

## The Relationship between Nutritional Status of Pregnant Women and Stunted Children

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### ABSTRACT

**Introduction:** The nutritional status of pregnant women has a significant impact on the fetus's health and development. Low birth weight can be caused by womb growth problems. Research in Nepal shows that babies with low birth weight have a higher risk of becoming stunted. West Sulawesi is the most populous province in Central Indonesia, with a population of 39.7%. In Mamuju District, West Sulawesi, the relationship between stunted babies and maternal nutritional status during pregnancy was investigated.

**Methods:** Cross sectional analytic survey with a retrospective approach. Data processing using the chi square test. The population in this study was 20.039 people. Total sampling was used to collect nutritional status data of children under the age of five in West Sulawesi province from February to June 2020. In this study, 88 people were sampled, all of whom were mothers of stunted children aged 2 to 5 Years old and who had a KIA book during pregnancy.

(Continued on next page)

### Article history:

Received: 12 February 2021

Accepted: 26 April 2021

Published: 30 April 2021



GREEN MEDICAL  
JOURNAL  
E-ISSN 2686-6668

**Published by:**

Faculty of Medicine  
Universitas Muslim Indonesia

**Mobile number:**

+62821 9721 0007

**Address:**

Jl. Urip Sumoharjo Km. 5, Makassar  
South Sulawesi, Indonesia

**Email:**

greenmedicaljournal@umi.ac.id

*(Continued from previous page)*

**Results:** The results of statistical tests showed that the p value of nutritional status with BMI and LILA 0.000 and the p value of HB levels 0.066. There was a link between pregnant women's nutritional status and LILA, but not between HB levels and stunting.

**Conclusion:** The conclusion of this study is that there is a relationship between the nutritional status of pregnant women based on BMI and LILA and the incidence of stunting in Mamuju Regency, West Sulawesi Province.

**Keywords:** Nutritional status; BMI; stunting

## Introduction

Nutritional issues must be considered even while the baby is still in the womb. The nutritional status of pregnant women has a significant impact on the growth and development of the fetus. Stunting or short children under the age of five are toddlers with chronic nutritional problems who have nutritional status based on length or height according to age when compared to the 2005 WHO-MGRS (Multicentre Growth Reference Study) standard, with a z-score of less than -2SD, and if the z-score is less than -3SD, they are classified as very short under five (Pusdatin, 2015).(1,2)

In developing countries, including Indonesia, nutrition is still a major public health problem and a cause of death for mothers and children. The mortality rate for infants and mothers and babies with low birth weight (LBW) is essentially also determined by the nutritional status of pregnant women. Pregnant women with poor nutritional status or experiencing KEK (Chronic Energy Deficiency) tend to give birth to LBW babies and are faced with a greater risk of death compared to babies born to mothers with normal weight. There are several ways that can be used to determine the nutritional status of pregnant women, including monitoring weight gain during pregnancy, measuring the upper arm circumference (LILA), and measuring HB levels.(3,4)

The health and development of the fetus are greatly influenced by the nutritional status of pregnant women. Low birth weight can be caused by womb growth problems (WHO, 2014). Babies born with a low birth weight have a higher risk of becoming stunted, according to Nepalese research (Paudel, et al., 2012). Stunting is also linked to the length of time a baby spends in the womb. According to research conducted in Kendal, babies born with short birth lengths have a higher risk of stunting as toddlers (Meilyasari and Isnawati, 2014). Exclusive breastfeeding for children under the age of five is another factors linked to toddlers stunting who are not exclusively breastfed for 6 months have a high risk of stunting, according to research conducted in Southern Ethiopia (Fikadu, et al., 2014).(5-8)

In Indonesia, East Nusa Tenggara is a province with the highest prevalence of infants with stunting,

namely 42.6% (Riskasdas, 2018). The province with the second largest stunted infants in Indonesia is West Sulawesi and is the highest province in Central Indonesia, reaching 39.7%. This number consists of very short toddlers reaching 14.7% and 25% short toddlers. (9,10)

Because of the high incidence of stunting in Central Indonesia, particularly in West Sulawesi Province and Mamuju Regency, the authors are interested in conducting research on the relationship between maternal nutritional status during pregnancy and the incidence of stunting babies in Mamuju Regency, West Sulawesi, in order to reduce stunting in the West Sulawesi region.

## **Method**

This type of research is an analytical survey. The research design used was a cross sectional approach (cross sectional) with a retrospective approach in which the cause and effect variables (related and independent variables) were measured at the same time and moment (point time approach).

The study took place in the Mamuju Regency of West Sulawesi Province. According to LP2S UMI's schedule, the research took place between February and June 2020. The study's participants were stunted children in Mamuju Regency, West Sulawesi Province. The population in this study was 20.039 people. The sampling technique used in this study was total sampling, with a total sample size of 88 people who met the inclusion criteria of mothers with stunted children aged 2 to 5 Years and who had a KIA book during pregnancy. Questionnaires and observation sheets were used as data collection instruments in this study. The chi square test was used in this data analysis.

The operational definition of stunting in this study is children aged 2-5 Years with nutritional status based on Body Length (BL)/ Age (A) or Body Height (BH) / Age (A) z-score  $<-2SD$  to  $-3SD$  for short status and  $<-3SD$  for very short status. Circumference of the upper arm (LILA) is a measurement of the nutritional status of pregnant women by measuring the circumference of the upper arm, which is divided into normal 23-33 cm, under nutrition  $<23$  cm and over nutrition  $> 33$  cm. BMI (Body Mass Index) is a measurement of the nutritional status of pregnant women by measuring body weight (kg) and height (m<sup>2</sup>). Hemoglobin levels are blood hemoglobin levels with normal levels  $> 10.5$  mg/dl.

## **Results**

The results of this stunting study were derived from simple random sampling of data on the nutritional status of children under the age of five in West Sulawesi province in February-June 2020. In this study, a total of 88 people were sampled, all of whom were mothers with stunted children aged 2 to 5. The age range was chosen because the effect of malnutrition on height takes a long time to manifest.

In this study, preliminary data were obtained regarding the nutritional status of children in West Sulawesi Province as follows:

**Table 1. Initial nutritional status data for children in West Sulawesi based on their height and age.**

Regency/City	Very Short				Short				Normal			
	0-2 Years		2-5 Years		0-2 Years		2-5 Years		0-2 Years		2-5 Years	
	L	P	L	P	L	P	L	P	L	P	L	P
Majene	335	221	797	622	396	314	967	916	1354	1302	1687	1646
Polewali Mandar	467	285	1341	980	998	673	2447	2037	4315	4109	6419	5892
Mamasa	219	113	460	289	308	222	799	615	1234	1089	2646	2419
Mamuju	470	393	869	740	347	264	640	580	2766	2467	3861	3366
Mamuju Utara	195	85	456	339	273	186	921	752	1720	1690	2981	2854
Mamuju Tengah	33	19	116	72	81	37	198	152	541	465	1080	841
Total	1719	1116	4039	3042	2403	1696	5972	5052	11930	11122	18674	17018

Source: Primary Data

**Table 2. Nutritional characteristics of pregnant women with stunted babies based on BMI**

Characteristics	n	%
<b>Body Mass Index</b>		
Less	53	60.2
Normal	32	36.4
Overweight	3	3.4
Obesity	0	0
<b>Circumference of The Upper Arm</b>		
Less	59	67.0
Normal	29	33.0
Obesity	0	0
<b>HB</b>		
No Anemia	76	86,4
Anemia	12	13,6
Total	88	100.0

Source: Primary Data

Based on table 2, the data shows that the characteristics of the nutritional status of mothers during pregnancy based on BMI were 53 people (60.2%) with low nutritional status. As many as 32 people (36.4%) with normal nutritional status distribution and 3 people (3.4%) with overweight nutritional status.

The characteristics of nutritional status based on LILA were 59 people (67%) with low nutritional status and as many as 29 people (33%) with normal nutritional status based on measurements of upper arm circumference.

Characteristics of nutritional status based on hemoglobin levels as many as 76 people (86.4%) with HB levels were not anemia and as many as 12 people (13.6%) with hemoglobin levels showed anemia.

The relationship between stunting based on the observed nutritional status includes: BMI, LILA and HB levels can be seen from the following tables:

**Table 3. Analysis of the effect of nutritional status based on BMI on the incidence of stunting**

Nutritional Status	Stunting				Total	<i>p</i>
	Short		Very Short			
	N	%	n	%		
Less	5	5,68	48	54,54	53	60,22
Normal	28	31,82	4	4,55	32	36,37
Overweight	3	3,41	0	0	3	3,41
Obesity	0	0	0	0	0	0
<b>Total</b>	<b>36</b>	<b>40.91</b>	<b>52</b>	<b>59.09</b>	<b>88</b>	<b>100.0</b>

Sources: Primary Data

Based on the primary data in table 3, it was found that with low nutritional status based on BMI, it is found that the group of mothers with a BMI less than 52 people with 48 people (54.54%) having very short babies and 5 people (5.68%) with short babies. Whereas in the group of mothers with normal BMI as many as 32 people with 28 people (31.82%) having short babies and 4 people (4.55%) with very short babies. In the group of mothers with overweight (more) BMI as many as 3 people with 3 people (3.41%) having short babies. The statistical test yielded a p value of 0.05, indicating that there is a link between maternal nutritional status and the incidence of stunting during pregnancy, as measured by BMI.

**Table 4. Analysis of the effect of nutritional status based on LILA on the incidence of stunting**

Nutritional Status	Stunting				Total	<i>p</i>
	Short		Very Short			
	N	%	n	%		

	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	
Less	8	9,10	51	58	59	67,1	
Normal	28	31,82	1	1,14	29	32,9	0.000
Obesity	0	0	0	0.0	0	0	
<b>Total</b>	<b>36</b>	<b>40.9</b>	<b>52</b>	<b>59.1</b>	<b>88</b>	<b>100.0</b>	

Sources: Primary Data

Based on the primary data in table 4, it is found that with a malnutrition status based on LILA, it is found that the group of mothers with less nutritional status is 59 people with 51 people (58%) having very short babies and 8 people (9.10%) with short babies. While in the group of mothers with normal nutritional status as many as 29 people with 28 people (31.82%) having short babies and 1 person (1.14%) with very short babies. The statistical test yielded a p value of 0.05, indicating that there is a link between maternal nutritional status during pregnancy as measured by LILA and the incidence of stunting.

**Table 5. Analysis of the effect of nutritional status based on HB to the incidence of stunting**

<b>Nutritional Status</b>	<b>Stunting</b>						<b>p</b>
	<b>Short</b>		<b>Very Short</b>		<b>Total</b>		
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	
Non Anemia	34	38,63	42	47,73	76	86,36	0.066
Anemia	2	2,28	10	11,36	12	13,64	
<b>Total</b>	<b>36</b>	<b>40,91</b>	<b>52</b>	<b>59,09</b>	<b>88</b>	<b>100,00</b>	

Sources: Primary Data

Based on the primary data in table 5, it is found that with less nutritional status based on HB levels, 76 people with HB levels are not anemic with 42 people (47.73%) having very short babies and 34 people (38.63%) with babies. short. Whereas in the group of mothers with anemia as many as 12 people with 10 people (11.36%) having very short babies and 2 people (2.28%) with short babies. The results of statistical tests showed that the value of  $p \Rightarrow 0.05$ , which means that there is no relationship between maternal nutritional status based on HB levels during pregnancy and the incidence of stunting.

## Discussion

Stunting is a complex health problem, which can be linked by several factors that are currently still developing, such as health, economic, social and cultural factors. As in this study, data from various factors

were obtained from respondents both from medico social factors, medico obstetra and nutritional status which focused on the condition of the mother during pregnancy.

The mother's nutritional status was determined using her LILA during pregnancy, her BMI, and her HB level. Based on the results of statistical tests, a p value of 0.05 was obtained, indicating that there is a significant relationship between pregnant women's nutritional status as measured by LILA and BMI and stunting status in children aged 2 to 5 Years in Mamuju district, West Sulawesi Province. This is in line with Ringgo et al's (2019) findings, which show that the incidence of stunting is linked to the nutritional status of mothers during pregnancy. In another study also conducted by Sukmawati (2018), it was stated that there was a relationship between the nutritional status of mothers during pregnancy and the incidence of stunting and LBW. (11,12)

The statistical test of the relationship between maternal HB levels during pregnancy yielded a p value > 0.05, indicating that there is no significant relationship between HB levels and stunting status in Mamuju Regency children aged 2 to 5. This is in line with a study conducted in Semarang by VindaNur et al (2019), which found no link between HB levels and the incidence of stunting. Another study conducted in Yogyakarta by Kristiana et al (2016) found no link between maternal hemoglobin levels during pregnancy and the incidence of stunting in children. Factors that can affect hemoglobin levels are the intake of nutrients such as vegetables, fruits and foods that contain iron. (13,14)

A healthy baby is more likely to be born if the mother's nutritional status is good during pregnancy. The nutritional status of pregnant women, like that of the general population, is a physical condition that results from the consumption, absorption, and utilization of various macro and micronutrients. Because the pregnancy process causes physiological changes including hormonal changes and increased blood volume for fetal development, pregnant women must also increase their nutrient intake to meet these needs (Ministry of Health, RI 2018). The incidence of stunting is also influenced by various factors from the child, such as the presence of infectious diseases, exclusive breastfeeding, and the nutritional intake obtained.(13–15)

## **Conclusion**

According to the findings, there was a link between maternal nutritional status during pregnancy as measured by BMI and LILA and the incidence of stunting, but no link between nutritional status as measured by HB levels and the incidence of stunting in Mamuju Regency, South Sulawesi Province.

## **Acknowledgments**

We would like to express our deepest gratitude to the leadership of the Universitas Muslim Indonesia, especially to the Chairperson of LP2S Prof. Dr. H. Syahnur Said, SE, MS who gave us the opportunity in the form of a forum, support and financial assistance for the implementation of this research. We would also like to thank the Local Government of Mamuju Regency for allowing us to conduct research in Mamuju Regency



and always helping during this research process. We also do not forget to express our deepest gratitude to the leadership of the Faculty of Medicine at Universitas Muslim Indonesia, who contributed a lot in the preparation of this research, as well as the lecturers, colleagues and friends who continuously supported us so that this research could be completed. . Hopefully through this research, Allah SWT will give us useful knowledge, solutions to all problems and of course health to anyone who reads it.

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