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Influence of family and child demographic characteristics on the incidence of stunting

Pengaruh Karakteristik Demografi Keluarga dan Anak Pada Kejadian Stunting

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ABSTRACT

Background: *Stunting cases in Surakarta ranked fourth lowest in Central Java. However, the stunting target in Surakarta is zero.*

Objective: *This study aimed to analyze the influence of maternal and child demographic factors on the incidence of stunting at the Gilingan Surakarta Community Health Center.*

Methods: *This research method used analytical observations with a case-control research design. The research subjects were obtained using a simple random sampling method consisting of 38 stunted toddlers and 38 non-stunted toddlers aged 24-59 months at Gilingan Surakarta Community Health Center. Data collection was done by distributing questionnaires to respondents. The statistical test used for bivariate analysis is the chi-square, and multivariate analysis uses multiple logistic regression.*

Results: *Bivariate analysis showed that maternal occupation (p=0.047) and family income (p=0.002) influenced the incidence of stunting. Multivariate analysis then found that maternal occupation and family income were associated with the incidence of stunting (p=0.005).*

Conclusion: *The conclusion in this study was that mothers' occupation and family income significantly influence the incidence of stunting. Therefore, there is a need for assistance in the form of additional food for toddlers from underprivileged families to meet their nutritional needs so that stunting can be prevented.*

Keywords*: child, demographic, family, stunting*

ABSTRAK

Latar Belakang: Kasus stunting di Kota Surakarta menduduki peringkat keempat terendah di Jawa Tengah. Meskipun demikian, target stunting di Kota Surakarta adalah nol.

Tujuan: Penelitian ini bertujuan menganalisis pengaruh faktor demografi ibu dan anak terhadap kejadian stunting di Puskesmas Gilingan Surakarta.

Metode: Metode penelitian ini menggunakan observasi analitik dengan rancangan penelitian kasus kontrol. Subjek penelitian didapat dengan menggunakan metode simple random sampling yang terdiri dari 38 balita stunting dan 38 balita non stunting usia 24-59 bulan di Puskesmas Gilingan Surakarta. Pengumpulan data dilakukan dengan menyebarkan kuesioner kepada responden. Uji statistik yang digunakan untuk analisis bivariat adalah chi-square dan analisis multivariat menggunakan regresi logistik ganda.

Hasil: Analisis bivariat menunjukkan bahwa pekerjaan ibu (p=0,047) dan pendapatan keluarga (p=0,002) mempengaruhi kejadian stunting. Kemudian dilanjutkan dengan

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analisis multivariat hasilnya pekerjaan ibu dan pendapatan keluarga berhubungan dengan kejadian stunting (p=0,005).
Simpulan: Kesimpulan dalam penelitian ini adalah pekerjaan ibu dan pendapatan keluarga berpengaruh signifikan terhadap kejadian stunting. Oleh karena itu, perlu adanya bantuan berupa makanan tambahan bagi balita dari keluarga kurang mampu untuk memenuhi kebutuhan gizi anak sehingga stunting dapat dicegah.

Kata kunci: anak, demografi, keluarga, stunting

INTRODUCTION

Stunting refers to a condition in which a young child (under five years) has a length or height lower than his age, which, when measured using the WHO growth curve, indicates that height or length is less than -2 standard deviation (SD) [1], [2]. 21.3% of newcomers in the world suffer from stunting [3]. Meanwhile, in the same year, Southeast Asia also had a fairly large stunting percentage of 27.4% [4]. The stunting rate in Indonesia in 2022 reached 21.6%. This figure has fallen from 2021, when it was 24.4%. Central Java province has a stunting proportion of 20.8%, and Surakarta City ranks fifth lowest stunting prevalence [5]. Surakarta City has a target of zero stunting by 2024, but the target has not been achieved [6].

Stunting is a complex issue that is brought on by several factors [7]. One of the factors associated with stunting is the demographic factor, such as family and child factors. Family factors related to stunting are socio-economic status, number of children, education of mothers, maternal work, and mother age [8]. The socioeconomic status of the family will affect the incidence of stunting. This is because the higher the family's economy, the greater the ability to buy food in adequate quantities and quality. In addition, families with a high socio-economic level will increase their chances of obtaining good health care to prevent stunting [9]. The number of children in the family is also estimated to influence the occurrence of stunting because of the family's availability of food. The number of children associated with this stunting event is estimated to be stronger when a family has large numbers of children, while the family economy is poor, so that it will be difficult for children to meet their nutritional needs [10]. In order to achieve nutritional fulfilment, a mother must have a good understanding of nutrition. A mother's poor educational history will lead to an obstacle in the absorption of information about the child's nutrition. Besides, the mother's level of education can also affect her work, so that it can affect the family's income level [11], [12]. Mother's age was also judged to influence stunting. It's because a mother of a mature age is judged to have a deeper seriousness in caring for her child. In addition, the age of a mature mother will also affect the mother's ability or experience in giving nutrition to her child, so that a child can be prevented from stunting [13].

In addition to family factors, the child's factors also influence the occurrence of stunting, such as gender, age, and history of infection [8]. Boys are more at risk of stunting because boys have more activity than women and need to be balanced with adequate nutritional intake [14]. Age also affects the occurrence of stunting because at a young age, there is a phase of food change from milk (Mother's Milk Water) to milk supplementary foods (MPASI), so that sometimes children have difficulty adjusting to the food and can end up with a deficiency of nutritional intake [15]. Meanwhile, a child's history of infection is also a factor in stunting. The incidence of such infections can be curbed by immunization, so that young people who are given full immunization will reduce the risk of stunting [16].

Based on the above exposure, it can be concluded that the stunting case in Surakarta has already ranked the fifth lowest in Central Java. However, Surakarta has still not been able to achieve the target of zero stunting. Based on previous research, demographic

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factors were also assessed to influence stunting incidents. Therefore, this study aimed to examine the influence of mother and children's demographic factors in stunting incidents at the Gilingan Surakarta Community Health Center in an effort to reduce stunting rates.

METHODS

Study design

The study was an analytical observational study with a case-control approach aimed at identifying the influence of family and child demographic factors on stunting incidents. The study was carried out from May to July 2023 in the Gilingan Community Health Center in Surakarta, with the study population consisting of toddlers in the area.

Data source and sampling procedure

The inclusion criteria of the sample were toddlers aged 24-59 months, whose mothers were willing to follow the study with informed consent, and toddlers who lived with their mothers. The sample's exclusion criteria were toddlers with labioschisis abnormalities. Simple random sampling was the sampling method employed in this study. The randomization process on the sample was carried out by randomizing the sample using a spin wheel on 67 stunted toddlers at the Gilingan Health Center, up to a total of 38 toddlers. Meanwhile, in the control group (not stunted), a similar randomization was performed on 943 non-stunted toddlers. The non-stunted toddler data were numbered, then the spin wheel was arranged so that there were numbers on the wheel from 1 to 943, spinning the wheel 38 times to obtain the data number of the toddler selected as the research subject, resulting in a sample size of 38 non-stunted toddlers.

Variables of the study

The variables examined in this study were family and child demographic factors as independent variables and stunting incidents as the dependent variable.

Measurement and instruments

The identification of stunting and non-stunting status in toddlers was based on the available data at the Gilingan Community Health Center, used during the sampling and selection of research subjects.

Ethical considerations

The research has passed a test of ethical excellence with ethical clearance number 743/V/HREC/2023 and has been authorized by the Surakarta City Health Service under letter number K5/8.03/4350/V/2023.

Data analysis

The analysis used in this study includes univariate, bivariate, and multivariate analyses. Univariate analysis is used to analyze the frequency distribution of family and children characteristics, and toddlers who are stunting and not stunting. Chi-square bivariate analyses will be used to analyze the influence of family and child demographic characteristics on stunting incidents. Multivariate analysis was done using multiple logistic regression analysis.

RESULTS

As many as 75% of mothers of toddlers in this study were in the normal reproductive age range of 20-35 years. The educational history of mothers of toddlers in this study was 50% Senior High School (SHS). As many as 68.4% of mothers of toddlers were housewives. Of toddlers in this study, 56.6% came from families with an income <2,174,169, which is less than the Surakarta City Minimum Wage. As many as 42.1% of families of research respondents had 2 children. More than half of the toddler respondents in this study were female. The toddlers in this study were mostly in the range

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of 36-47 months old, with a percentage of 47.4%. As many as 86.8% of toddlers had a complete immunization status (Table 1).

Table 1. Characteristic Respondent Survey

Characteristic Respondent		n	Percentage
Family characteristics			
Mother's age	Early reproductive age (<20 years)	1	1,3%
	Optimal reproductive age (20–35 years)	57	75%
	Advanced reproductive age (>35 years)	18	23,7%
Mother's Education level	Basic education (Elementary–Junior High School)	25	32,9%
	Secondary education (Senior High School)	38	50%
	Higher education (College/University)	13	17,1%
Mother's employment status	Homemaker	52	68,4%
	Employed	24	31,6%
Family income	<2,174,169	43	56,6%
	≥2,174,169	33	43,4%
Number of children	1 child	26	34,2%
	2 children	32	42,1%
	3 children	14	18,4%
	≥4 children	4	5,2%
Characteristics of the child			
Sex	Male	34	44,7%
	Female	42	55,3%
Child's age	24-35 months	18	23,7%
	36-47 months	36	47,4%
	48-59 months	22	28,9%
Immunization status	Complete	66	86,8%
	Incomplete	10	13,2%
Nutrition status	*Stunting*	38	50%
	Not stunting	38	50%

Table 2. Bivariate Analysis of Demographic Characteristics on the Incidence of Stunting

Variables	*Stunting*		No *Stunting*		*p*
	n	%	n	%	
Family characteristics					
Mother's age					
Early reproductive age (<20 years)	1	2,6%	0	0%	
Optimal reproductive age (20–35 years)	30	78,9%	27	71,1%	0,295
Advanced reproductive age (>35 years)	7	18,4%	11	28,9%	
Mother's education level					
Basic education (Elementary–Junior High School)	15	39,5%	10	26,3%	0,225
Secondary education (Senior High School)	19	50%	19	50%	
Higher education (College/University)	4	10,5%	9	23,7%	
Mother's employment					
Homemaker	30	78,9%	22	57,9%	0,047*
Employed	8	21,1%	16	42,1%	
Family Income					
<2,174,169	28	73,7%	15	39,5%%	0,002*

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Variables	*Stunting*		No *Stunting*		*p*
	n	%	n	%	
≥2,174,169	10	26,3%	23	60,5%	
Number of children					
1 child	8	21,1%	18	47,4%	
2 children	19	50%	13	34,2%	0,093
3 children	9	23,7%	5	13,2%	
≥4 children	2	5,3%	2	5,2%	
Sex					
Male	18	47,4%	16	42,1%	0,644
Female	20	52,6%	22	57,9%	
Child's age					
24-35 months	10	26,3%	8	23,7%	
36-47 months	14	36,8%	22	47,4%	0,159
48-59 months	14	36,8%	8	28,9%	
Immunization status					
Complete	31	81,6%	35	92,1%	0,169
Incomplete	7	18,4%	3	7,9%	

*Chi-Square

Based on the chi-square bivariate analysis, maternal age did not show a meaningful effect on the incidence of stunting with a p-value of 0.295 (p>0.05). In the maternal education variable, a p-value of 0.225 (p>0.05) was obtained, so the maternal education variable did not display a significant effect on the incidence of stunting. The analysis of the effect of maternal employment on the incidence of stunting showed a noticeable impact with a p-value of 0.047 (p<0.05). Family income had a p-value of 0.02 (p<0.05), so it had a significant effect on the incidence of stunting. In this study, the number of children was not significantly related to the incidence of stunting, with a p-value of 0.093. The gender of the toddler in this study did not have a significant effect on the incidence of stunting, with a p-value of 0.664. This is because both male and female toddlers are likely to experience stunting if their nutrition is not met. The age of the child in this study did not have a significant effect on the incidence of stunting, with a p-value of 0.159. In this study, the immunization status of the majority of respondents was complete, with a p-value of 0.169, which means immunization status does not significantly affect the incidence of stunting (Table 2).

Multivariate Analysis

The independent variables that have a p-value ≤ 0.25, namely the variables of mother's employment and family income, were analyzed using logistic regression analysis. Table 3 shows that the coefficient of determination of the logistic regression of the two variables is 0.173 so the contribution of the variables of mother's employment and family income to the incidence of stunting is 17.3%. Therefore, factors other than the two variables have a contribution of 82.7% (Table 3).

Table 3. Multiple Logistic Regression Test Summary Model

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	94.801[a]	0.130	0.173

Table 4. Omnibus Tests of Multiple Logistic Regression Test Model

		Chi-square	df	Sig.
Step 1	Step	10.557	2	0.005
	Block	10.557	2	0.005
	Model	10.557	2	0.005

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Table 4 shows that the chi-square value is 10.557 and has a significance value of 0.005 (below 0.05), so mothers' employment and family income simultaneously have a substantial correlation with the incidence of stunting.

DISCUSSION

Based on the results of this study, maternal age does not affect the incidence of stunting because most (78.9%) of the ages of mothers of toddlers who were respondents in this study were within the normal reproductive age range. Maternal age is closely related to the occurrence of stunting; the prevalence of stunting increases in pregnant women at a young age under 21 years and in pregnant women at an older age over 35 years. In children of young mothers, the incidence of stunting is three times higher than in children of adult mothers. Several factors that are suspected of causing stunting in young mothers are because young mothers still need nutrition until they reach adulthood, most young mothers are not ready to get pregnant, do not have sufficient knowledge and skills related to pregnancy and childcare, do not have mental and psychological readiness so they are susceptible to stress due to changes in events in their lives [17]. Pregnant women at an older age also have an increased risk of stunting due to several factors, such as decreased absorption of nutrients due to the aging process, decreased stamina, and increased risk during pregnancy, so pregnant women at an older age are included in the high-risk group for experiencing complications [18].

The educational history of mothers of toddlers in this study was more than 50% high school (Senior High School). The following data released by the Surakarta City Population and Civil Registration Service in 2022 showed that as many as 83,834 female residents had a high school education [19]. This study showed that education did not affect the incidence of stunting because people with higher education do not necessarily all know about stunting due to differences in educational or scientific backgrounds that are sometimes not in line with their knowledge of something [20]. In addition, health information can be obtained from non-formal education or other sources, such as media owned by people other than formal education [21]. Mothers' knowledge can also be obtained from experience or the environment where they live, not only from formal education.

A total of 68.4% of mothers of toddlers are housewives. Based on data from the Surakarta City Population and Civil Registration Service, 16,250 women in Surakarta are housewives [19]. Parents' occupations are related to family income, which can support family needs related to food shopping, such as healthy and nutritious food, which is directly related to good nutritional status to prevent stunting.

This study's findings show a correlation between family income and the incidence of stunting ($p = 0.047$). Toddlers who come from families with incomes lower than the Surakarta City minimum wage are at greater risk of becoming stunted compared to toddlers whose families' incomes are higher than or equal to the minimum wage. Family socioeconomic status correlates with the incidence of stunting in toddlers significantly [22], [23], [24], [25]. Because low income causes families to be unable to meet the adequacy of nutritional intake for toddlers and inappropriate feeding patterns, families with low socioeconomic status are at greater risk of having stunted toddlers. Families with low incomes have low purchasing power, so they have difficulty meeting food needs, both in terms of quantity, nutritional quality, and food diversity. If this happens continuously for a long time, it will hurt the nutritional status of children; in addition, they also experience obstacles in accessing education and health, which can slow down their growth and development.

The results of this study reveal that there is no significant relationship between the number of children in a family and the incidence of stunting, with ($p = 0.093$). There is no

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significant relationship between the number of household members and the incidence of stunting [26]. The number of household members does not guarantee a person's nutritional status absolutely. For large families, a balanced diet and adequate nutritional intake can lower the risk of stunting [27].

In this study, female toddlers dominated the respondents, which was 55.3% compared to male toddlers. The possible reason why the number of female toddler respondents is greater than that of male toddlers is that the selection of respondents was carried out randomly without looking at gender. The results of the study showed that there was no significant relationship between the gender of toddlers and the incidence of stunting ($p = 0.644$). The results of this study are supported by several previous studies, which also reported that gender does not affect the incidence of stunting in toddlers [28]. This is thought to be because the speed and growth between male and female toddlers have not yet differed, so that both male and female toddlers are at equal risk of experiencing stunting.

The results of the study imply that there was no relationship between age and stunting. Toddlers aged > 24 months do not understand personal hygiene, so they become easily sick. If toddlers get sick, their appetite can decrease, and this can result in a lack of nutrition entering the body, thus disrupting toddler growth, resulting in stunting [29]. At the age of 24 months, some toddlers will face several conditions like decreased appetite, low nutritional intake, fewer sleep hours, and infections, when mothers/caregivers do not pay enough attention to hygiene and sanitation, which can cause nutritional deficiencies [30]. The age of the child is related to the occurrence of wasting and stunting that occur simultaneously in individuals [31]. Increasing age is associated with moderate to severe stunting levels [32].

This study showed that there was no relationship between vaccination status and stunting incidence. This result is in line with previous studies, which stated that vaccination status had no relationship with stunting incidence in toddlers ($p = 0.473$) [33]. Other studies also stated that there was no clear link between vaccination status and stunting incidence. Children who are not given complete basic vaccinations do not necessarily suffer from infectious diseases [25]. There was no correlation between vaccination status and stunting prevalence in developing countries [34], [35]. Vaccination is considered to be able to protect children from disease by forming an immune system so that it can prevent them from experiencing malnutrition, but this process takes time. So, it is understandable if vaccination does not correlate significantly because it takes time for vaccination to have an impact on nutritional conditions in children [36].

The logistic regression of the two variables shows that the variables studied only contributed 17.3% to the incidence of stunting. The remaining 82.7% can be caused by other external factors. Environmental factors include poor handwashing practices, use of inadequate water sources, consumption of unsafe drinking water, and smoking habits, which are associated with stunting [37]. Furthermore, access to health services has been shown to influence stunting [38]. Maternal behaviors also have a role in influencing stunting incidence. Maternal behavioral factors regarding intentions in engagement behaviors in stunting prevention care, good nutrition, and good eating culture are closely related and can reduce the risk of stunting [39] [40].

This study examined demographic factors, both from family and child factors, using a case-control approach. Using a case-control approach allows for causal risk factors for stunting to be analyzed. However, this study was limited to the Surakarta population. Nevertheless, the results indicate that demographic factors such as mothers' employment and family income influence stunting incidence. This is expected to inform policies for implementing stunting prevention programs, particularly in Surakarta, to achieve the target of zero stunting.

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CONCLUSION

Many factors influence the incidence of stunting in toddlers, one of which is the demographic factors, both from family and child factors. The results of this study conclude that demographic factors, mother's employment, and family income are related to the incidence of stunting, while demographic factors originating from children did not influence the incidence of stunting. Based on the results of the study, the role of family income is very important because it affects the family's ability to meet food needs, both in terms of quantity, nutritional quality, and food diversity. To overcome these causal factors, it is inseparable from the responsibility of both the central and regional governments to provide assistance in the form of additional food for toddlers from underprivileged families in order to meet the child's nutritional needs, so that stunting can be prevented.

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