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Analysis of Stunting Factors and the Implementation of Stunting Prevention Programs based on Health Promotion Theory

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ABSTRACT

Objective: The prevalence of stunting in Surabaya City is high (24.5%), particularly among toddlers aged 24-59 months. This study aims to analyze factors associated with stunting and the implementation of stunting prevention programs based on the Health Promotion Theory in Surabaya City. **Method:** This research employed a quantitative approach with 200 toddlers selected through non- probability accidental sampling. Variables tested included birth length, birth weight, exclusive breastfeeding, exclusive breastfeeding up to 2 years, immunization status, birth spacing, number of children, and economic status. Statistical analysis was used to identify the relationships between these variables and the occurrence of stunting, with path analysis to analyze multivariate impacts. **Results:** The study found significant associations between birth length, birth weight, the number of children, and economic status with stunting incidence. However, exclusive breastfeeding, breastfeedingup to 2 years, immunization status, and birth spacing did not exhibit significant relationships. Path analysis results indicated that only birth weight and economic status significantly influenced stunting occurrence. **Conclusion:** Birth weight, the number of children, and economic status play essential roles in stunting incidence. The implementation of prevention programs should consider these factors. Exclusive breastfeeding, breastfeeding up to 2 years, immunization status, and birth spacing do not significantly affect stunting. **Recommendations:** In stunting prevention efforts, a focus on birth weight and economic aspects is essential. Further research is recommended to explore other factors influencing stunting for more effective prevention program improvements.

Keywords: Stunting, Balita, Determinan, Teori Health Promotion, Implementasi Program Stunting

INTRODUCTION

Indonesia, as one of the most populous countries in the world, continues to grapple with serious nutrition-related issues that have substantial repercussions for its human resources' quality [1]. One of the prominent concerns is the alarmingly high prevalence of stunting among toddlers. Stunting is a condition where a child's physical growth is impeded, resulting in the child being shorter than their expected height for their age [2]. Data reveals that Indonesia ranks fifth globally in terms of the number of children experiencing stunting, with over one-third of children under the age of five exhibiting growth rates below the average [3].

The elevated incidence of stunting has garnered significant attention due to its profound impact on children's quality of life and their future prospects [4]. Stunting not only affects a child's physical health but also has implications for cognitive development and school performance. Furthermore, the long-term consequences of stunting extend to national productivity and competitiveness, which can ultimately hinder the country's growth and progress [5].

The critical period for stunting prevention is the first 1,000 days of life,

encompassing the periodfrom pregnancy to a child's second birthday. Malnutrition during this period can result in irreparable developmental impairments with serious long-term consequences. Therefore,efforts to prevent stunting must focus on this golden window [6].

The Health Promotion Model (HPM), developed by Nola J. Pender, emphasizes the active role of individuals in managing their health behaviors. This theory focuses on anindividual's ability to maintain their health condition and underscores the importance of preventive actions. In the context of stunting prevention, HPM can serve as a relevant framework to understand the role of individualsin ensuring child nutrition and preventing stunting [7].

Given the high incidence of stunting in Indonesia and its serious impact on human resource quality and national development, researchers are motivated to conduct a study onthe determinant factors influencing stunting among toddlers aged 24-59 months and the implementation of stunting prevention programs based on the Health Promotion Modelin Surabaya City. This research aims to provide deeper insights into this issue and assist in formulating more effective solutions for stunting prevention in Indonesia, contributing to innovation and novelty in the understanding and approach to stunting prevention [8].

Research Objectives

The objectives of this study are to analyze the determinant factors influencing stunting amongtoddlers aged 24-59 months in Surabaya City and to explore the implementation of stunting prevention programs based on the Health Promotion Model. This research aims to offer amore profound understanding of stunting, the factors influencing its occurrence, and the contribution of the Health Promotion Model to formulate effective solutions for stunting prevention.

Research Significance:

This research holds significant importance due to the following factors:

High Incidence of Stunting: The elevated incidence of stunting in Indonesia, particularly in Surabaya, underscores a serious problem affecting the quality of children's lives. This research is significant in identifying its underlying factors.

Long-term Impact: Stunting has long-term consequences on a child's development, including health, school performance, and future productivity. Therefore, this research is vital in preventing these detrimental consequences.

The Importance of the First 1,000 Days: This research is essential because the first 1,000 days of a child's life is a critical period that cannot be replaced. Stunting prevention efforts during this period will have a significant impact on a child'sfuture.

Innovation in Stunting Prevention: This research attempts to introduce innovation in the understanding and approach to stunting prevention by applying the Health Promotion Model. This has the potential to result in a more profound understanding and potentially more effective solutions to combat stunting.

Contribution to Health Policy: The research findings can contribute to formulating moreeffective health policies in stunting prevention efforts, ultimately improving the quality of Indonesia's human resources.

RESEARCH METHOD

Research Type. This study employs a quantitative approach with the aim of analyzingdeterminant factors affecting the occurrence of stunting among toddlers aged 24-59 months in Surabaya City. Research Design: the research design utilized in this study is an analytical observational design. This approach enables theresearchers to gather data and analyze the relationships between the variables under investigation to address the research questions.

Research Location. The research

was conductedin the Surabaya City area, focusing on four Community Health Center (Puskesmas)Working Areas: Mojo Puskesmas, Tanah Kali Kedinding Puskesmas, Jagir Puskesmas, and Menur Puskesmas. These four areas were selected as they reflect a variety of social, economic, and demographic conditions relevantto this research.

Population and Sample. The population in this study comprises all toddlers aged 24-59 months in Surabaya City, with a total population of 923 children. The research sample consists of toddlers aged 24-59 months in Surabaya, with the mothers of the toddlers as respondents. To determine the sample size, the Slovin formula was utilized, resulting in a sample of 200 respondents for the study.

Research Instruments. To collect data, researchers will use a specifically designed questionnaire to measure variables related to stunting, such as nutritional status, feeding practices, immunization status, and other factors identified within the theoretical framework [9].

Data Collection. Data will be collected through field surveys involving mothers of toddlers who are the study's respondents. These surveys will be conducted by a trained research team to ensure data quality.

Data Analysis. The collected data will be analyzed using various statistical methods, including correlation tests and regression analysis. This will enable researchers to identify factors associated with the occurrence ofstunting in toddlers [10]. The research is characterized by a robust methodology and will provide a deeper understanding of the factors influencing stunting among toddlers in Surabaya City, laying the foundation for the development of more effective preventionstrategies.

RESULT AND DISCUSSION

The research conducted in Surabaya City aimed to understand the factors influencing stunting among toddlers aged 24-59 months and explore the implementation of stunting prevention programs based on the Health Promotion Model. The study utilized a quantitative approach, collecting data from 200 respondents.

Key Findings:

1. Determinant Factors: The research identified that birth weight, the number of children, and economic status significantly affect the occurrence of stunting amongtoddlers. These factors play a critical role in stunting incidence.
2. Non-Significant Factors: Factors such as exclusive breastfeeding, breastfeeding up to 2 years, immunization status, and birth spacing did not show significant relationships with stunting incidence.
3. Health Promotion Model: The Health Promotion Model was used as a relevant framework for understanding the role ofindividuals in maintaining child nutrition and preventing stunting.

Overall, the study's findings offer valuable insights into the factors affecting stunting among toddlers in Surabaya City. The research provides a foundation for more effective strategies to prevent stunting, with a particular focus on birth weight and economic aspects. These findings contribute to the ongoing effortsto enhance the quality of human resources in Indonesia and can inform health policies for stunting prevention [11].

Below is presented descriptive data, analysis test results and path analysis results.

Table 1. Characteristics of Mothers of Toddlers in the Mojo, Tanah Kali Kedinding, Jagir, and Menur Community Health Center Areas

No	Variable	f	%
1	**Age**		
	< 20 years	23	14
	20-30 years	112	66

	31-40 years	35	20
2	**Education**		
	Elementary/Middle School	8	5
	High Scool	152	89
	College (Bachelor's degree)	10	6
3	**Job**		
	Housewife	94	56
	Work	76	44

From the table above, the characteristics of the respondent mothers are depicted, indicating that66% of them fall within the age range of 20 to 30 years, 89% have completed high school education (SMA/SMK), and 56% are homemakers. These findings portray the common profile of the respondent mothers in this study, demonstrating that the majority of them are young females with a high school education level who have chosen to be homemakers. A deeper understanding of these characteristics can provide valuable insights for further analysis of the factors influencing stunting incidence among toddlers.

Table 2. Results of Data Collection for Toddlerslive in the areas of Mojo Health Center, Tanah Kali Kedinding Health Center, Jagir Health Center and Menur Health Center

No	Variable Type	f	%
1	Body Length at Birth		
	Not Short	137	80.6
	Short	33	19,4
2	Birth Weight		
	Not LBW	140	82,4
	LBW	30	17,6
3	Exclusive		
	BreastfeedingNot	42	24,7
	Exclusive Exclusive	128	75,3
4	Breastfeeding Up to 2 Years		
	No	39	22,9
	Yes	131	77,1
5	Immunization Status		
	Incomplete	29	17,1
	Complete	141	82,9
6	Birth Distance		
	More Than 2 Years	133	78,2
	Less Than Equal 2 Years	37	21,8
7	Number of children		
	Less Than 2	128	75,3
	More Than 2	42	24,1
8	Socioeconomic Status		
	High (≥ Rp. 4,526,000)	122	71,8
	Low (< Rp. 4,526,000)	48	28,2
9	Stunting Status		
	Stunting	30	17,6
	Not Stunting	140	82,4

The table above depicts the characteristics of the toddler respondents, where various percentages of toddlers exhibit low birth length,low birth weight, receive exclusive breastfeeding, breastfeed up to the age of 2, receive complete immunization, have a birth spacing of less than 2 years, low economic status, and experience stunting at a rate of 17.6%.

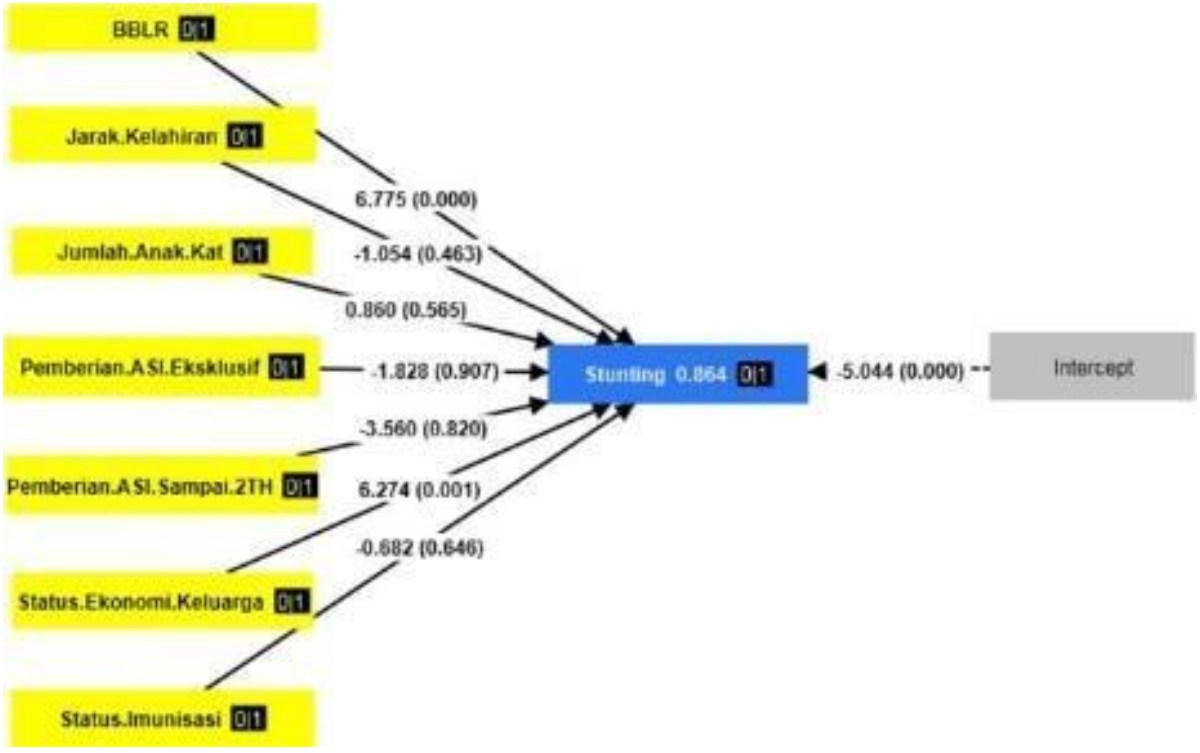
The analysis of the relationships between variables and the occurrence of stunting revealsthe following:

1. The chi-square test between Birth Length and Stunting yielded a p-value of 0.000, which is less than 0.05. Conclusion: There is a strong relationship (68.6%) between Birth Length (PB) and the occurrence of stunting, falling into the strong category.
2. The chi-square test between Low Birth Weight (LBW) and Stunting also resulted in a p-value of 0.000, which is less than 0.05. Conclusion: There is a strong relationship (66.0%) between Low BirthWeight and the occurrence of stunting, categorized as strong.
3. However, the chi-square test between Exclusive Breastfeeding and Stunting produced a p-value of 1.000, which is greater than 0.05. Conclusion: There is no relationship between Exclusive Breastfeeding and the occurrence of stunting.
4. Similarly, the chi-square test between

Exclusive Breastfeeding up to the age of 2 and Stunting also yielded a p-value of 1.000, which is greater than 0.05. Conclusion: There is no relationship between Exclusive Breastfeeding up to the age of 2 and the occurrence of stunting.

5. The chi-square test between immunization status and Stunting also showed a p-value of 1.000, which is greater than 0.05. Conclusion: There is no relationship between immunization status and the occurrence of stunting.
6. Likewise, the chi-square test between birthspacing and Stunting resulted in a p-value of 1.000, which is greater than 0.05. Conclusion: There is no relationship between birth spacing and the occurrence ofstunting.
7. The chi-square test between Number of Children and Stunting yielded a p-value of 0.018, which is less than 0.05. Conclusion: There is a very weak relationship (19.6%) between the number of children and the occurrence of stunting, categorized as veryweak.
8. Lastly, the chi-square test between Economic Status and Stunting produced a p-value of 0.007, which is less than 0.05. Conclusion: There is a weak relationship (21.8%) between Economic Status and the occurrence of stunting, falling into the weakcategory.

Furthermore, path analysis was conducted to evaluate the pattern of relationships among the variables in this model.



Path analysis allows for a comprehensive examination of the direct and indirect effects ofvarious factors on the outcome variable, which,in this case, is the occurrence of stunting amongtoddlers. This analysis aims to provide a deeper understanding of how different variables interact and contribute to stunting, shedding light on the complex web of relationships withinthe model. The results of the path analysis will help in identifying the most influential factors and their pathways in the context of stunting prevention.

From the analysis of the interplay of variables influencing stunting among toddlers residing in the areas of Mojo Health Center, Tanah Kali Kedinding

Health Center, Jagir Health Center, and Menur Health Center, statistical tests using Path Analysis were employed to identify direct dependency relationships between several variables, including birth length, birth weight, birth spacing, the number of children in the family, exclusive breastfeeding, breastfeeding up to the age of 2, immunization status, and socio-economic status with the occurrence of stunting. However, in this analysis, the birth length variable could not be included because the data from stunted respondents revealed thatnone of them had non-stunted birth lengths, andthere was identical data between birth length and birth weight. Therefore, through multivariate testing, only two variables were found to influence the occurrence of stunting, namely, Low Birth Weight and Socio-economicStatus.

The findings of this research provide significant insights into the factors influencing stunting among toddlers in Surabaya City, particularly within the catchment areas of Mojo Health Center, Tanah Kali Kedinding Health Center, Jagir Health Center, and Menur Health Center. Stunting remains a major concern for child development and public health in Indonesia, and understanding the determinants of stunting is essential for designing effective preventive strategies [12]. This discussion summarizes the key findings and implications of the study.

Birth Length and Low Birth Weight.

The study found that both low birth weight andshort birth length significantly correlate with the occurrence of stunting [13]. This highlights theimportance of adequate prenatal care and maternal nutrition in preventing stunting. Improving birth outcomes and reducing low birth weight should be a priority in stunting prevention programs [1314].

Exclusive Breastfeeding and Extended Breastfeeding.

Contrary to expectations, exclusive breastfeeding and breastfeeding up to the age of2 years did not exhibit significant relationships with stunting [15]. This suggests that while breastfeeding is essential for overall child health, it may not directly impact stunting incidence [16]. Other factors, such as post- weaning nutrition, may play a more prominent role in stunting[17].

Immunization Status and Birth Spacing.

The study found no significant relationships between immunization status, birth spacing, and stunting[18]. It implies that factors other thanvaccination and birth intervals are contributingmore substantially to stunting in these areas. Further investigation into these factors is warranted[19].

Number of Children and Socio-economic Status.

The number of children in the family and socio- economic status exhibited significant relationships with stunting[20]. The number of children was weakly correlated with stunting, while socio-economic status had a moderate correlation[21]. These findings suggest that larger family sizes and lower socio-economic status may increase the vulnerability of children to stunting[22].

In summary, this research underscores the multi-faceted nature[23] of stunting in Surabaya City. While some factors, like low birth weight and socio-economic status, show strongcorrelations with stunting, other factors, including breastfeeding practices, birth spacing,and immunization status, do not exhibit direct associations[24]. Therefore, comprehensive stunting prevention strategies should prioritize maternal and child health during pregnancy, emphasize the importance of nutrition, and address socio-economic disparities [25]. Further studies are needed to delve deeper into the complexities of these relationships and to develop more effective preventive interventions tailored to the specific needs of the communities within the catchment areas of these health centers[26].

The relationship between birth length and the occurrence of stunting is

consistent with Gladyset al.'s study titled 'Analysis of Risk Factors forStunting in Toddlers (0-59 Months) in Developing Countries and Southeast Asia,' which states that birth length is associated with stunting, in line with Awalaudin's research demonstrating the correlation between birth length and subsequent child height in stunting occurrences[27]. There is indeed a connection between birth weight and stunting. This is in accordance with theories that infants with Low Birth Weight (LBW) have a greater likelihood of experiencing growth disturbances, includingstunting[28]. This aligns with the findings of Gladys, who reported the influence of Low Birth Weight (LBW) on the incidence of stunting in toddlers. Out of seven related articles, two articles specifically address theimpact of low birth weight (LBW) on stunting in toddlers[29]. Toddlers with a birth weight of less than 2,500 grams have a 3.82 times higher risk of experiencing stunting, and the risk factorof a birth weight of less than 2,500 grams has ap-value of <0.001. Exclusive breastfeeding andcontinued breastfeeding until the age of 2 years do not correlate with the occurrence of stunting[30]. The research results in Kalimantan indicate that exclusive breastfeeding has no impact on stunting[31]. Despite this, several large-scale studies are still able to find a protective relationship between exclusive breastfeeding and stunting. These findings do not align with Hardya et al.'s research on the Effects of Exclusive Breastfeeding on Stunting in Children Aged 6-59 Months in Bogor Regencyin 2019, where multivariate analysis in both strata revealed that exclusive breastfeeding is protective (PR 0.41 CI 95% 0.25 – 0.68) against stunting[32]. The immunization status of children is not related to the occurrence of stunting,which contradicts WHO's journal stating that during the first 1,000 days of life, children have a significant risk of infection if their nutritionalintake is inadequate. According to theresearchers, there are other factors besides immunization that influence stunting. Birth spacing does not correlate with the occurrence of stunting, which contradicts some studies showing that birth spacing significantly affects stunting in children[33]. This is not in line with Sofia et al.'s research titled 'The Influence of Birth Spacing on the Prevalence of Stunting in Indonesia.' An additional year of birth spacing will reduce the probability of a child suffering from stunting by 0.039. The number of children in the family is related to the occurrence of stunting[34]. This is closely related to the adequacy of nutrition that the family can provide. This aligns with Supariasa et al.'s research published in the e-journal Kartaraharjain 2019. The family's socio-economic status is related to the occurrence of stunting[35]. This is in line with Supariasa et al.'s research published in the e-journal Kartaraharja in 2019, which states that factors influencing the occurrence of stunting in children include the socio-economic level of the family[36]. This is in line with Gladys'research that data from Malaysia based on household income, namely low householdincome[37].

The above sentence integrates various findings from different studies to support the research's results on the relationship between birth length, birth weight, breastfeeding, immunization, birth spacing, the number of children in the family, socio-economic status, and stunting in toddlers[38]**.**

CONCLUSION AND RECOMMENDATION

This research has yielded important insights into the factors influencing stunting incidence among toddlers in Surabaya City, particularly in the catchment areas of Mojo Health Center, Tanah Kali Kedinding Health Center, Jagir Health Center, and Menur Health Center. The key findings indicate significant associationsbetween low birth weight (LBW) and socio- economic status with the occurrence of stunting. However,

other variables such as birth length, exclusive breastfeeding, breastfeeding up to the age of 2, immunization status, and birth spacing did not demonstrate significant associations.

Stunting prevention is a complex challenge, and collaborative efforts from the healthcare sector, government, community, and non- governmental organizations are required to achieve significant outcomes. Through a deep understanding of the factors influencing stunting and the implementation of appropriate actions, it is anticipated that the rate of stuntingamong toddlers in this region can significantly decrease, thereby positively impacting the future generation[39].

Based on the findings of this study, several recommendations can be made for stunting prevention efforts in this region:

1. Enhanced Maternal and Child Health Monitoring. It is crucial to enhance maternal and infant health monitoring during both the prenatal and postnatal periods. Emphasis should be placed on prenatal care to mitigate the risk of LBW.
2. Economic Empowerment of Families. Programs aimed at improving family income and socio-economic status should be implemented. This may include skills training, job access, and promotion of small-scale enterprises.
3. Nutrition and Childcare Education. Educating mothers on the importance of good nutrition during pregnancy and the breastfeeding period, as well as proper infant and toddler care, is essential. This can help ensure optimal growth and development.
4. Specific Interventions for Larger Families. Families with a higher number of children may require special attention in resource management and meeting the needs of their children.
5. Further Studies: Further research is needed to comprehend other potential factors that may play a role in stunting within this region, especially those not explored in this study.

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