3	8%[6-1]
≥ 8 kg	63	46	91%[52-38]
Birth Weight			

< 2500 g	4	6	8%[3-5]
≥ 2500 g	67	43	91%[56-35]
Head Circumference			
< 45 cm	26	17	36%[21-14]
≥ 45 cm	45	32	63%[37-26]
Upper Arm Circumference			
< 14,5 cm	1	1	1.7%[0.8-0.8]
≥ 14,5 cm	70	48	98%[58-39]
Mother's Job			
Housewife	63	47	81.5%[52-28]
Working	8	2	18.5%[6-11]

Table 2 showed that most mothers had good knowledge (55%). The mothers' knowledge about hygiene behavior was seen in table 3; almost all respondents' mothers cleaned the genitalia after urinating/defecation (90.8%) and washed their hands before and after cleaning the genitalia (99.2%). Most mothers cleaned the genital area from front to back (97.5%) and wore disposable diapers (62.5%).

Table 2. Respondent's Mother's knowledge

Mother's knowledge	Frequency (n=120)	Percentage (%)
Good	66	55
Poor	54	45

Table 3. Respondent's Mother's hygiene behavior

Hygiene		(n=120)	(%)
Cleaning genitalia after urinating/defecation	Yes	109	90.8
	No	11	9.2
Wash hands before and after cleaning genitalia	Yes	119	99.2
	No	1	0.8
How to clean genitalia	Front to back	117	97.5
	Back to front	3	2.5
Use of disposable diapers	Yes	75	62.5
	No	45	37.5
Long use of diapers	< 4 hours	77	64.2
	> 4 hours	43	35.8

The results of the urinalysis examination were shown in table 4; ph under 7 was obtained in the majority of respondents (80.8%) and found a small percentage of respondents had positive nitrites (5.8%). Positive leukocyte results were found in a small percentage of respondents (85%), and one respondent (0.8%) had positive bacterial results.

Table 4. Result of urinalysis examination from respondents

Examination		(n=120)	(%)
pH	< 7	97	80.8
	≥ 7	23	19.2
Proteins	+	6	5
	-	114	95
Glucose	+	0	0
	-	120	100
Bilirubin	+	0	0
	-	120	100
Ketones	+	2	1.7
	-	118	98.3
Nitrites	+	7	5.8
	-	113	94.2
Urobilinogen	+	10	8.3
	-	110	91.7
Blood	+	1	0.8
	-	119	99.2
Yeast	+	0	0
	-	120	100
Leukocytes	+	18	85
	-	102	15
Erythrocytes	+	18	85
	-	102	15
Epithelial cell	+	120	100
	-	0	0
Crystals	+	0	0
	-	120	100
Bacteria	+	1	0.8
	-	119	99.2
Casts	+	0	0
	-	120	100
Others	+	0	0
	-	120	100

Out of 120 respondents, 72 respondents (60%) were categorized as stunting seen in table 5. A total of 26 respondents (21.67%) who experienced urinary tract infections were presented in Table 6, and 20 respondents with stunting (16.67%) had urinary tract infections, which are seen in table 7. Based on the chi-square test analysis, the association between UTI and stunting obtained a p-value of 0.017, which means a significant association between UTI and stunting.

Table 5. Frequency of Child Stunting

Stunting	Frequency	Percentage
	(n=120)	(%)

Severely stunted	41	34.17
Stunted	31	25.83
Normal	48	40
Total	120	100

Table 6. Frequency of Urinary Tract Infection

Urinary Tract Infection	Frequency	Percentage
	(n=120)	(%)
UTI	26	21.67
Normal	94	78.33
Total	120	100

Table 7. Comparison of Child Stunting Events based on Urinary Tract Infections

Variable			Stunting Children			Total
			Severely Stunted	Stunted	Normal	
Urinary Tract Infection	UTI	Frequency	15	5	6	26
		Percentage	12.5%	4.17%	5%	21.67%
	Normal	Frequency	26	25	43	94
		Percentage	21.67%	20.83%	35.83%	78.33%
Total	Frequency		41	30	49	120
	Percentage		34.17%	25%	40.83%	100.00%

DISCUSSION

This study showed that 60% of respondents were categorized as stunting and occurred more in males than females. The percentage was high when compared to the National Basic Health Research Report (Riskesdas), which is 30.8% in 2018.¹⁵ Ascertain the prevalence rate of stunting incidence is essential because according to the Indonesian Ministry of Health's Performance Accountability Report in 2020, Indonesia itself targets the number of stunting toddlers to reached 24.1%.¹⁶

In this study, 8% of stunting children experienced low birth weight less than 2500 grams; this percentage was lower than the data of Kemenkes RI (Pusdatin) was 20% of children with low birth babies are at risk for stunting. Low birth weight can be caused by the mother's lack of nutritional state during pregnancy, causing intrauterine growth retardation, and when born, manifested by low birth weight. The long-term problem caused by low birth weight is stunted growth and development.¹⁷

The results of this study more housewives have children with stunting than mothers who have a job. These results are in line with the research conducted by Utami et al., which reported that the work of parents, especially fathers, had a 1.045 times higher chance of having children with stunting.¹⁸

In this study, most of the respondent's mothers had good hygiene behavior and good knowledge of stunting and UTIs. Good knowledge and hygiene behavior lead to a low UTI incidence rate, but the incidence rate of stunting is relatively high. The incidence rate of stunting is due to many factors, one of which is related to clean and healthy living behavior (PHBS).¹⁹ The influence of PHBS on the incidence of stunting has been reported by several studies, one of them is research in Ketapang Regency, which shown the indirect effect on the

incidence of stunting through a history of infection in children aged 24 to 59 months in the Coastal Region of Ketapang Regency.²⁰

UTI in children aged 6-72 months in Pandeglang Regency, Banten can be assessed by parameters such as leukocytes, erythrocytes with leukocytes that show >3 fields of view, and erythrocytes that show >3 fields of view. In this study, fewer children had UTI than children who did not experience UTI. The combined and interactive effects of infections, environmental factors, and malnutrition as possible determinants of stunting in children have long been thought to be of great importance.²¹

Based on the results of bivariate analysis using chi-square statistical methods between the correlation of UTI and stunting conditions in children aged 6-72 months in Kaduagung Village and Labuan Health Center obtained a p-value is smaller than the value of $p=0.05$, and it can be concluded that there is a correlation between UTI and Stunting Events of Children aged 6-72 months. The result is in congruence with research conducted by Karangasem, which shows that infectious diseases can interfere with linear growth by first affecting the nutritional status of children under five years old.²² Another study in children aged 12-59 months in Palu showed that toddlers suffering from infectious diseases are at 3.4 times greater risk of stunting. This infection that causes malnutrition occurs because a sick person needs more nutrition to fight the disease suffered.²³

This study has some limitations. The study only represents one district, and the number of the respondent is only 120 children, which is still less to describe the actual situation.

CONCLUCCIONS

Based on the result of this study, the frequency of UTI in Stunting was 16.67%. There are correlation between UTI and stunting. The common cause of stunting is due to malnutrition or insufficient food intake and is followed by an infection. Interaction between poor nutrition and infection; any kind of infection can worsen the nutritional status. Children with stunting have risk of getting UTI

ACKNOWLEDGEMENT

The authors would like to thank the late H. Edwin Afrian, MARS, MD, as Head of Medical Support Berkah Pandeglang Hospital, who deceased in pandemic Covid-19 and assisted in processing samples and all staff of Labuan Health Center, for their support to this study. We also thank all of our respondents for their cooperation in this study.

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