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IDENTIFICATION OF RISK FACTORS CAUSING STUNTING IN CHILDREN UNDER FIVE YEARS OF AGE

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ABSTRACT
Stunting is a global health problem in children that has an impact on increasing morbidity and mortality, developmental disorders (cognitive, motor, language), and increasing the economic burden for the costs of child care and treatment.The aim is to identify risk factors for stunting in children under five years of age. The research method uses a descriptive observational design and a cross-sectional approach, with a sample size of 94 respondents use cluster sampling. Measuring instruments used Questionnaire which contains a history of exclusive breastfeeding, history of infectious diseases, immunization status and 10 knowledge questions about stunting that have been tested for validity. Correlation data analysis using chi-square, and multiple logistic regression prediction modeling. The results of the study showed a significant relationship between exclusive breastfeeding and the incidence of stunting in toddlers. Toddlers who do not receive exclusive breastfeeding have a 33.139 times greater chance of experiencing stunting compared to toddlers who receive exclusive breastfeeding with a wald value of 14.159. The conclusion is that the factor of exclusive breastfeeding is the factor that plays the most role in influencing the incidence of stunting in toddlers.An important role is needed for cadres, health promoters, and health services to support the government's program on providing exclusive breastfeeding, providing education and providing correct and accurate information regarding stunting and how to prevent it.

Keywords: exclusive breastfeeding; stunting; under five years of age

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INTRODUCTION

One of the goals of the Sustainable Development Goals (SDG's) which is included in the second sustainable development goal, namely ending all forms of malnutrition by 2030, the target set is to reduce stunting rates by 40% by 2025. (Novianti Utami et al., 2022)In the 2020-2024 RPJMN, the target for reducing stunting rates is 14% in 2024 from the current 30.8% (Kementerian Kesehatan RI, 2019).Stunting is a global health problem, especially in low- and middle-income countries (Gani et al., 2020). Stunting is a linear growth disorder caused by chronic malnutrition of nutrient intake or chronic or recurrent infectious diseases indicated by a z-score value of height for age (TB/U) of less than -2 SD. (Kementerian Kesehatan RI, 2019) Stunting has a big impact on children's growth and development. If it occurs during the golden period, children's suboptimal growth and development can become irreversible or cannot be changed when they are adults(Asra Laily et al., 2023).Stunting is one of the nutritional problems facing the world today (Novia Puspitasari & Adi, 2020). The prevalence of stunting in Asia is 36%, mostly in South Asia, where stunting occurs in almost half of all toddlers, which currently number 61 million (Utami et al., 2019). WHO targets a 40% reduction in stunted children by 2025, which means it will decrease by 3.9% each year, in other words it will decrease from 171 million in 2010 to 100 million in 2025. According to WHO, the prevalence of stunting in Southeast Asia in 2018 was 31.9% or 55.5 million

toddlers, then in 2019 it was 31% or 52.6 million toddlers, then reached 30.1% or 51.1 million toddlers in 2020 (Wulandari Budjana et al., 2023).

Based on the 2021 Indonesian Nutritional Status Study (SSGI), it was stated that 1 in 4 toddlers experience stunting (Cahyono et al., 2023),with the prevalence of stunting in toddlers in Indonesia in that year being 24.4%, then this figure dropped to 21.6% in 2022.(Kementerian Kesehatan Republik Indonesia, 2022).When compared with the results of the 2021 SSGBI, the prevalence of stunting has decreased, but this figure is still high when compared to the threshold set by WHO, which is 20%. In 2020, the number of stunted toddlers in South Sumatra Province was 14,584 out of 202,696 toddlers measured or around 7.20%.(South Sumatra Provincial Health Office, 2020), and in the 2022 SGGI, the prevalence of stunting in South Sumatra was ranked 26th out of a total of 34 provinces with a prevalence of 18.6%, which is a decrease in the prevalence of stunting from the previous year, namely from 24.8%.(Cahyono et al., 2023)The prevalence of stunting in Palembang City in 2022 was 14.3%, with a prevalence of stunting of more than 1%, namely I Ulu Health Center at 2.75%, with findings of 45 cases of stunting in toddlers out of 1,634 toddlers, Merdeka Health Center at 1.68% (25 cases of stunting out of 1,492 toddlers), Kertapati Health Center (39 cases of stunting out of 3,216 toddlers) and 7 Ulu Health Center (15 cases of stunting out of 1,261 toddlers(Cahyono et al., 2023).

Stunting is influenced by various factors which can be divided into four parts, namely toddlers, parents, socio-economic factors and the environment.(Halim & Sari, 2021) Research conductedMarume et al., (2023)shows the factors causing stunting including child age, birth length, low maternal education, breastfeeding status, diet, and infectious diseases. Other factors that influence the risk of stunting according to research resultsThe Story of Nurul Iman (2022)are knowledge factors, family income, history of exclusive breastfeeding, parenting patterns, and history of low birth weight. The aim is to identify risk factors for stunting in children under five years of age.

METHOD

The design used in this study is observational descriptive design and cross-sectional approach. The research sample was determined using the technique cluster sampling. The sample size was calculated using the Slovin formula n = N/1+N (d2), totaling 94 mothers of toddlers consisting of 21 from PKM I Ulu, 18 from PKM Merdeka, 40 from PKM Kertapati and 15 from PKM 7 Ulu. The inclusion criteria for research subjects were 1) mothers who have toddlers aged 6 months - 60 months with a z-score index of TB/U < -2 SD. Mothers who reside in the work area of the four health centers that are the research areas.The instrument used was a demographic characteristics questionnaire consisting of age, education, occupation, income, and history of exclusive breastfeeding, history of infectious diseases, immunization status, and a knowledge questionnaire about stunting., with the results of the validity test of reliability statistics, the correlation value of the Gutman Split-Half Coefficient11,083>0.80. This research has received an ethical approval letter from the Research Ethics Committee of STIKES Hesti Wira Sriwijaya Nomor :000565/KEP STIKES HESTI WIRA SRIWIJAYA/2024. Data analysis used correlation using chi-square, and multiple logistic regression prediction modeling.

RESULT

Table 1.
Frequency Distribution of Respondent Characteristics (n=94)

Variables	f	%
Mother's Age		
10-25 years	23	24.5
26-30 years	47	50.0
31-35 years	21	22.3
≥ 36 years	3	3.2
Mother's Education		
Primary School	12	12.8
Junior High School	38	40.4
Senior High School	40	42.6
College	4	4.3
Working Mother		
No	86	91.5
Yes	8	8.5
Family Income		
< regional minimum wage	63	67.0
≥ regional maximum wage	31	33.0
Status Anthropometry		
Stunting	32	34.0
Normal	62	66.0
Mother's Knowledge		
Low	42	44.7
high	52	55.3
Exclusive Breastfeeding		
Not Exclusive	37	39.4
Exclusive	57	60.6
Immunization Status	29	30.9
Incomplete	65	69.1
Complete		
History of infectious disease		
Yes	77	80.9
No	17	19.1

Table 1 shows that respondents aged 26-30 years were 47 (50%), high school education was 40 (42.6%), almost all were unemployed as many as 86 (91.5%), family income ≤ UMR as many as 63 (67%), stunted children as many as 32 (34%), mothers with high knowledge as many as 52 (55.3%), exclusive breastfeeding 57 (60.6%), most had complete immunization status 65 (69.1%) and there was a history of infectious diseases 77 (80.9).

Table 2.
Relationship Between Stunting and Respondent Characteristics

Independent Variables	Stunting				OR	95%CL	p-Value
	No		Yes				
	f	%	f	%			
Mother's education							
Low	22	53.7	19	46.3	2,657	1,106-6,384	0.046
High	40	75.5	13	24.5			
Working Mother							
No	57	66.3	29	33.7	0.848	0.189-3.799	1,000
Yes	5	62.5	3	37.5			
Family Income							
< Regional minimum wage	38	60.3	25	39.7	2,256	0.845-6.020	0.157
≥ Regional maximum wage	24	77.4	7	22.6			

Independent Variables	Stunting				OR	95%CL	p-Value
	No		Yes				
	f	%	f	%			
Mother's Knowledge							
Low	15	34.9	28	65.1	21,933	6,619-72,681	0.001
High	47	92.2	4	7.8			
Exclusive Breastfeeding							
Not Exclusive	12	32.4	25	67.6	14,881	5,215-42,462	0.001
Exclusive	50	87.7	7	12.3			
Immunization Status							
Incomplete	7	24.1	22	75.9	17,286	5,840-51,160	0.001
Complete	55	84.6	10	15.4			
History of infectious disease							
Yes	56	72.7	21	27.3	0.205	0.067-0.623	0.008
No	6	35.3	11	64.7			

Table 2 shows the results of bivariate tests that prove the relationship between the dependent variable and the independent variable. According to education level, mothers with low education are significantly associated with the incidence of stunting in toddlers (OR = 2.657, 95% Cl: 1.106-6.384; p-value <0.05). In terms of knowledge, mothers with low knowledge are significantly associated with stunting (OR = 21.933, 95% Cl: 6.619-72.681; p-value <0.05). Likewise, exclusive breastfeeding, immunization status and history of infectious diseases were significantly associated with stunting, exclusive breastfeeding (OR=14.881, 95% Cl: 5.215-42.462; p-value <0.05), Immunization status (OR=17.286, 95%Cl 5.840-51.160Cl:; p-value <0.05) and history of infectious diseases (OR = 0.205% Cl: 0.067-0.623; p-value <0.05). Meanwhile, maternal occupation and family income were not significantly associated with the prevalence of stunting in toddlers (p-value ≤ (0.05).

Table 3.
The Final Model of Factors Related to Stunting Incidence

Variables	B	SE	p-Value	OR	(95% Cl)
Exclusive Breastfeeding	3,501	0.930	0.001	33,139	5,351-205,240
Immunization Status	2,259	0.789	0.004	9,575	2,038-44,990
Level of Knowledge	3,172	1,020	0.002	23,848	3,231-176,028
Level of education	0.135	0.900	0.880*	1,145	0.196-6.682

Table 3, the results of the multivariate logistic regression test show three variables, namely exclusive breastfeeding, immunization status, and maternal knowledge, which are significantly related to the incidence of stunting in toddlers with a P-value of 0.05. Toddlers who are not given exclusive are 33.139 times more likely to experience stunting compared to toddlers who are given exclusive breastfeeding (OR: 33.139, 95% Cl: 5.351-205.240). Toddlers with incomplete immunization status are 9.575 times more likely to experience stunting compared to toddlers with complete immunization (OR: 9.575, 95% Cl: 2.038-44.990). In addition, mothers who have low knowledge are 23.848 times more likely to experience stunting compared to high knowledge (OR: 23.848, 95% Cl: 3.231-176.028). Meanwhile, the level of education is a supporting factor for the level of maternal knowledge (OR: 1.145, 95% CI: 0.196-6.682).

DISCUSSION

In this study, half of the mothers of toddlers were includedinto the early adulthood age groupor are aged 26-30 years (50%). Most mothers of toddlers (56.4%) are highly educated, and almost half of the mothers (43.6%) are low educated. The mother's education level can influence how the mother will act to find the cause and solution in solving the problem(Yanti et al., 2020). The level of maternal education is one of the strong predictors of stunting in

children, because education will affect the mother's ability to receive information related to stunting risk factors. The level of maternal education can affect the mother's openness to change and innovation in fulfilling toddler health.The results of the bivariate analysis showed that the mother's education level had a significant effect on the incidence of stunting in children. An OR value of 2.657 was found, meaning that mothers with low levels of education have a 2.657 times higher risk of having stunted toddlers. This is in line with researchLaksono et al., (2022) saythat the level of maternal education is related to stunting, the lower the level of maternal education, the higher the likelihood of the mother having a stunted child. This result is in line withYunitawati et al., (2025)which states that education is one of the factors that significantly influences the incidence of stunting. A highly educated mother tends to ensure that her child will be given exclusive breastfeeding, immunization and proper nutrition to prevent stunting risk factors.

The results of statistical tests show that the mother's occupation does not have a significant effect on the incidence of stunting in children, this is in accordance with the results of the study.Pertiwi et al., (2024)showed no significant correlation between maternal employment status and the occurrence of stunting in infants aged 12-23 months. The absence of a relationship between maternal employment and the occurrence of stunting may be caused by other factors that have a greater effect, such as the mother's level of knowledge about nutrition and skills in providing good care to her child. Likewise, the family income variable does not have a significant effect on the occurrence of stunting in children. This study is in line withKetut et al., (2023) there is no significant relationship between family income variables and stunting incidence. The absence of this relationship provides information that it is not certain that family income, either low or high, can be a risk factor for stunting in children because there are various other factors that can influence it.The results of the bivariate analysis also concluded that the level of maternal knowledge had a significant effect on the incidence of stunting in children. The OR value in the analysis results was 21.933. This shows that mothers with low levels of knowledge have a 21.933 times higher chance of having stunted children. ResearchAtamou et al., (2023)concludes that maternal knowledge has a significant relationship with the high risk of stunting. Lack of maternal knowledge can affect the mother's attitude and skills in caring for her child during the 1000 HPK period, for example, proper handling to prevent stunting in children under five years of age, improving nutritional status to achieve growth maturity, and determining the right parenting pattern.

Exclusive breastfeeding in children has a significant effect on the incidence of stunting. An OR value of 14.881 was found, meaning that children who do not receive exclusive breastfeeding have a 14.881 times higher risk of stunting. This is supported by the results of the study(Azizah et al., 2022) shows that there is a relationship between breastfeeding and the risk of stunting, children who receive exclusive breastfeeding have a risk of experiencing stunting as much as 0.62 times compared to children who do not receive exclusive breastfeeding. Related to the theory that states that the benefits of exclusive breastfeeding support infant growth, especially in terms of height, because calcium in breast milk is more efficiently absorbed by the body than formula milk, babies who receive exclusive breastfeeding tend to have a height that is more in accordance with the growth curve compared to babies who are only given formula milk. Lack of exclusive breastfeeding increases the risk of stunting, especially in early life(Kragel et al., 2020)The results of the statistical test also showed that the immunization status of children and the incidence of stunting in toddlers had a significant relationship. Based on the results of the analysis, the OR value was 17.286.

This means that toddlers with incomplete immunization have a 17.286 times greater chance of causing stunting. ResearchAfriansyah & Fitriyani, (2023) show thatToddlers who have a history of incomplete immunization are 1.508 times more at risk compared to toddlers with a history of complete basic immunization. This is in line with researchFajariyah & Hidajah, (2020) childrenwith incomplete immunization status is 1.78 times greater risk of experiencing stunting. This is because immunization will stimulate the child's immune system to protect against infection or disease. Repeated infections in children can affect the child's growth and development which can result in stunting.A history of infectious diseases in children has a significant effect on the incidence of stunting. An OR value of 0.205 was found, meaning that children with a history of infectious diseases have a 0.205 times risk of stunting. In line with researchShofifah et al., (2022), shows that a history of infectious diseases is related to the incidence of stunting in toddlers. Toddlers who have never suffered from infectious diseases are 4.6 times more likely to experience stunting than toddlers who suffer from infectious diseases. Infectious diseases related to stunting are acute respiratory infections (ARI), diarrhea, worms, and tuberculosis (TB)(Mariene Wiwin Dolang et al., 2024).

Finally, multivariate analysis showed that exclusive breastfeeding had the most dominant risk in the occurrence of stunting in toddlers (p-value = 0.001), with an OR of 33.139. Based on this model, it can be concluded that children who are not exclusively breastfed have a 33.139 times higher chance of stunting than children who are exclusively breastfed with a Wald value of 14.159. Exclusive breastfeeding in children was identified as a significant factor associated with stunting. Exclusive breastfeeding interventions have the potential to have an impact on reducing stunting and the importance of promoting exclusive breastfeeding to improve children's health and development(Haque et al., 2023) and further advocacy efforts to promote, support, and improve breastfeeding practices(Hossain & Mihrshahi, 2024)This study aims to determine the relationship between stunting in toddlers with maternal education, maternal occupation, family income, maternal knowledge, exclusive breastfeeding, immunization status, and history of infectious diseases. Toddlers who do not receive exclusive breastfeeding are 33.139 times more at risk of stunting than children who receive exclusive breastfeeding. Toddlers who are not given exclusive breastfeeding and receive complementary foods and formula milk too early will be more susceptible to infectious diseases such as diarrhea, respiratory diseases and other infectious diseases because it can affect their growth and development.

CONCLUSION

Exclusive breastfeeding is an important protective factor that can reduce the risk of stunting. Factors that influence exclusive breastfeeding in toddlers cannot be separated from the mother's knowledge regarding exclusive breastfeeding and the practice of Early Initiation of Breastfeeding, therefore, an important role is needed for cadres, health promoters, and health services to support government programs on exclusive breastfeeding, provide education and provide correct and accurate information regarding stunting and how to prevent it.

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