

Original Article

**Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District**

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**ABSTRACT**

*Social aspect is a determinant of stunting. Stunting in children is an indicator of well-being and an accurate reflection of social inequality. This study aims to analyze the social and health determinants of the families of children under two years of age with stunting in Sigi District. This was an analytical study with cross sectional design which involved a population of children aged 6-23 months. A sample size consisted of 380 people were selected through cluster simple random sampling technique. Respondents involved the mothers of children under two years of age. Data collection was conducted in February-June 2022. The dependent variables was stunting incidence. The independent variables were maternal age, parity, birth spacing, maternal education, child's gender, child's age in months, length of birth, early initiation of breastfeeding, exclusive breastfeeding, breastfeeding status, child condition at the time of study, history of ARI, diarrhea, pulmonary tuberculosis, measles, Helminth Infection, utilization of health facilities, growth and development stimulation, complementary food, water sources, ownership of family latrines, food insecurity, housing, and smoking family members. Stunting data was obtained by measuring body length using the Length Measuring Board (LMB) and measuring age by reading the birth certificate or MCH book of the child. Other data were obtained by filling out the kobocollect questionnaire. Data were analyzed using SPSS version 22.00. The WHO-Anthro 2005 software was applied to determine the Z-Score. Height-for-Age data were analyzed using univariate, bivariate and multivariate analysis using Backward logistic regression method. Ethical clearance was obtained from the ethics committee of Palu Health Polytechnic number 0011/KEPK-KPK/IV/2022. The results showed that children aged 12-24 months had a 4.1 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=4.1; 95% CI: 2.0-8.4). Furthermore, children aged 7-11 months had a 2.2 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=2.2;95%CI: 1.2-3.9). Children who had a length of birth of <48 cm had a 2.1 times higher risk of experiencing stunting compared to children who had a length of birth of ≥48 cm (AOR=2.1; 95% CI: 1.2-3.6). Children of women with education of <9 years had a 2.7 times higher risk of experiencing stunting compared to children of women with education of ≥9 years (AOR=2.7; 95% CI: 1.4-5.0). Children from families with food insecurity had a 1.6 times higher risk of experiencing stunting compared to children from families with no food insecurity (AOR=1.6; 95% CI: 0.9-2.7). Social and health determinants of children under two years of age with stunting in Sigi District were child's age, length of birth of <48 cm, maternal education and food insecurity.*

**Keywords: Social and Health Determinants, Stunting, Children Under Two Years of Age**

<https://doi.org/10.33860/jik.v17i1.2252>



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## INTRODUCTION

Social aspect is a determinant of the incidence of stunting among<sup>1</sup>. Stunting is linear growth retardation of  $\leq 2$  SD height-for-age according to WHO standards<sup>2</sup>. Stunting is believed to be an indicator of well-being when assessing social inequality<sup>3</sup>. Stunting in childhood is an overall indicator of children's well-being and an accurate reflection of social inequality<sup>4,5</sup>. Prevention of stunting can utilize social behaviour changes communication intervention<sup>6</sup>. A recent study in relation to Covid-19 in Indonesia highlighted policy strategies to reduce the social impact of stunting during the COVID-19 pandemic<sup>7</sup>.

Several previous studies revealed that the incidence of stunting was related to child's age<sup>8-11</sup> length of birth<sup>12,13</sup>, maternal education<sup>14,15,16</sup> and food insecurity<sup>17,18,19</sup>.

The high stunting rate with increasing age of children highlights the need for consideration towards social behavioural factors such as hand washing behaviour and access to clean water<sup>20</sup>. Combination of health and nutrition programs evaluated to identify priority interventions for program implementation to reduce stunting in low- and middle-income countries was associated with success when it included health and nutrition outcomes and social safeguards network<sup>21</sup>.

Several studies showed an effect of social support on the incidence of stunting<sup>22-25</sup>. In addition, strengthening early initiation and exclusive breastfeeding, encouraging health service-seeking behavior and recommending social support programs for poor families were found to be beneficial for reducing stunting<sup>22</sup>. There was consistent evidence regarding the determinants of stunting in Indonesia which included non-exclusive breastfeeding for the first 6 months, low household socio-economic status, premature birth, short birth, low maternal height, parental education, poor condition of latrines, untreated drinking water, poor access to health care and living in rural areas<sup>26</sup>.

The prevalence of stunting in Central Sulawesi in 2007, 2011 and 2016 were 32.3%, 31.5% and 26.0% respectively. There was a decline in the last 9 years by 6.2% with a mean of 0.6% per year<sup>27</sup>. The result of a survey on the nutritional status of under-five children conducted by the Ministry of Health of the Republic of Indonesia showed that there was a

decrease in the trend of the prevalence of child stunting in Sigi District from 40.7% (Ministry of Health of the Republic of Indonesia, 2021) in 2021 to 36.8% (Ministry of Health of the Republic of Indonesia, 2022) in 2022 which indicated a decrease by 3.9% in a year<sup>28,29</sup>.

The unknown social determinants among families of children under two years of age in Sigi District became the basis for the current study. This study aims to analyze the social and health determinants of the families of children under two years of age with stunting in Sigi District.

## METHOD

This was an analytical study with a cross sectional design. The study site was Sigi District. The study population involved children aged 6-23 months in Sigi District. A sample size consisted of 380 people were selected through cluster simple random sampling technique. Respondents involved the mothers of children under two years of age. Data collection was conducted in February-June 2022. The completeness and correctness of the data was assessed by the Data Technical Person in Charge. The dependent variables was stunting incidence. The independent variables were maternal age, parity, birth spacing, maternal education, child's gender, child's age in months, length of birth, early initiation of breastfeeding, exclusive breastfeeding, breastfeeding status, child condition at the time of study, history of ARI, diarrhea, pulmonary tuberculosis, measles, Helminth Infection, utilization of health facilities, growth and development stimulation, complementary food, water sources, ownership of family latrines, food insecurity, housing, and smoking family members. Stunting data was obtained by measuring body length using the Length Measuring Board (LMB) and measuring age by reading the birth certificate or MCH book of the child. Other data were obtained by filling out the kobocollect questionnaire. Data were analyzed using SPSS version 22.00. The WHO-Anthro 2005 software was applied to determine the Z-Score. Height-for-Age data were analyzed using univariate, bivariate and multivariate analysis using Backward logistic regression method. Ethical clearance was obtained from the ethics committee of Palu Health Polytechnic number 0011/KEPK-

KPK/IV/2022 dated April 5, 2022 and a research permit was obtained from the Central Sulawesi provincial government, national unitary body and regional politics number 070/0204/Bid.III-BKBPD /2022 dated March 14, 2022. The study questionnaire could be found in kobocollect: <https://ee.kobotoolbox.org/x/GR86Vw0i>.

The socialization of the implementation of the study has been presented by the researchers in the consolidation and reconciliation activities of the team of acceleration of the reduction of stunting at Sigi District level on August 2, 2022 with the participants of stakeholders in Sigi District.

## RESULTS

Table 1 presented certain characteristics of the study samples. 54.5% of children under two years of age were male, 45.3% aged 12-24 months, 59.7% had Length of Birth of  $\geq 48$  cm, 53.4% of mothers performed Early Initiation of Breastfeeding, 51.6% did not provide exclusive breastfeeding, but 78.2% of mothers continued to breastfeed the children until the time of data collection. 87.4% of children were healthy, while 12.6% had mild disease at the time of data collection. Furthermore, 15.8% of children had a history of ARI, 12.4% had a history of diarrhea, 1.3% had a history of pneumonia, 0.3% had a history of

pulmonary tuberculosis, 4.5% had a history of measles, and 1.8% had a history of Helminth Infection. 81.8% of families used health facilities, 61.6% conducted growth and development Stimulation, 37.1% of children received complementary food. 88.9% of families had improved water sources, 69.7% had family latrine, 21.3% had food insecurity, 74.2% of family members smoked. Meanwhile, the characteristics of the mother included maternal age of  $< 20$  years by 17.4%, Caesarean Section delivery by 16.8%, Parity of  $> 3$  by 14.5%, Birth spacing of  $\leq 3$  years by 18.9%, maternal education of  $< 9$  years by 62.1%.

**Table 1. Characteristics of children, mothers, breastfeeding behavior, access and health services of the respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.**

Characteristic	Number	Percentage (%)
<b>Child's Gender</b>		
Male	207	54.5
Female	173	45.5
<b>Child's Age (Months)</b>		
0-6 months	109	28.7
7-11 months	99	26.1
12-24 months	172	45.3
<b>Length of Birth</b>		
$< 48$ cm	153	40.3
$\geq 48$ cm	227	59.7
<b>Maternal Age</b>		
$< 20$ years	66	17.4
$\geq 20$ years	314	82.6
<b>Type of Delivery</b>		
Normal	316	83.2
Caesarean Section	64	16.8
<b>Parity</b>		
$> 3$	55	14.5
$\leq 3$	325	85.5
<b>Birth Spacing</b>		
$\leq 3$ Years	72	18.9
$> 3$ Years	308	81.1
<b>Maternal Education</b>		
$< 9$ years	64	16.8
$\geq 9$ years	316	83.2

<b>Early Initiation of Breastfeeding</b>		
No	177	46.6
Yes	203	53.4
<b>Exclusive Breastfeeding</b>		
No	196	51.6
Yes	184	48.4
<b>Breastfeeding Status</b>		
No	83	21.8
Yes	297	78.2
<b>Utilization of Healthcare Facilities</b>		
No	69	18.2
Yes	311	81.8
<b>Growth and Development Stimulation</b>		
No	146	38.4
Yes	234	61.6
<b>Complementary Food</b>		
No	239	62.9
Yes	141	37.1

**Table 2. History of Infectious Diseases, Source of Drinking Water, Ownership of Family Latrine, Food Insecurity and Smoking Environment among respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.**

<b>Characteristic</b>	<b>Number</b>	<b>Percentage (%)</b>
<b>Child Condition at the Time of Study</b>		
Mild Disease	48	12.6
Healthy	332	87.4
<b>History of ARI</b>		
No	320	84.2
Yes	60	15.8
<b>History of Diarrhea</b>		
No	333	87.6
Yes	47	12.4
<b>History of Pneumonia</b>		
No	375	98.7
Yes	5	1.3
<b>History of Pulmonary Tuberculosis</b>		
No	379	99.7
Yes	1	0.3
<b>History of Measles</b>		
No	363	95.5
Yes	17	4.5
<b>History of Helminth Infection</b>		
No	373	98.2
Yes	7	1.8
<b>Source of Drinking Water</b>		
Not Improved	42	11.1
Improved	338	88.9
<b>Ownership of Family Latrine</b>		
No	115	30.3
Ye	265	69.7

<b>Food Insecurity</b>		
Yes	81	21.3
No	299	78.7
<b>Smoking Family Members</b>		
No	98	25.8
Ye	282	74.2

**Table 3. Stunting Prevalence among respondents in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.**

<b>Nutritional Status</b>	<b>Number</b>	<b>Percentage (%)</b>
<b>Stunting</b>	111	29.2
<b>Normal</b>	269	70.8

Cross-tabulation between the dependent variable and the independent variables (nutritional status) showed a significant correlation between the variables of Type of Delivery ( $p=0.020$ ), Child's Age ( $p<0.001$ ), Ownership of Family Latrine ( $p<0.001$ ), Length of Birth ( $p<0.001$ ), Matern education ( $p<0.001$ ), Food Insecurity ( $p=0.010$ ), Complementary Food ( $p=0.001$ ), Growth and Development Stimulation ( $p=0.002$ ), and History of Helminth Infection ( $p=0.001$ ). Further finding showed that there were more children of women with education of  $<9$  years who experienced stunting (34.7%)

compared to children of women with education of  $\geq 9$  years (20.1%). There were more children of women with normal delivery who experienced stunting (31.6%) compared to children of women with Caesarean Section delivery (17.2%). There were 63 children who were born short and were currently stunted, while there were 90 children who were born short but were currently free from stunting. Likewise, there were 48 children who were not born short but were currently stunted, while 179 children were free from stunting since birth until the study was conducted.

**Table 4. Cross Tabulation in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District**

<b>Variable</b>	<b>Nutritional Status</b>				<b>p-value</b>
	<b>Stunting</b>		<b>Normal</b>		
	<b>n (111)</b>	<b>%</b>	<b>n (269)</b>	<b>%</b>	
<b>Maternal Age</b>					
$<20$ years	24	36.4	42	63.6	0.160
$\geq 20$ years	87	27.7	227	72.3	
<b>Maternal Education</b>					
$<9$ years	33	51.6	31	48.4	$<0.001$
$\geq 9$ years	78	24.7	238	75.3	
<b>Child's Gender</b>					
Male	67	32.4	140	67.6	0.139
Female	44	25.4	129	74.6	
<b>Type of Delivery</b>					
Normal	100	31.6	216	68.4	0.020
Caesarean Section	11	17.2	53	82.8	
<b>Child's Age</b>					
0-6 months	27	24.8	82	75.2	$<0.001$
7-11 months	13	13.1	86	86.9	
12-24 months	71	41.3	101	58.7	

<b>Source of Drinking Water</b>					
Not Improved	17	40.5	25	59.5	0.089
Improved	94	27.8	244	72.2	
<b>Ownership of Family Latrine</b>					
No	50	43.5	65	56.5	<0.001
Yes	61	23.0	204	77.0	
<b>Early Initiation of Breastfeeding</b>					
No	56	31.6	121	68.4	0.331
Yes	55	27.1	148	72.9	
<b>Length of Birth</b>					
<48 cm	63	41.2	90	58.8	<0.001
≥48 cm	48	21.1	179	78.9	
<b>Exclusive Breastfeeding</b>					
No	62	31.6	134	68.4	0.284
Yes	49	26.6	135	73.4	
<b>Breastfeeding Status (at the time of the study)</b>					
No	18	21.7	65	78.3	0.088
Yes	93	31.3	204	68.7	
<b>Food Insecurity</b>					
Yes	33	40.7	48	59.3	0.010
No	78	26.1	221	73.9	
<b>Parity</b>					
>3	19	34.5	36	65.5	0.347
≤3	92	28.3	233	71.7	
<b>Birth Spacing</b>					
≤3 years	19	26.4	53	73.6	0.559
>3 years	92	29.9	216	70.1	
<b>Utilization of Healthcare Facilities</b>					
No	25	36.2	44	63.8	0.156
Yes	86	27.7	225	72.3	
<b>Complementary Food</b>					
No	56	23.4	183	76.6	0.001
Yes	55	39.0	86	61.0	
<b>Growth and Development Stimulation</b>					
No	56	38.4	90	61.6	0.002
Yes	55	23.5	179	76.5	
<b>Smoking Family Members</b>					
No	24	24.5	74	75.5	0.233
Yes	87	30.9	195	69.1	
<b>History of Disease</b>					
No	21	30.0	49	70.0	0.872
Yes	90	29.0	220	71.0	

<b>History of ARI</b>					
No	93	29.1	227	70.9	0.883
Yes	18	30.0	42	70.0	
<b>History of Diarrhea</b>					
No	92	27.6	241	72.4	0.071
Yes	19	40.4	28	59.6	
<b>History of Pneumonia</b>					
No	110	29.3	265	70.7	0.648
Yes	1	20.0	4	80.0	
<b>History of Pulmonary Tuberculosis</b>					
No	111	29.3	268	70.7	0.520
Yes	0	0.0	1	100.0	
<b>History of Measles</b>					
No	105	28.9	258	71.1	0.572
Yes	6	35.3	11	64.7	
<b>History of Helminth Infection</b>					
No	105	28.2	268	71.8	0.001
Yes	6	85.7	1	14.3	
<b>Child Condition at the Time of Study</b>					
Mild Disease	13	27.1	35	72.9	0.729
Healthy	98	29.5	234	70.5	

**Table 5. Multivariate Analysis in Social and Health Determinants of the Families of Children Under Two Years of Age with Stunting in Sigi District.**

Variables	Nilai p	AOR	95%CI	
			Lower	Upper
<b>Child's Age</b>				
0-6 months				
7-11 months	0.010	2.2	1.2	3.9
12-24 months	<0.001	4.1	2.0	8.4
<b>Length of Birth</b>				
≥48 cm				
<48 cm	0.008	2.1	1.2	3.6
<b>Maternal Education</b>				
<9 years	0.003	2.7	1.4	5
≥9 years				
<b>Food Insecurity</b>				
Yes	0.083	1.6	0.9	2.7
No				

Social and health determinants of children under two years of age with stunting in Sigi District included age, length of birth of <48 cm, maternal education and food insecurity. Children aged 12-24 months had a 4.1 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=4.1; 95% CI: 2.0-8.4). Furthermore, children aged 7-11

months had a 2.2 times higher risk of experiencing stunting compared to children aged 0-6 months (AOR=2.2;95%CI: 1.2-3.9). Children who had a length of birth of <48 cm had a 2.1 times higher risk of experiencing stunting compared to children who had a length of birth of ≥48 cm (AOR=2.1; 95% CI: 1.2-3.6). Children of women with education of <9 years had a 2.7

times higher risk of experiencing stunting compared to children of women with education of  $\geq 9$  years (AOR=2.7; 95% CI: 1.4-5.0). Children from families with food insecurity had a 1.6 times higher risk of experiencing stunting compared to children from families with no food insecurity (AOR=1.6; 95% CI: 0.9-2.7).

As the age of the child increases, there is a tendency for the prevalence of stunting to increase. If a child is born with a body length of  $< 48$  cm, there is an increase in the risk of stunting. Children of women with the level of education of less than basic education or  $< 9$  years had a higher risk of experiencing stunting. A study conducted by Scheffler (2021) showed a correlation between maternal education and height among privileged and underprivileged children<sup>30</sup>. Scheffler further states that stunting is a complex phenomenon and can be considered a synonym for social retardation and low parental education<sup>30</sup>.

A previous study conducted in Ethiopia showed that the prevalence of household food insecurity, poor diet and low wealth status were risk factors for stunting. Providing health and nutrition education through behaviour change communication is very important to address risk factors related to stunting. Nutrition and health information must be provided by health educators to mothers since poor child feeding practice was found as a major factor in stunting<sup>19</sup>.

Social interventions to prevent stunting in Sigi District involved earlier prevention, even when the fetus is still in the preconception period, policy on 9-year compulsory education especially for women and an increase in family food security. In addition, encouraging households to do gardening and farming is very important for diversifying children's diets and helping the social and economic status of every household in Sigi District.

## CONCLUSION

Social and health determinants of

children under two years of age with stunting in Sigi District included the child's age, child's length of birth of  $< 48$  cm, maternal education of  $< 9$  years and food insecurity. Interventions toward stunting reduction should consider social and health determinants found in this study.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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