

Comparison of Stunting Risk Factors in Tulungagung and Bangkalan Regency, East Java, Indonesia

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ABSTRACT

Background: The formation of intelligence at an early age depends on the upbringing and intake of nutrients received. Toddlers have a higher risk and should get more attention related to their nutritional intake and health. However, only a few studies have focused on differences in family characteristics of stunted toddlers, and this study aims to describe and compare the characteristics of parenting styles for toddlers in Tulungagung and Bangkalan regencies.

Method: Descriptive analytical with cross-sectional design, a sample of 404 mothers of toddlers. Data analysis using Chi-square test.

Results: There are no factors that could be a risk of stunting for respondents in Tulungagung. Whereas in Bangkalan, mothers with elementary or junior high school education had higher family characteristics ($p = 0.027$), the parenting style was higher for children who were cared for by other people ($p = 0.011$). Nutritional care pattern, giving non-breastfeeding fluids at birth ($p < 0.001$), age at weaning ($p = 0.019$), age of child at receiving food other than breast milk ($p = 0.004$), and a history of vitamin A supplementation ($p = 0.046$) can increase the risk of stunting.

Discussion: Mothers have a very big role in the growth and development of children, especially in toddlerhood. One of the risk factors associated with stunting in children is the mother's education. Mother's education is the main risk factor for stunting after considering other factors. In addition, children who are not cared for by their parents have a higher risk of stunting than those who live with their parents.

Conclusion: From the healthy parenting style, no risk factors for stunting were found. Tulungagung District with the lowest prevalence of stunting has better family characteristics and parenting styles than Bangkalan District

Keywords: Family characteristics, parenting style, toddler, stunting.

INTRODUCTION

The first 1000 days of life are a critical period for the onset of nutritional problems in infants and toddlers, such as stunting, which will have a long-

term impact on the life cycle. Malnutrition as a direct cause of stunting, especially in toddlers, has a short-term impact on increasing morbidity, and in the long term it will affect cognitive function, that is, the level of intelligence, which will have

an impact on the quality of human resources in the future. In recurrent conditions (in the life cycle), children who experience malnutrition early in life (the first 1000 days) have a risk of non-communicable diseases in adulthood^(1,2). Mothers play a very important role in the growth and development of children. Mothers' education, mothers' physical and mental state, mothers' ability to practice in everyday life, and family support accumulate in child development⁽³⁾. Toddlerhood is one of the nutritionally vulnerable groups. Toddlers have a higher risk and should get more attention related to nutrient intake. Inadequate nutritional intake is one of the causes of nutritional problems in toddlers, such as stunting, which will affect their growth and cognitive development. The food given to toddlers must contain balanced nutrients, including both macronutrients and micronutrients needed by the body⁽⁴⁾. In addition to nutrient intake, infectious diseases are a direct cause of nutritional problems in toddlers. Infectious diseases caused by poor hygiene and sanitation (e.g., diarrhea and helminthiasis) can interfere with the absorption of nutrients in the digestive process. Some infectious diseases that babies suffer from can cause them to lose weight. If this condition occurs for a long time and is not accompanied by adequate intake for the healing process, it can result in stunting⁽⁵⁾. In this case, family characteristics, especially mothers, greatly influence the health of toddlers in terms of providing nutritious and quality food, caring for children's and mothers' health, and improving conditions and environmental sanitation.

According to the result of the 2021 Indonesia Nutrition Status Survey, the average stunting prevalence in East Java was 23.5 percent. The regency with the lowest percentage of stunting was Tulungagung (13.1%), while the highest percentage of stunting was recorded in Bangkalan, Madura (38.9%)⁽⁶⁾. Based on this information, we hypothesize that there is an effect of family characteristics on parenting styles for toddlers in both areas. Therefore, the purpose of this study was to investigate the effect of family characteristics on toddler parenting styles in Tulungagung and Bangkalan Regencies.

METHOD

This research applied a descriptive analytical cross-sectional design to analyze the effect of the characteristics of toddler parenting in Tulungagung and Bangkalan Regencies. The sample in this study were mothers who had stunted and non-stunted toddlers in 5 sub-districts in Tulungagung and Bangkalan regencies. The samples were selected using purposive sampling. Based on the 2021 Indonesian Nutrition Status Survey, Bangkalan had a total of 77.634 toddlers, while Tulungagung had 12.840 toddlers. The sample calculation referred to the prevalence of stunting in each regency with a ratio of 1:2 between stunted and non-stunted children. 404 mothers of toddlers were involved as respondents, consisting of 330 mothers in Bangkalan (110 stunted toddlers and 220 non-stunted toddlers) and 74 mothers in Tulungagung (24 stunted toddlers and 50 non-stunted toddlers). The primary data were collected through a structured questionnaire containing open and closed questions that was arranged according to the variables studied, including family characteristics, parenting style, children's dietary habits, history of infection, utilization of health services, and environmental sanitation. The questionnaire on parenting and nutrition for toddlers was prepared by the researchers, while the questionnaire on the utilization of health services and environmental sanitation was adopted from the 2021 Indonesian Nutritional Status Survey (Ministry of Health of the Republic of Indonesia, 2021). Ethical approval for this study was granted by the Ethics Committee of the Faculty of Medicine, Brawijaya University, Indonesia, No. 61/EC/KEPK/03/2022, and the National Unity and Political Agency of each sub-district. All mothers who agreed to participate in this study filled out and signed an informed consent. The data were analyzed using the SPSS program. Descriptive analysis was used to describe the basic characteristics of the respondents under various demographic variables, including parenting style. Bivariate data analysis was carried out using the Chi-square test with a p-value of less than 0.01 to analyze the effect of the characteristics of toddler parenting style in Tulungagung and Bangkalan.

RESULTS

This study investigated the effect of the characteristics of the respondents on toddler parenting in Tulungagung and Bangkalan Regencies. Characteristics are divided into socio-demographic characteristics, socio-cultural parenting style, nutritional parenting style, and health parenting style. The results of the analysis showed that more stunted toddlers in Tulungagung came from non-working mothers, while normal toddlers were found mostly among working

mothers. Regarding the education level, mothers with primary (SD) and lower secondary (SMP) education in Tulungagung (45.7%) were less than Bangkalan (74.2%). Meanwhile, mothers with upper secondary education (SMA) in Tulungagung (54.3%) were larger than Bangkalan (25.7%). These data indicate that mothers in Tulungagung had a higher level of education than mothers in Bangkalan.

Table 1. Differences of Family Characteristics, Parenting Styles, and Risk Factors for Stunting among Toddlers in Tulungagung and Bangkalan

Variable	Tulungagung			Bengkalan		
	Stunting (n=24)	Normal (n=46)	p- value	Stunting (n=105)	Normal (n=198)	p- value
	n(%)	n(%)		n(%)	n(%)	
Family Characteristics						
Mother's age group			0.422			0.597
<20 years	5 (20.8)	11 (23.9)		4 (3.8)	14 (7.1)	
20-25 years	6 (25.0)	13 (28.3)		28 (26.7)	46 (23.2)	
26-30 years	3 (12.5)	11 (23.9)		24 (22.9)	55 (27.8)	
31-35 years	10 (41.7)	11 (23.9)		28 (26.7)	44 (22.2)	
>35 years				21 (20.0)	39 (19.7)	
Employment status			0.951			0.125
Employed	8 (33.3)	15 (32.6)		32 (30.5)	78 (39.4)	
Unemployed	16 (66.7)	31 (67.4)		73 (69.5)	120 (60.6)	
Family income (per month)			0.779			0.779
<1 million rupiah				68 (64.8)	125 (63.1)	
>1 million rupiah				37 (35.2)	73 (36.9)	
Education status			0.988			0.027
Primary or Junior high school	11 (45.8)	21 (45.7)		86 (81.9)	139 (70.2)	

Variable	Tulungagung			Bangkalan		
	Stunting (n=24)	Normal (n=46)	p- value	Stunting (n=105)	Normal (n=198)	p- value
	n(%)	n(%)		n(%)	n(%)	
Family Characteristics						
Senior high school and above	13 (54.2)	25 (54.3)	0.409	19 (18.1)	59 (29.8)	0.333
Children's order						
1 st child	9 (37.5)	22 (47.8)		38 (36.2)	83 (41.9)	
Not 1 st child	15 (62.5)	24 (52.2)		67 (63.8)	115 (58.1)	
Birth attendant			0.469			0.469
Midwives	15 (62.5)	26 (56.5)		83 (79.0)	166 (83.8)	
Medical doctor	9 (37.5)	20 (43.5)		14 (13.3)	23 (11.6)	
Other				8 (7.6)	9 (4.5)	
Socio-cultural Parenting Style						
Live with husband			0.920			0.516
Yes	18 (75.0)	35 (76.1)		90 (85.7)	164 (82.8)	
No	6 (25.0)	11 (23.9)		15 (14.3)	34 (17.2)	
Live with parents/parents in law			0.513			0.274
Yes	9 (37.5)	21 (45.7)		44 (41.9)	96 (48.5)	
No	15 (62.5)	25 (54.3)		61 (58.1)	102 (51.5)	
Mother taking care of the children			0.269			0.553
Yes	22 (91.7)	45 (97.8)		102 (97.1)	188 (94.9)	
No	2 (8.3)	1 (2.2)		3 (2.9)	10 (5.1)	
Parents/in-laws taking care of the children			1.000			0.432
Yes	1 (4.2)	2 (4.3)		7 (6.7)	9 (4.5)	
No	23 (95.8)	44 (95.7)		98 (93.3)	189 (95.5)	

Variable	Tulungagung			Bangkalan		
	Stunting (n=24)	Normal (n=46)	P- value	Stunting (n=105)	Normal (n=198)	P- value
	n(%)	n(%)		n(%)	n(%)	
Family Characteristics						
Age of child when starting to be parented by someone else						0.011
0-6 month old				26 (59.1)	64 (58.2)	
7-12 month old				12 (27.3)	12 (10.9)	
>12 month old				6 (13.6)	34 (30.9)	
Dietary taboos for children			0.705			0.518
Yes	2 (8.7)	6 (13.6)		22 (21.0)	48 (24.2)	
No	21 (91.3)	38 (86.4)		83 (79.0)	150 (75.8)	
Nutritional Parenting Style						

Early breastfeeding (first 1 hour after birth)			0.758			0.812
Yes	15 (62.5)	27 (58.7)		88 (83.8)	168 (84.8)	
No	9 (37.5)	19 (41.3)		17 (16.2)	30 (15.2)	
Provision of liquids other than breast milk at birth			0.600			<0.001
Yes	8 (33.3)	12 (27.3)		44 (41.9)	43 (21.7)	
No	16 (66.7)	32 (72.7)		61 (58.1)	155 (78.3)	
Child's age when stopped for breastfeeding			0.081			0.019
<6 month old	1 (4.2)	9 (19.6)		14 (13.3)	11 (5.6)	
≥ 6 month old	23 (95.8)	37 (80.4)		91 (86.7)	187 (94.4)	
Child's age when receiving food other than breast milk			1.000			0.004
<6 month old	2 (8.3)	3 (6.7)		46 (43.8)	54 (27.3)	

≥6 month old	22 (91.7)	43 (93.5)		59 (56.2)	144 (72.7)	
The frequency of vegetables and fruit consumption			0.403			0.002
Once per day or Not at all	6 (25.0)	16 (34.8)		33 (31.4)	32 (16.2)	
At least twice per day	18 (75.0)	30 (65.2)		72 (68.6)	166 (83.8)	
The frequency of vegetable and animal side dishes consumption			0.352			0.669
Once per day or Not at all	3 (12.5)	11 (23.9)		14 (13.3)	30 (15.2)	
At least twice per day	21 (87.5)	35 (76.1)		91 (86.7)	168 (84.8)	
The person who prepares daily food for children			1.000			1.000
Mother	23 (95.8)	43 (93.5)		103 (98.1)	194 (98.0)	
Others	1 (4.2)	3 (6.5)		2 (1.9)	4 (2.0)	
The person who feeds the children			0.087			0.912
Mother	24 (100)	40 (87.0)		100 (95.2)	188 (94.9)	
Others	0	6 (13.0)		5 (4.8)	10 (5.1)	
History of vitamin A supplementation			0.259			0.046
Yes	22 (95.7)	40 (87.0)		81 (78.6)	134 (67.7)	
No	1 (4.3)	6 (13.0)		22 (21.4)	64 (32.3)	
Type of salt for cooking						0.002
Iodized				86 (81.9)	185 (93.4)	
Non-iodized				19 (18.1)	13 (6.6)	
Health Parenting Style						

Immunization status			0.213			0.553
Basic immunization completed	18 (85.7)	33 (71.7)		93 (96.9)	176 (94.6)	
Basic immunization not completed	3 (14.3)	13 (28.3)		3 (3.1)	10 (5.4)	

Frequency of bathing children			0.343			0.421
< 2 times per day	1 (4.2)	0		3 (2.9)	3 (1.5)	
≥ 2 time per day	23 (95.8)	46 (100)		102 (97.1)	195 (98.5)	
History of contracting illness in the past 6 months			0.524			0.412
Yes	17 (70.8)	35 (77.8)		96 (91.4)	175 (88.4)	
No	7 (29.2)	10 (22.2)		9 (8.6)	23 (11.6)	
Type of health facilities visited when the child sick			0.343			0.098
Secondary health care	1 (4.2)	0		3 (2.9)	15 (7.6)	
Primary health care	23 (95.8)	46 (100)		102 (97.1)	183 (92.4)	
Initial actions before taking a sick child to the health facility			0.063			0.742
Give the child medicine bought from drugstore	9 (37.5)	28 (60.9)		32 (30.5)	64 (32.3)	
Others	15 (62.5)	18 (39.1)		73 (69.5)	134 (67.7)	

As presented in Table 1, in both Tulungagung and Bangkalan, more non-stunted and stunted toddlers were found living in a normal condition (living in the nuclear family with parents and children). In addition, the number of mothers of toddlers living with their parents or parents-in-law was 42.8 percent in Tulungagung and 46.2 percent in Bangkalan. The percentage of toddlers who were parented by their mothers both in Bangkalan and Tulungagung was almost the same, that is, 95.7 percent. Meanwhile, the percentage of toddlers who were parented by other people (grandparents) was 4.28 percent in Tulungagung and 5.28 percent in Bangkalan. In the context of Bangkalan, most toddlers began to be parented at the age of 0–6 months (58.2%). Additionally, breastfeeding within one hour after birth in Tulungagung was 60 percent, while in Bangkalan it was 28.7 percent. Most families did not give non-breast milk liquids at the start of the baby's birth, both in Tulungagung

(68.5%) and Bangkalan (71.2%). The age of weaning (under 6 months) for stunted toddlers in Bangkalan was 18.9%, smaller than Tulungagung (23.8%). Meanwhile, the age of weaning (6 months or older) in Bangkalan (91.7%) was greater than Tulungagung (85.7%). The age of non-breastfeeding for toddlers (under 6 months) in Tulungagung (8.3%) was smaller than Bangkalan (43.8%). In the case of non-breastfeeding for toddlers aged 6 or older, Tulungagung had a higher percentage (92.8%) than Bangkalan (66.9%). Toddlers who consumed vegetables and fruits at least twice a day in Tulungagung was 68.57 percent, while those in Bangkalan was 78.5 percent. Regarding the frequency of consumption of vegetables and fruits (once a day), Tulungagung (31.4%) had a higher percentage than Bangkalan (21.4%). In the case of twice-a-day consumption of vegetables and fruits, Tulungagung (68.57%) was smaller than Bangkalan (78.5%) in

percentage. This shows that the frequency of vegetable and fruit consumption among toddlers in Bangkalan was better than Tulungagung. In addition, 88.5 percent of toddlers in Tulungagung were supplemented with vitamin A, higher than those in Bangkalan (70.95%).

Table 1 also shows that there were no factors that caused stunting in Tulungagung. Meanwhile, there was a factor that caused stunting in Bangkalan, namely the mother's education. In this context, mothers with primary or lower secondary education had a higher risk of having stunted children ($p = 0.027$). Regarding the socio-cultural parenting style, it can be seen that there were also no factors that caused stunting in Tulungagung. On the contrary, the factor that caused stunting in Bangkalan was the age when toddlers started to be

parented by someone else. The risk of stunting was higher for children under 12 months who were parented by someone else ($p = 0.011$). Concerning the nutritional parenting style, the stunting factors were also not found in Tulungagung. In Bangkalan, however, some factors were identified as the cause of stunting, namely the provision of non-breast milk liquids when the baby was born ($p < 0.001$); the child's age when weaned ($p = 0.019$); the child's age when receiving food other than breast milk ($p = 0.004$); the frequency of consumption of vegetables and fruits ($p = 0.002$); and the history of vitamin A supplementation ($p = 0.046$). In the context of health parenting style, there were no factors of stunting found in either Tulungagung or Bangkalan.

Table 2. Differences of Respondent Characteristics and Socio-cultural Parenting Styles in Tulungagung and Bangkalan

Characteristics	Tulungagung					Bangkalan				
	Live with parents/parents in law	Mother taking care of the children	Parents/in-laws taking care of the children	Age of child when starting to be parented by someone else	Dietary taboos for children	Live with parents/parents in law	Mother taking care of the children	Parents/in-laws taking care of the children	Age of child when starting to be parented by someone else	Dietary taboos for children
Mother's age	$p=0.001^*$	$p=1.000$	$p=1.000$	$p=1.000$	$p=1.000$	<0.001	0.225	1.000	0.315	0.267
Employment status	$p=0.557$	$p=0.032^*$	$p=0.032^*$	$p=0.424$	$p=0.009^*$	0.015	1.000	0.524	0.485	0.689
Education level	$p=0.072$	$p=1.000$	$p=1.000$	$p=0.455$	$p=0.125$	0.036	0.746	1.000	0.737	0.002
Family income	$p=0.074$	$p=1.000$	$p=0.547$	$p=0.420$	$p=0.687$	0.028	0.005	0.006	0.384	0.653

As presented in Table 2, the findings showed that mother characteristics affected the socio-cultural parenting style in Tulungagung, that is, mothers

under 25 years old tended to live with their parents or parents-in-law ($p = 0.001$). In addition, non-working mothers tended to raise their children

themselves ($p = 0.032$), did not involve their parents in taking care of their children ($p = 0.032$), and did not have food taboos for children ($p = 0.009$). In Bangkalan, the findings revealed that mothers under 25 years old ($p < 0.001$), employed ($p = 0.015$), primary or secondary education graduates ($p = 0.036$), and had family income of under 1 million rupiah (0.028), tended to live with their parents or parents-in-law. Mothers with a family income of less than 1 million rupiah tended to raise their children themselves ($p = 0.005$) and did not involve their parents in taking care of their children ($p = 0.005$). Meanwhile, mothers graduating from upper secondary education or higher tended to have more food taboos ($p = 0.002$).

Table 2 also shows that mothers under 25 years old in Tulungagung ($p = 0.040$) earning more than 1 million rupiah per month were more at risk of stopping breastfeeding before their children reach 6 months of age. In addition, working mothers were also at risk of skipping vitamin A supplementation for their children ($p = 0.030$). In Bangkalan, mothers under 25 years old tended to give non-breast milk fluids after their babies were born ($p = 0.036$) and skipped vitamin A

supplementation for their children ($p = 0.003$). Likewise, mothers graduating from primary and lower secondary education also tended to give non-breast milk fluids after giving birth to their babies ($p = 0.015$), introduce solid food earlier (before the children were 6 months old) ($p < 0.001$), give vegetables and fruits more often ($p = 0.045$), and skip vitamin A supplementation ($p = 0.003$).

Regarding health parenting style, the results showed that mothers in Tulungagung whose family income was less than 1 million rupiah had a higher risk of their children having a history of illness in the last 6 months. Meanwhile, mothers above 25 years old in Bangkalan were more likely to take their children for treatment to a health care facility ($p = 0.031$). Mothers who graduated from primary or lower secondary education preferred to take their children to the hospital ($p = 0.050$). Last but not least, mothers whose family income was less than 1 million rupiah per month were more likely to give medicines from pharmacies as an initial treatment when their children were sick ($p = 0.011$).

Table 3. Differences of Respondent Characteristics and Nutritional Parenting Styles in Tulungagung and Bangkalan

Characteristics	Tulungagung					Bangkalan				
	Provision of fluids other than breast milk at birth	Child's age when stopped for breast feeding	Child's age when received food other than breast milk	The frequency of vegetables and fruit consumption	History of vitamin A supplementation	Provision of fluids other than breast milk at birth	Child's age when stopped for breast feeding	Child's age when received food other than breast milk	The frequency of vegetables and fruit consumption	History of vitamin A supplementation
Mother's age	0.079	0.040	0.100	0.607	0.259	0.036	0.274	0.484	0.597	0.003
Employment status	0.160	0.279	1.000	0.222	0.030	0.344	0.182	0.740	0.322	0.241

Education level	0.925	0.745	1.000	0.585	0.692	0.015	0.788	<0.001	0.045	0.003
Family income	0.210	0.025	1.000	0.612	0.188	0.495	0.028	0.401	0.484	0.569

Table 3 shows that there is no difference in giving fluids other than breast milk in Tulungagung district between different ages of mothers ($p=0.079$), but in Bangkalan district there are differences in giving liquids other than breast milk ($p=0.036$). There was no difference in giving fluids other than breast milk in Tulungagung district between working and non-employed mothers ($p=0.160$) as well as in Bangkalan district ($p=0.344$). There was no difference in giving fluids other than breast milk in Tulungagung district between different levels of education ($p=0.925$), but in Bangkalan district there was a difference ($p=0.015$). Likewise, there was no difference in giving liquids other than breast milk in Tulungagung district between high and low income ($p=0.210$). Likewise, there was no difference in Bangkalan district. ($p=0.495$).

There is a difference in the age of the children at weaning in Tulungagung district between different ages of the mother ($p=0.04$), but in Bangkalan district there is no difference in the age of the children at weaning ($p=0.274$). There was no difference in the age of children at weaning in Tulungagung district between working and non-employed mothers ($p=0.279$) as well as in Bangkalan district. There was no difference in the age of children at weaning in Tulungagung district between different levels of education ($p=0.279$), but in Bangkalan district there was a difference ($p=0.279$). Likewise, there was no difference in the age of children at weaning in Tulungagung district between high and low income ($p=0.210$). Likewise, there was no difference in Bangkalan district. ($p=0.495$)

There is no difference in the age of the child when receiving food other than breast milk in Tulungagung district between different ages of the mother ($p=0.100$), as well as in Bangkalan district there is no difference in the age of the child when receiving food other than breast milk ($p=0.484$). There was no difference in the age of the child

when receiving food other than breast milk in both Tulungagung and Bangkalan districts between working and non-employed mothers ($p=0.740$). There was no difference in the age of the child when receiving food other than breast milk in Tulungagung district between different levels of education ($p=1.00$), but in Bangkalan district there was a difference ($p<0.001$). There is no difference in the age of children when they receive food other than breast milk in Tulungagung district between high and low income ($p=1.00$). Similarly, there is no difference in Bangkalan district. ($p=0.401$).

There is no difference in the frequency of consumption of vegetables and fruit in Tulungagung district between different ages of the mother ($p=0.607$), likewise there is no difference in Bangkalan district ($p=0.597$). The frequency of consumption of vegetables and fruit did not differ between mothers who worked and were not well in Tulungagung ($p=0.222$) and Bangkalan ($p=0.322$). There was no difference in the frequency of consumption of vegetables and fruit in Tulungagung district between working and non-working mothers ($p=0.585$), but in Bangkalan district there was a difference ($p=0.045$). There is no difference in the frequency of consumption of vegetables and fruits in Tulungagung district ($p=0.612$) and Bangkalan district ($p=0.484$) between different levels of education.

There is no difference in giving Vitamin A supplements in Tulungagung district between different ages of the mother ($p=0.259$), but in Bangkalan district there is a difference in giving Vitamin A supplements ($p=0.003$). There was a difference in the provision of Vitamin A supplements in Tulungagung district between the employment status of mothers who were working or not ($p=0.030$) but in Bangkalan district there was no difference ($p=0.241$). There was no difference in the provision of Vitamin Adi Supplements in Tulungagung district between different levels of education ($p=0.692$), but in

Bangkalan district there was a difference (p=0.03). Likewise, there is no difference in Provision of Vitamin Adi Supplements in Tulungagung Regency between High and Low Income

(p=0.188) Likewise in Bangkalan Regency there is no difference. (p=0.569)

Table 4. Differences of Respondent Characteristics and Health Parenting Styles in Tulungagung and Bangkalan

Characteristics	Tulungagung					Bangkalan				
	Immunization status	History of contracting illness in the past 6 months	Visiting health facilities when the child sick	Type of health facilities visited when the child sick	Initial actions before taking a sick child to the health facility	Immunization status	History of contracting illness in the past 6 months	Visiting health facilities when the child sick	Type of health facilities visited when the child sick	Initial actions before taking a sick child to the health facility
Mother's age	N/A	0.442	1.000	1.000	0.231	1.000	0.602	0.031	0.417	0.167
Employment status	N/A	0.843	0.546	0.329	0.555	0.775	0.530	0.862	0.200	0.419
Education level	N/A	0.444	0.589	0.457	0.602	0.196	0.744	1.000	0.050	0.058
Family income	N/A	0.040	1.000	1.000	0.848	0.776	0.810	1.000	0.200	0.011

Table 4 shows that there is no difference in the history of the disease in the last 6 months in Tulungagung and Bangkalan districts between the ages of mothers over 25 years and below (p=0.442), (p=0.602). There was no difference in the history of the disease in the last 6 months in working mothers and not well in Tulungagung (p=0.843) and Bangkalan (p=0.530). Likewise, there was no difference in the past 6 months of medical history in higher and lower education in both Tulungagung District (p=0.444) and Bangkalan (p=0.744). There was a difference in the history of the disease in the last 6 months in Tulungagung district between different income levels (p=0.040), but in Bangkalan district there was no difference (p=0.810).

There is no difference in visits to health facilities when children are sick in Tulungagung district for mothers aged over 25 years and below (p=1.00) but in Bangkalan district there is a difference between mothers aged over 25 years and below (p= 0.031), (p=0.602). There is no difference between visits to health facilities when children are sick to mothers who work and are not well in Tulungagung (p=0.546) and Bangkalan (p=0.862). Likewise, visits to health facilities when children are sick at higher and lower levels of education were not different in Tulungagung District (p=0.589) and Bangkalan (p=1,000). There is no difference in Visits to Health Facilities When Children Are Sick in both Tulungagung districts between different income levels

($p=1,000$), as well as in Bangkalan district ($p=1,000$).

Table 4 shows that the type of health service visited when the child is sick in Tulungagung district is no different for mothers aged over 25 years and below ($p=1.00$). ($p=0.417$), ($p=0.602$). There was no difference in the type of visits to health facilities when the child was sick to mothers who worked and were not well in Tulungagung ($p=0.546$) and Bangkalan ($p=0.862$). Likewise, there was no difference in the types of health services visited when children were sick in higher and lower education in Tulungagung District ($p=0.329$) and Bangkalan ($p=0.200$). There was no difference in the type of health services visited when the child was sick in both Tulungagung districts between different income levels ($p=1.00$), as well as in Bangkalan district ($p=0.200$).

The type of health service visited when the child is sick in Tulungagung district is no different for mothers aged over 25 years and below ($p=1.00$). ($p=0.417$), ($p=0.602$). There was no difference in the type of visits to health facilities when the child was sick to mothers who worked and were not well in Tulungagung ($p=0.546$) and Bangkalan ($p=0.862$). Likewise, there was no difference in the types of health services visited when children were sick in higher and lower education in Tulungagung District ($p=0.329$) and Bangkalan ($p=0.200$). There was no difference in the type of health services visited when the child was sick in both Tulungagung districts between different income levels ($p=1.00$), as well as in Bangkalan district ($p=0.200$).

The initial action before bringing a sick child to the health service in Tulungagung district was no different for mothers aged over 25 years and below ($p=0.231$). $p=0.167$). There was no difference in the initial action before bringing sick children to health services for mothers who were working and not doing well in Tulungagung ($p=0.555$) and Bangkalan ($p=0.419$). Likewise, there was no difference in the initial action before bringing sick children to health services in higher and lower education in Tulungagung District ($p=0.602$) and Bangkalan ($p=0.058$). There was no difference in initial action before taking a sick child to health services in Tulungagung district between different income levels ($p=1.848$), but

there was a difference in Bangkalan district ($p=0.011$).

DISCUSSION

Mothers have an immense role in the growth and development of children, especially in toddlerhood. Aditianti found that one of the risk factors associated with stunting in children aged 24-59 months in Indonesia was mothers' education (AOR 1.44; 95% CI 0.89–1.23). It was even said that mothers' education is the main risk factor for stunting after considering other factors (Abuya *et al*, 1998). Moreover, orphans had an increased risk of stunting (RR 1.3; 95% CI 1.2-1.4) compared to those living with their parents (Finlay *et al*, 2016). The presence of parents or parents-in-law of mothers contributes to parenting styles, including feeding toddlers, visiting an Integrated Service Post and preparing food for toddlers at home.

The provision of nutritious food is one of the most important aspects of achieving optimal health and nutritional status in toddlers. However, special attention is needed regarding the rules for providing food, such as the age at which food is introduced, the type of food, and the frequency of giving food. Prelacteal food is food given to newborns before breastfeeding. Prelacteal feeding at an early age can cause health problems and is a risk factor for stunting in toddlers (Sara, M *et al*, 2016 and Rohmah, M *et al*, 2022). One of the reasons newborns are given prelacteal food is due to the lack of knowledge of mothers and the absence of early initiation of breastfeeding within an hour after birth (AOR: 2.70; 95% CI: 1.78, 3.99). This condition needs attention from health workers by conducting continuous education on how to promote the use of breast milk within an hour after birth (Legasse, 2014).

Macronutrients such as carbohydrates, proteins, and fats are needed by the body to get energy to grow and develop. In addition, micronutrients, which consist of fiber, vitamins, and minerals, also play an important role in the growth and development of a child. There was also a correlation between vitamin A supplementation and stunting in children aged 24-59 months ($p = 0.024$) (Legasse, 2014). Children who suffer from

a deficiency of vitamin A will be more susceptible to infection due to a decreased immune response, so they are at a higher risk of stunting (Sandjaya, S, 2015 and Elvandari *et al*, 2017).

There were differences in the demographic characteristics of respondents in Tulungagung and Bangkalan districts in the terms of average age of mother, income, education level, age of children, and birth attendants. Respondents in Tulungagung have a younger average age, have a better income and level of education, have older children under five, and many birth attendants are assisted by doctors. The difference in income levels of the two groups is supported by data from the Central Statistics Agency in 2020 which shows that the number of poor people in Bangkalan is indeed higher than Tulungagung, namely 204,000,000 people versus 76,040,000 people, consecutively (Indonesian Ministry of Health, 2021a; Tulungagung Regional Development Planning Agency, 2021). Data on the health profile of East Java in 2020 shows that both districts have not reached the target for delivery by health workers. However, Bangkalan has a lower delivery rate by health workers than Tulungagung (Indonesian Ministry of Health, 2021a). Unfavorable economic status conditions in Bangkalan can increase the risk of stunting (Beal, 2018) as the stunting rate in Bangkalan is still high.

Previous study by Illahi & Muniroh (2016) in Bangkalan examine socio-cultural practices related to early initiation of breastfeeding, newborn immunization practices, prelacteal feeding for newborns, early breastfeeding complementary feeding (given for baby under 6 months old), and abstinence from consuming too much marine fish. Study by Illahi & Muniroh (2016) is also in line with present study indicated that most mothers of children under five in Bangkalan have initiated early breastfeeding but the proportion is different in Tulungagung which is lower than in Bangkalan. Previous study conducted by Sunartiningsih, Fatoni, & Ningrum (2020) showed that there is a relationship between early initiation of breastfeeding and the incidence of stunting. Babies who do not initiate early breastfeeding affect their future height growth because they do not benefit from colostrum and

are proven at the age of 12-24 months to experience stunting conditions or height that is not appropriate for the child's age. Previous study showed that there is an effect of prelacteal feeding with the incidence of stunting. Giving prelacteal intake before breast milk comes out and a history of infectious diseases will affect the occurrence of children's growth that is not optimal (stunting) (Rohmah et al., 2022).

There was a difference in Tulungagung and Bangkalan districts in terms of the children immunization status. Tulungagung has a better complete immunization status than Bangkalan. This difference can be caused by differences in education levels as research data shows that the level of education in Tulungagung is higher than in Bangkalan. Previous research found that mothers with high levels of education had children with complete immunization status. A good level of knowledge can have an impact on differences in mothers' attitudes. A positive mother's attitude will make mothers more diligent in immunizing their children (Hartatik et al, 2013; Hudhah et al., 2017). The education level of respondents in Bangkalan which is lower than Tulungagung increased the risk of stunted children as reported from previous study.

Another factor that can also affect this result is the difference in birth attendants where in Tulungagung, it was found that more maternal deliveries were assisted by health workers. As previous studies reported that mothers who were helped by health workers reported having complete immunization status for their children (Efendi, 2019). This is possible because health workers will simultaneously provide important information related to immunization to mothers who are assisted in childbirth.

Respondents in Tulungagung had better behavior in accessing health services when their child was sick than mothers in Bangkalan. This could be due to the higher education level of mothers in Tulungagung. Education is a very important factor to provide the ability to think, analyze and understand the information obtained with more rational considerations and a good education will also provide a good ability to make decisions about family health (Hastono, 2010; Chandra et

al., 2020). Meanwhile, mothers in Bangkalan have less behavior in using health services when their child is sick compared to mothers in Tulungagung. Low knowledge of caregivers may have an impact on the perception that the disease is mild. Previous qualitative study stated that parents will use traditional medicine first to deal with the sickness condition children (Purwati, 2021).

CONCLUSION

Tulungagung, the regency with the lowest prevalence of stunting in East Java in 2021, had family characteristics and parenting styles that led to a lower risk of stunting than Bangkalan, the regency with the highest prevalence of stunting. Interventions for stunting prevention by studying characteristics of each region need to be carried out.

REFERENCES

- [1] Abuya BA, Ciera J, Kimani-Murage E. Effect of mother's education on child's nutritional status in the slums of Nairobi. *BMC Pediatr.* 2012;12(1998).
- [2] Aditianti A, Raswanti I, Sudikno S, Izwardy D, Irianto SE. Prevalence and risk factors for stunting in toddlers 24-59 months in Indonesia: analysis of basic health research data 2018 [Prevalence and stunting risk factors in children 24-59 months in Indonesia: analysis of basic health research data 2018]. *Nutrition and Food Researcher (The J Nutr Food Res.* 2020;43(2):51-64.
- [3] Barker DJP, Thornburg KL, Osmond C, Kajantie E, Eriksson JG. Beyond birthweight: The maternal and placental origins of chronic disease. *J Dev Orig Health Dis.* 2010;1(6):360-4.
- [4] Beal, Ty, et al. 2018. A review of child stunting determinants in Indonesia. *Maternal & Child Nutrition* 2018 Oct; 14(4): e12617.
- [5] Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet.* 2008;371(9608):243-60.
- [6] Diadjeng Setya W, Rismaina Putri, Miftahul Jannah (2022). Impact Of The Covid-19 Pandemic On The Convergence Effort Of Stunting Prevention And Treatment In East Java Province. *International Journal of Mechanical Engineering, Vol 7 , No 2, February 2022; Page 1943-1949*
- [7] Elvandari M, Briawan D, Tanziha I. Vitamin A supplementation and nutrient intake with serum retinol and morbidity in children 1-3 years. *J Nutrition Clinical Indonesia.* 2017;13(4):179
- [8] Fatimah D, Chondro F. The relationship between giving vitamin A capsules and caregiver knowledge with stunting in children aged 24-59 months. *J Biomedicine and Health.* 2020;3(4):176-82.
- [9] Finlay JE, Fink G, McCoy DC, Tavárez LC, Chai J, Danaei G, et al. Stunting risk of orphans by caregiver and living arrangement in low-income and middle-income countries. *J Epidemiol Community Health.* 2016;70(8):784-90.
- [10] Hartatik, Naik, et al. (2013). Relationship of Mother's Attitude About Complete Basic Immunization with Completeness of Immunization for Infants at Posyandu Pucangan Village, Kauman District, Tulungagung Regency, 2012. *Scientific Journal of Midwifery.* Pages 31-34.
- [11] Hastono, S. (2010). Health data analysis. Jakarta: Faculty of Public Health, University of Indonesia. *Journal of Mental Nursing*
- [12] Illahi, R K; Muniroh, L. 2016. Socio-cultural Description of Madurese Ethnic Nutrition and Stunting Incidents of Toddlers Age 24-59 Months in Bangkalan. *Indonesian nutrition media.* Volume 11 No. 2 July-December 2016: p. 135-143
- [13] Indonesian Ministry of Health. (2000). National Plan of Action for Food and Nutrition, 2001-2005.
- [14] Indonesian Ministry of Health. (2021a) *Indonesia Nutrition Status Study 2021-Individual Questionnaire.* National Health Research and Development Agency for Health Research.
- [15] Indonesian Ministry of Health. (2021b). *Pocket Book of Indonesian Nutrition Status Study Results (SSGI) in 2021.* Health Research and Development Office, Ministry

- of Health of the Republic of Indonesia. <https://www.litbang.kemkes.go.id/buku-saku-hasil-studi-status-gizi-indonesia-ssgi-tahun-2021/>
- [16] Kotch JB. Maternal and Child Health - Jonathan B Kotch. Jones & Bartlett Learning LLC; 2013.
- [17] Legesse M, Demena M, Mesfin F, Haile D. Prolactal feeding practices and associated factors among mothers of children aged less than 24 months in Raya Kobo district, North Eastern Ethiopia: A cross-sectional study. *Int Breastfeed J*. 2014;9(1):1–8.
- [18] Mc.Lanahan, Sara and Booth, Karen. (1989). Mother Only Families: Problems, Propects and Politics. *Journal of Marriage and The Family* 55: 481-493
- [19] Ministry of Health of the Republic of Indonesia. Pocket book of results of the Indonesian Nutrition Status Study (SSGI) at the national, provincial and district/city levels in 2021. 2021. 1–168 p.
- [20] Rolfes SR, Pinna K, Whitney E. Understanding Normal and Clinical Nutrition, 9th Ed. [Internet]. 2012. 1184 p. Available from: [http:// books.google.com.au/books/about/Understanding_Normal_and_Clinical_Nutrit.html?id=c27B9Y83r8cC&pgis=1](http://books.google.com.au/books/about/Understanding_Normal_and_Clinical_Nutrit.html?id=c27B9Y83r8cC&pgis=1)
- [21] Rohmah M, Natalia S, Mufida RT, Siwi RPY. The Influence of Prolactal Intake History and History of Infectious Diseases on the Incidence of Stunting in Children Aged 1-3 Years at the Tangeban Health Center, Banggai District. *J Qual Women's Heal*. 2022;5(1):17–26.
- [22] Purwati, Nyimas Heny. (2021). Knowledge and Health Seeking Behaviour of Family Caregiver of Children with Pneumonia: A qualitative in urban community in Indonesia. *Belitung Nursing Journal* Vol 7 (2).
- [23] Sandjaja S. Serum Retinol Binding Protein (Rbp) For Breastfeeding Mothers And Babies In Two Districts In West Java Serum Retinol Binding Protein of Lactating Mothers and Infants at Two Districts in West Java. *Indonesian Nutrition* [Internet]. 2015;38(2):143–54. Available from: <http://ejournal.persagi.org/go/>
- [24] Sara M, Hertanto W, Irene M. Food (prelactal and papaya) as a risk factor for stunting at the age of 12-24 months in East Lombok, West Nusa Tenggara. *J Health Sciences* [Internet]. 2016;1–10. Available from: http://eprints.undip.ac.id/56087/1/JURNAL_PUBLIKASI_STUNTING.pdf
- [25] Tamburlini G. Nurturing care for early child development. Vol. 37, *Medico e Bambino*. 2018. 489 p.
- [26] Tulungagung Regional Development Planning Agency (2021). *Stunting Prevalence in Tulungagung Regency 2021*. Tulungagung Regional Development Planning Agency.
- [27] Wardani, Diadjeng S., Hariyanti, Tita (2022). Comparative Study: Audiovisual Method And Teleducation Method On Increasing Knowledge And Attitude Of Pregnant Women As Stunting Prevention Effort. *Journal of Positive School Psychology*, Vol. 6, No. 8, 1854-1862 (2022).
- [28] Wardani, Diadjeng S (2021). Team Convergence in Prevention and Reduction of Stunting Rate in Malang District, East Java, Indonesia. *Journal of Bioscience Biotechnology Research Communications*. Special Issue Vol 14 No 05 (2021) Pp-133-140.
- [29] World Health Organization. (2010). Nutritional Prevalence.
- [30] World Health Organization (2018) Nurturing care for early childhood development: a framework for helping children survive and thrive to transform health and human potential