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Parental Sociodemographic Factors Associated with Stunted Children below 5 Years of Age in Kampar Indonesia

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Abstract

BACKGROUND: The prevalence of stunted children under 5 years in Riau Province exceeds 27.35% and Kampar District contributed the highest prevalence rate (32.05%) compared to other districts in Riau Province.

AIM: This study aims to analyze the parental sociodemographic factors of parents associated with stunting children in Kampar District, Riau Province in Indonesia.

METHODS: This type of research is a case-control study on stunted children in Kampar Regency aged under 5 years. Control group was selected by matching process include age, gender, residence, and socioeconomic status. Anthropometric measurements performed and calculated using the World Health Organization Anthro (version 3.2.2, October 2020) include weight-for-age z-score (WAZ), height-for-age z-score (HAZ), weight-for-height z-score (WHZ), and body mass index. The analysis carried out includes univariate and bivariate analysis to find the relationship between the independent variable and the dependent variable.

RESULTS: Approximately 139 children aged 2 to 59 months consist of stunted (68) and nonstunted (71) groups. Among the 68 stunted children, 31 (41.3%) were very stunted. The stunted group had decreased in WAZ, HAZ, and WHZ, but only HAZ was statistically significant ($p < 0.05$). Lower mother's height and education were determined of parental sociodemographic factors associated with stunting and increased risk of stunted children in Kampar (odds ratio [OR] 3.02 and OR 2.50, 95% confidence interval, respectively).

CONCLUSIONS: Lower maternal's height and education were determine parental sociodemographic factors associated with stunting in Kampar.

Introduction

Stunting was defined as a height-for-age z-score (HAZ)-2 standard deviation (SD) of the mean height of the World Health Organization (WHO) reference population [1]. Stunting is a complex entity that may reflect several etiologists, most notably a poor and unbalanced diet and insufficient intake of vitamins/micronutrients. It also involves social factors, including family resources and configuration, as well as the broader political and economic conditions in which children live [2]. Stunting is a devastating result of poor nutrition *in utero* and early childhood. Children who are stunted may never reach their maximum height and their brains may never develop to their full cognitive potential [3].

Children whose growth are stunted more likely to experience higher rates of death, morbidity, and cognitive and motor development [4]. These children begin their lives at a real disadvantage; they face learning difficulties in school, earn less as adults, and face barriers to participation in their communities. Globally, approximately 149.2 million children under 5 years of age were stunted in 2020. This number could increase substantially due to cost constraints in accessing nutritious food and essential nutrition services during the COVID-19 pandemic, with the full impact on stunting possibly taking years to manifest [3].

Several studies have examined the factors associated with stunting in areas that focus on examining this occurrence as complex and multidimensional at the individual, household, community, and national levels [5]. Beal found consistent evidence showing that nonexclusive breastfeeding for the first 6 months, low household socioeconomic status, premature birth, short birth length, and low maternal height and education were important determinants of child stunting in Indonesia [6]. Li *et al* found in many low- and middle-income countries, socioeconomic conditions, and nutritional statuses of parents are the strongest factors associated with anthropometric failure of children [7].

Mansur in Bangladesh found that urban dwellers and working mothers were associated with a higher likelihood of childhood stunting [8]. Titaley's research from the 2013 Indonesian basic health survey found that the odds ratio (OR) for stunting increased significantly among children living in households with 3 or more children under 5 years of age, households with five to seven household members, children with children whose mothers during pregnancy attended <4 antenatal care services, boys, children aged 13–23 months, and children weighting <2500 g at birth [9].

The latest data from the 2018 Indonesian National Basic Health Research, the number of stunted children under 5 years is around 30.8%. There are large differences between provinces, ranging from 26% to 40% [10]. In Riau Province, the number of stunted children exceeds 27.35% and among all districts in Riau, Kampar district is the highest (32.05%) [11]. Kampar district area borders the capital City of Riau Province, Pekanbaru and has socioeconomic and health services coverage that are not different from other districts in Riau Province. Therefore, we conducted a study that aimed to determine the parental sociodemographic risk factors associated with stunted children under 5 years old living in Kampar.

Methods

Design

The research was an analytical observation with case–control study to investigate the parental sociodemographic risk factors associated with stunted children in Kampar.

Settings

The study was conducted during July–December 2021 in Kampar District. We selected five villages in Kampar district by simple random sampling: Parit Baru, Palung Jaya, Pulau Sarak, Rumbio, and Balam Jaya. The stunted children were recruited from Public Health Centers (PHC) data and nonstunted children group as control were recruited from patients whose came to PHC or Maternal and Health Primary Care (posyandu) for periodically checked up.

Inclusion and exclusion criteria

Inclusion criteria stunted children: aged 0–59 months old, body length/height below – 2 SD according to the WHO 2006 growth chart according of age and gender, written consent by parents to participate in the study. Exclusion criteria: genetic disorder, disproportion short stature, syndromes, and chronic or systemic diseases. Control or nonstunted group was chosen after adjusting age, gender, residence, and socioeconomic status.

Data collection methods

The children data collected includes age, gender, body height/length and weight, upper/lower segment ratio, birth weight, birth length, exclusive breastfed, and immunization status. Parental data included age, body weight, body height, education, and number of children in family. Before data collection, parents or carers were asked to obtain written consent. This study used data collection techniques in the form of interviews using questionnaires, then measurements of height, weight of children and parents were carried out simultaneously. For children 0–24 months, body length was measured using the baby length board, whereas children 24–60 months using the stature meter with accuracy of 0.1 cm. Body weight was measured with minimal clothing using calibrated scale with accuracy 0.1 kg. All gauges are properly verified. Independent variables such as characteristics of children and parents, number of households were asked using a structural questionnaire with direct interviews of trained enumerators with parents. Anthropometric variables were defined according to the 2006 WHO growth chart and calculated using the WHO Anthro (version 3.2.2, October 2020). The following variables were calculated: HAZ, weight-for-age z-score (WAZ), and weight-for-height z-score (WHZ). The following cutoffs as defined by the WHO were used: stunted: <−2 HAZ, severe stunted: − 3 HAZ.

Statistical analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 26.0 (IBM Co., Armonk, NY, USA). We used descriptive statistic to conduct the univariate and bivariate analysis. Univariate analysis was used to analyze children and parents' characteristic distribution and bivariate analysis was used to analyze the relationship between risk factors and stunting incidence using Chi-squared test and OR analysis with 95% confidence interval (CI) was used to determine risk factors of stunting. The $p < 0.05$ indicates statistical significance.

Ethical consideration

Institutional permission was obtained from the Research Ethics Committee of the Faculty of Medicine, Riau University to Conduct Research with code B/063/UN19.5.1.8/UEPKK/2021. The protocol included written consent for participation in the study and requested data from all parents or guardians of each child participant on their behalf.

Results

This study involved 139 children consisting of 68 stunted children and 71 nonstunted children

Table 1: Characteristics of children

Characteristic	Nutritional status		Total (n=149)	p
	Stunted children (n=71)	Non stunted children (n=68)		
Age (months)*	30.7 (13.0)	27.2 (15.8)	139 (100)	0.156
Gender				
Boys	40 (51.3)	38 (48.7)	78 (100)	1.000
Girls	31 (50.8)	30 (49.2)	61 (100)	
Birth weight (g)				
<2500	6 (100)	0	6 (100)	0.002
2500–4000	65 (50.4)	64 (49.6)	129 (100)	
>4000	0	4 (100)	4 (100)	
Birth length (cm)				
<48	11 (78.6)	3 (21.4)	14 (100)	0.059
≥48	60 (48)	65 (52)	125 (100)	
Exclusive breastfeed				
Yes	39 (48.1)	42 (51.9)	81 (100)	0.519
No	32 (55.2)	26 (44.8)	58 (100)	
Basic immunization status				
Complete	48 (51.1)	46 (48.9)	94 (100)	1.000
Incomplete	23 (51.1)	22 (48.9)	45 (100)	

*Data are expressed as mean±SD. Significant difference from control at P<0.05. n: Number of subject in each group, SD: Standard deviation.

aged 2–59 months. Among the 68 stunted children, 31 (41.3%) were very stunted. Table 1 shows the sociodemographic characteristics of children. The average age of stunted children was 30.7 months compared to 27.2 months of nonstunted children. Stunted children are more common in boys than girls, respectively, by 57.3% to 42.6%. The low birth weight more common in stunted group compared to control and statistically significant (p < 0.05). There was no difference between exclusive breastfeeding and complete basic immunization between stunted and nonstunted children.

Table 2 shows the anthropometric profile between stunted and nonstunted children. The data showed a significant decrease in WAZ, HAZ, and WHZ in stunted children compared to nonstunted children, but only HAZ was significantly significant (p < 0.05). There was no difference in (BMI-for-age Z-scores) between the two groups.

Table 2: Anthropometric profile of the children

Variable	Nutritional status		p
	Stunted (n=71)	Non-stunted (n=68)	
WAZ	−2.501 (1.047)	−1.068 (1.025)	0.595
HAZ	−2.99 (1.047)	−0.877 (1.013)	0.039
WHZ	−1.174 (1.414)	−0.835 (1.40)	0.538
BMIAZ	−0.817 (1.42)	−0.800 (1.44)	0.534

Data are expressed as mean±SD. Significant difference from control at P<0.05. WAZ: Weight for age Z-score, HAZ: Height-for-age Z-score, WHZ: Weight-for-height Z-score, BMIAZ: Body mass index Z-score, *n*: Number of subject in each group, SD: Standard deviation.

Table 3 shows the parental sociodemographic risk factors associated with stunting in children in Kampar. There was no relationship between parent's age, and father's education level and number of children in family with the risk of stunting in children (Figure 1). However, maternal education and maternal height are determining sociodemographic risk factors associated with stunting in their children. The relationship was considered statistically significant with p < 0.05. Mothers with low education had a higher risk of having stunted children compared to those with higher education (OR 3.02, 95% CI: 1.48, 6.16, p < 0.05). Meanwhile, children with lower maternal height (<150 cm) had a higher risk of experiencing stunting compared to normal maternal height (≥150 cm) (OR 2.50, 95% CI: 1.23, 5.07, p < 0.05).

Discussion

Our study aims to determine the parental sociodemographic factors associated with stunting children under 5 years old in Kampar, a district in Riau Province, Indonesia. The study showed that prevalence of stunting children was more common among male than female children but statistically was not significant. This founding similar to other studies that documented boys more common than girls in the prevalence of stunted children [12], [13], [14]. To date, it is unclear what social or biological reason might account for this difference [14]. The results showed that there were differences in birth weight between these groups where low birth weight was more commonly found in stunted group compared to nonstunted group and it was statistically significant (p < 0.05). Many studies support that low birth weight is an important factor in the occurrence of stunting in children [12], [15]. Birth weight is an important marker of maternal and fetal health and nutrition. Newborns with low birth weight have a higher risk of death in the first 28 days of life. Those who survive are more likely to suffer from stunted growth [16].

Table 3: Parental sociodemographic risk factors for stunting children

Characteristic	Nutritional status		Total	p	OR	95% CI	
	Stunted (n=71)	Non-stunted (n=68)				Minimum	Maximum
Mother's age (years old)							
20–35	55 (51.9)	51 (48.1)	106 (100)	0.887	1.146	0.524	2.504
>35	16 (48.5)	17 (51.5)	33 (100)				
Mother's education							
Low	37 (67.3)	18 (32.7)	55 (100)	0.004	3.023	1.483	6.161
High	34 (40.5)	50 (59.5)	84 (100)				
Mother's height (cm)							
<150	35 (64.8)	19 (35.2)	54 (100)	0.016	2.507	1.239	5.074
≥150	36 (42.4)	49 (57.6)	85 (100)				
Father's height (cm)							
<160	4 (66.7)	2 (33.3)	6 (100)	0.716	1.970	0.349	11.125
≥160	67 (50.4)	66 (49.6)	123 (100)				
Father's education							
Low	43 (58.1)	31 (49.1)	74 (100)	0.110	1.833	0.934	3.596
High	28 (43.1)	37 (56.9)	65 (100)				
Number of children							
≤2	48 (56.5)	37 (43.5)	85 (100)	0.155	1.749	0.878	3.483
>2	23 (42.6)	31 (57.4)	59 (100)				

Significant difference from control at P<0.05. Data are expressed as n (%). n: Number of subject in each group, OR: Odds ratio, CI: Confidence interval.

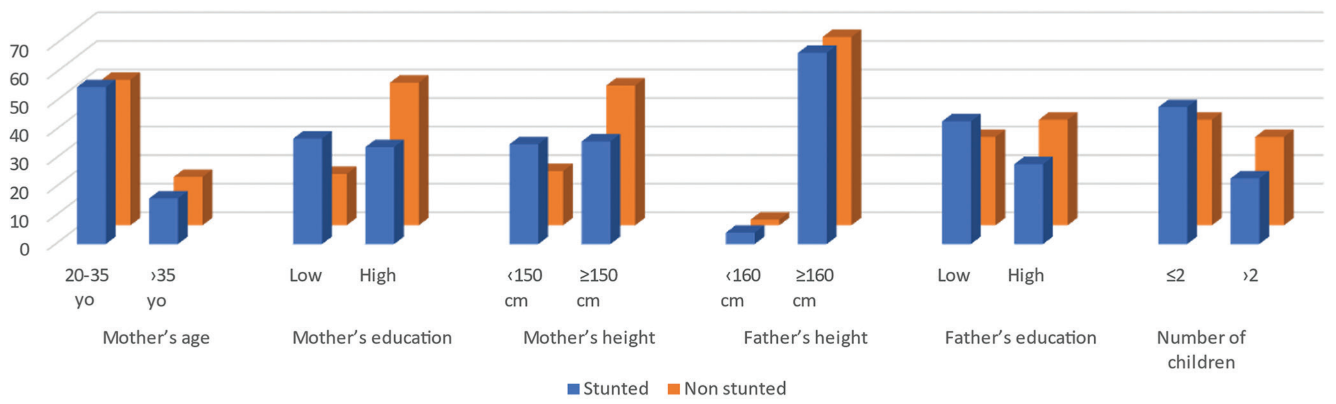

Figure 1: Parental sociodemographic risk factors for stunting children

Another results showed that there were no difference among length of birth, exclusive breastfeeding, and completeness of basic immunizations between stunted compared to nonstunted group. In contrast, consistent evidence suggests nonexclusive breastfeeding for the first 6 months, low household socioeconomic status, premature birth, short length birth and low maternal height, and education are particularly important child stunting determinant in Indonesia [5]. Rahayu *et al* found short length birth was dominant risk factor associated with stunted children [17]. However, in our study, length birth, breastfeeding, and completeness basic immunization were not significant factor associated with stunting.

Anthropometric data showed a decrease in WAZ, HAZ, and WHZ in stunted children compared to nonstunted children, but only HAZ was statistically significant. This means that the coexistence of stunting, wasting, and underweight in our subject participants already exists. Studies in Bangladesh found that one in thirty-five children had coexisted with stunting, wasting, and underweight [13].

Our study found that lower maternal education was associated with stunted children. Around 67.3% of mothers with low education have stunted children. Two studies in Jakarta and Indonesia reported that low maternal education was a risk factor for stunting in children [9], [18]. Another study found that children whose mothers were highly educated and whose height was >150 cm had a lower risk of stunting compared to mothers whose have lower education and shorter height (<150 cm) [17], [19]. In contrast, a study by Manggala [15] found a correlation of father's low education with stunting in children, which inconsistent with our study demonstrating mother's low education had increased risk of stunting in their children with $p = 0.004$ and OR = 3.02 (95% CI: 1.48–6.16). Our findings are supported by the fact that caregiver education is an important predictor of child health and nutritional outcomes. It is estimated that the increase in women's education was responsible for nearly 43% of the total reduction in malnutrition between 1971 and 1995 [20].

Lower maternal height in our study was found to be a significant factor associated with stunted children. A study also found that maternal height <150 cm coincided with maternal age at high risk, low birth weight, and body length were strongly associated with stunting [12]. Beal reports that lower maternal height along with lower maternal education are important determinants of child stunting in Indonesia [6]. Maternal height affects the linear growth of offspring during the growth period. These effects are likely to include both genetic and nongenetic factors, including the intergenerational influence of nutrition on growth that prevents attainment of genetic high potential in low- and middle-income countries [21].

Our study showed that maternal factor include low body height and low education level determine parental risk factors associated with stunted children in Kampar. In Zambia, the main factors for stunting in children under 5 years of age are the sex and age of the child; mother's age and education level; wealth status; improvement of drinking water sources; duration of breastfeeding, and place of residence [22].

There were limitations in our study including limited number of parental risk factors analyzed and the results came out without adjusting for possible confounding factors. Furthermore, some variables such as working mother, parent's knowledge, and cultural values how to raise children were not investigated in our study. We suggest for future studies with more complete parental risk factor and other variables to determine factors associated with stunted children in this community.

Conclusions

Low maternal's height and education were determine parental sociodemographic risk factors associated with stunted children in Kampar Riau.

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