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LITERATURE REVIEW
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Literature Review: Analysis of the Causes of Stunting in Toddlers in East Java Province

Literature Review: *Analisis Penyebab Kejadian Stunting pada Balita di Provinsi Jawa Timur*

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ABSTRACT

Background: The prevalence of stunting in East Java Province in 2022 reached 19.2%, showing a decrease compared to 2021, which recorded a prevalence rate of 23.5%. Despite the declining trend in stunting prevalence in East Java, the province has not yet achieved the Renstra target, which stipulates that the prevalence of stunting should decrease to 18.4% by 2022.
Objectives: This study aims to investigate further the causes of stunting incidents in East Java Province.
Methods: The method employed in this research is a literature review, where data sources are obtained using the Google Scholar electronic database. The research search process follows the PICOS protocol, formulating keywords using Boolean Operator techniques. The keywords used are "factors" AND "causes" OR "relationships" OR "risks" AND "stunting" AND "infants" OR "toddlers" OR "children." The selection of studies to be included in the review is adjusted to inclusion criteria: studies published in the last ten years (2013-2023), written in Indonesian and English, full-text, published, and open access. Exclusion criteria include age range, non-observational research, and studies that do not discuss the causes of stunting.
Results: A total of 13 studies were used in compiling this review. The location characteristics of the studies were found in 10 Districts/Cities in the East Java Province. Over the past ten years, various factors have been recognized as causes of stunting based on the identified research publications. These factors include parenting styles, Clean and Healthy Living Behavior (PHBS), economic status, educational history of birth, history of infectious diseases, and maternal pregnancy history.
Conclusions: The primary research focus on stunting incidents in toddlers in East Java Province is the parenting style provided by mothers. The level of maternal knowledge regarding Exclusive Breastfeeding (ASI), provision of Complementary Feeding (MPASI), and the intake of foods consumed by toddlers has a significant correlation with the occurrence of stunting and the developmental progress of children.

INTRODUCTION

Stunting is a child's condition caused by an imbalance in nutritional intake, especially during the first thousand years of life, known as the golden phase. It can disrupt the immune system and brain development [1]. Stunting is identified when a child's height or body length is below the growth standard by two standard deviations [2]. Stunting reflects on receiving suboptimal nutritional intake, which impacts growth and other body functions [3]. Toddlers who suffer from stunting tend to have suboptimal height, and their brain development may not reach full cognitive potential. The consequences of stunting continue into adulthood, creating challenges in school learning, lower earnings in adulthood, and barriers to active participation in the community, ultimately resulting in reduced productivity in the future [4,5].

Around 22.3% of children under the age of five suffer from stunting worldwide, which indicates that 141.8 million children worldwide experience the burden of stunting. This figure reflects the global decline in stunting over the last decade, with the most significant impact occurring in Asia (53%) and Africa (43%) [4]. The latest information shows that Asia has a problem with stunting among children under five years of age, especially in Southeast Asia, with the prevalence of stunting reaching 24.7%, being the second highest after South Asia [6]. Even though efforts have been made to reduce stunting in Indonesia, a report from The Global Nutrition Report shows that the prevalence of stunting in

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children under 5 years is still high, placing it in fourth place in Southeast Asia after Timor Leste, Laos and Cambodia. Based on Basic Health Research (Riskesdas) data and data integration between SSGBI 2019 and SUSENAS, it is known that the prevalence of stunting in Indonesia respectively from 2018 to 2022 is 30.8%, 27.7%, 26.9%, 24, 4%, and 21.6%. Over half of Indonesia's provinces report stunting prevalence exceeding the national average [7,8].

Facing the high prevalence *of* stunting among toddlers in Indonesia, steps are needed to overcome and prevent this problem from an early age. The government has prioritized public health programs in designing RPJMN 2020-2024 activities, with the main focus on reducing the prevalence of stunting and *wasting* in children under five, reducing the Maternal Mortality Rate (MMR), reducing the Infant Mortality Rate (IMR), as well as following relevant indicators [9]. These steps are in line with the target of achieving the Sustainable Development Goals (SDGs) in 2030, which aims to overcome various forms of malnutrition, including achieving the 2025 international target of reducing the incidence of stunting and *wasting* in children under five as well as addressing issues related to the nutritional needs of adolescent girls, pregnant and breastfeeding women, and the elderly. Therefore, emphasizing efforts to prevent and treat stunting early is very important in achieving these goals [10].

The United Nations International Children's Emergency Fund (UNICEF) framework generally categorizes stunting *levels* into three aspects: community, household, and individual. Factors that trigger stunting at the community level involve elements of the economic system, education, health, sanitation, and the availability of clean water. At the household level, stunting is triggered by deficiencies in the quality and quantity of food intake, income level, family structure, lack of access to basic health services, and inadequate sanitation and water supply. The impact of these factors at the household level creates conditions that affect individuals, especially children under five years, who experience imbalanced food intake, risk of low birth weight (LBW), and face serious health problems [11].

In East Java, the prevalence of stunting is decreasing yearly. In 2022, the majority of stunting will reach 19.2%, and there will be a significant decrease in 2021, which is 23.5%. Despite the decline, East Java Province has still not achieved the Strategic Plan target, which stipulates that the prevalence of stunting in 2022 should fall to 18.4% [12]. Based on this, appropriate strategies are needed to accelerate stunting *reduction,* with interventions that can be carried out with appropriate sensitive and specific interventions [13]. A number of studies have been conducted to analyze the causes of stunting in toddlers, but there is still a lack of research that summarizes the factors that cause stunting as a whole. One method that can summarize this information is synthesizing research results using the Literature Review method. Therefore, researchers are more interested in studying the factors that cause stunting in East Java Province.

METHODS

The method applied in this research is a literature review, where the data source was obtained using the *Google Scholar* electronic *database* . The research search process follows the PICOS (*Population-Intervention-Comparison-Outcome-Study Design)* protocol , where the description of PICOS in this study is: (P) toddlers aged 24-59 months, (I) incidence of stunting , (C) not suffering from stunting, (O) factors causing stunting, (S) observational research (*cross sectional, case-control, cohort*). Preparation of keywords as a tool for identifying research uses the *Boolean Operator technique* , so that the keywords used are "factors" AND "causes" OR "relationships" OR "risks" AND "stunting" AND "infants" OR "toddlers" OR "children". The determination of research that will be included in the study is adjusted to the inclusion and exclusion criteria prepared based on PICOS. The inclusion criteria used in this study were: research published in the last 10 years (2013-2023); research using Indonesian and/or English; *full-text* , published, and free-access research ; research is not the result of a study (*literature review, systematic review*); and research was conducted in the East Java region. Exclusion criteria in this study include: it is not an observational study and the study does not discuss the causes of stunting .

The results of data searches based on predetermined *keywords* are described in Figure 1. A total of 3,140 studies were identified and entered the screening stage to assess the quality of the articles to be reviewed according to the inclusion and exclusion criteria that had been prepared . After screening based on inclusion criteria, 2,975 studies were excluded because they were published more than the last ten years, were not *full-text* and *open access* , were the results of studies, and the research location was outside the East Java region. So a total of 165 studies were submitted for *full-text* screening . Results of *full-text screening* based on exclusion criteria As determined, 1 52 articles were excluded because they were not observational studies, the ages of the toddlers studied were not in the range of 24-59 months, and did not discuss the causes of stunting. So, 13 studies were obtained and used in compiling the literature review.

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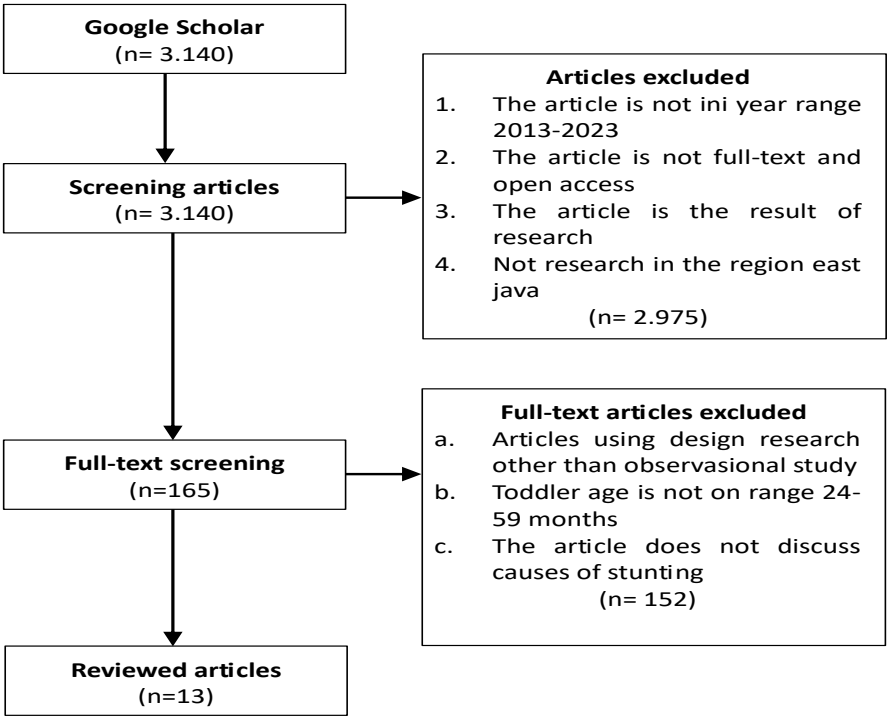

Figure 1. Article Search Flow

Next, data extraction and synthesis were carried out from the 13 articles found to collect important information on the research included in the review process. The information found is presented in a table prepared according to requirements, which describes the author and year of publication, research location, factors causing stunting incidents studied, and a description of the research findings.

RESULTS AND DISCUSSION

Based on research publications published from 2017-2023, various factors were found that cause stunting. Characteristics of the research locations are in 10 regencies/cities in the East Java Province. The factors that cause stunting will be discussed by identifying factors according to groups of factors: parenting style, socio-economics, birth history, mother's pregnancy history, PHBS, and history of infectious diseases.

Table 1 presents information that six articles conclude that there is a correlation between parenting patterns, which include providing nutritional intake, feeding practices, health nursing practices, nutritional knowledge, and stunting in toddlers. Meanwhile, three articles concluded a relationship between family socio-economic factors, such as the mother's age at pregnancy, household income, and the mother's education level, and the incidence of stunting in toddlers. In addition, two articles concluded that the birth history of toddlers, including birth weight and birth length, was related to the incidence of stunting in toddlers. Three articles concluded that clean and healthy living behavior, involving basic sanitation in the household and maternal and child hygiene practices, is also associated with stunting in toddlers. Two articles concluded that a history of infections in children, such as diarrhea and Acute Respiratory Infections (ARI), as well as the mother's pregnancy history, including Antenatal Care (ANC) visits and a history of Chronic Energy Deficiency (CED), were correlated with the incidence of stunting in toddlers. Information regarding the characteristics of the articles included in this review is presented in Table 1.

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Table 1. Factors that cause stunting in toddlers aged 24-59 months in East Java Province

Author	Location	Factors Causing Stunting Events Researched												Findings
		PHBS	Infectious Diseases	Family Income	LBW	Nutritional Intake	Mother's age when pregnant	CED	Exclusive breastfeeding	Immunization Status	MP-ASI	ANC	Mother's Education	
(Desyanti & Nindya, 2017)	City of Surabaya	p-value <0.05	p-value <0.05	-	-	-	-	-	-	-	-	-	-	A history of diarrheal disease and hygiene practices are related to the incidence of stunting
(Illahi, 2017)	Bangkalan Regency	-	-	-	p-value <0.05	-	-	-	-	-	-	-	-	Low birth weight is associated with stunting
(Azmy & Mundiastuti, 2018)	Bangkalan Regency	-	-	-	-	p-value <0.05	-	-	-	-	-	-	-	Nutritional intake of energy, protein, fat, carbohydrates, zinc is related to the incidence of stunting
(Ariati, 2019)	Madiun Regency	-	p-value <0.05	p-value <0.05	-	p-value <0.05	p-value <0.05	p-value <0.05	p-value <0.05	p-value <0.05	-	-	p-value <0.05	History of infectious diseases, family income, protein intake, maternal age during pregnancy, history of maternal CED during pregnancy, history of exclusive breastfeeding, immunization status and maternal education are related to the incidence of stunting
(Wijayanti, 2019)	Tuban Regency	-	-	-	p-value <0.05	-	-	-	p-value <0.05	-	-	-	-	LBW and exclusive breastfeeding are associated with stunting
(Hanum, 2019)	Probolinggo Regency	-	-	-	-	-	-	-	-	-	p-value <0.05	-	-	Giving MPASI is related to the incidence of stunting
(Sinatrya & Muniroh, 2019)	Bondowoso Regency	p-value <0.05	-	-	-	-	-	-	-	-	-	-	-	Maternal hand washing habits are associated with stunting
(Camelia, 2020)	Malang Regency	-	-	-	-	-	-	-	-	-	-	p-value <0.05	-	History of ANC visits is related to the incidence of stunting
(Fadilah et al., 2020)	Bondowoso Regency	-	-	-	-	-	-	-	-	p-value <0.05	p-value <0.05	-	-	Parenting patterns of providing MP-ASI and immunization health care are related to the incidence of stunting
(Sumarni et al., 2020)	Sampang Regency	-	-	-	-	-	-	-	p-value <0.05	-	-	-	-	Exclusive breastfeeding is associated with stunting
(Wulandari & Muniroh, 2020)	City of Surabaya	-	-	-	-	p-value <0.05	-	-	-	-	-	-	-	Energy, protein and calcium intakes were related to events
(Agustin & Rahmawati, 2021)	Kediri Regency	-	-	p-value <0.05	-	-	-	-	-	-	-	-	-	Family income is related to the incidence of stunting
(Amalina et al., 2023)	Jember Regency	p-value <0.05	-	-	-	-	-	-	-	-	-	-	-	Defecation practices are related to stunting

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Parenting styles majorly influence children's growth and development, including meeting their physical and psychological needs. Therefore, properly implementing parenting patterns is crucial in preventing or triggering stunting in children [14]. Research in Bangkalan Regency found a direct correlation between the level of nutritional intake, which includes energy, protein, fat, carbohydrates and zinc, and stunting in toddlers. Therefore, to support optimal growth of toddlers, special attention must be given to adequate nutritional intake for toddlers [15]. Similar findings were found in several other studies showing a relationship between adequate nutritional intake and the incidence of stunting in children under [16, 17, 18, 19]. Apart from adequate intake, mothers' knowledge about how they provide exclusive breastfeeding (ASI), Complementary Foods for Breast Milk (MPASI), and complete immunization also has an important role in preventing stunting in the future [16, 18, 19]. The relationship between maternal knowledge and exclusive breastfeeding and feeding practices can be seen in several studies that highlight the role of mothers in providing care to their children [20, 21, 22, 23, 24]. The practice of providing exclusive breastfeeding and complementary foods that are not optimal has the potential to cause stunting in toddlers in the next phase of development [25, 26]. So the food intake of toddlers needs to be paid attention to by both mothers and families because it is a golden period for children's growth and development [27, 28, 29, 30, 31].

Stunting in infants in Indonesia is closely related to several factors such as low household socio-economic levels (parental employment and household income) and especially low parental education [32]. The research results in Tuban Regency indicated that most parents (76%) with stunted toddlers *had* incomes less than the Regional Minimum Wage (UMR). Thus, it can be concluded that parents' capability to obtain nutritious food is influenced by low income levels [31]. This finding aligns with research in Bangkalan Regency and Sampang Regency which confirms that low family income is the root of problems related to fulfilling nutrition, especially for children under five [29, 33]. Children from families with limited economic levels tend to consume low quality and quantity food, which can ultimately lead to stunting [26, 34]. Education, income and family characteristics are closely related in causing stunting in children, because they play a direct role in meeting family food needs [16, 22, 29]. The ability of a person or group to gain access to sufficient food, both economically and physically, that is safe and has nutritional value is an important sign of household food security to ensure a person can live a healthy and good life [35, 36].

Birth weight and length are important in a child's early growth and development stages. Suboptimal nutritional absorption during pregnancy tends to give birth to babies with low body weight or short body length [37]. This results in delayed initial growth, making children more susceptible to stunting [38]. A study conducted in the city of Surabaya found that birth length was correlated with the level *of* stunting , which indicates the nutritional level of the baby during pregnancy [39]. A 2017 study found similar results where babies with a birth length of less than 48 cm were more likely to experience stunting [33]. Low birth weight of babies can affect their growth and development in the long term [28]. Children with a history of low birth weight (LBW) have a 2.8 times greater risk of experiencing stunting compared to children with normal birth weight [22, 40].

A significant interaction appears in the provision of household sanitation facilities and household water management as factors causing stunting , especially related to ownership of restrooms that do not meet standards and lack of drinking water treatment [32]. Studies in Nganjuk District found a relationship between stunting *conditions* and the availability of restrooms, waste management facilities, food management facilities, and basic sanitation [41, 42]. Children who live in an environment with poor family waste management can potentially harm their health and ultimately contribute to stunting [22]. Toddlers cared for by someone with poor hygiene practices have a 4,808 times higher risk of stunting compared to toddlers cared for by someone with good hygiene practices [37]. A 2019 study shows that the habit of mothers washing their hands before doing activities involving their babies is related to stunting *rates* [43]. Clean and healthy living practices (PHBS) are closely related to the incidence of stunting in toddlers, which is based on the role of parents in implementing PHBS in daily life in the household [23].

The mother's nutritional condition and health before, during and after pregnancy influence the risk of stunting in children [44]. During pregnancy, mothers who experience long-term energy deficiency or iron deficiency anemia are at risk of giving birth to babies with low birth weight, which is widely associated with stunting later in life [16, 45]. During pregnancy and early life, malnutrition causes changes in the fetus, including reduced growth and reduced number and development of body cells [26]. A study in Malang Regency found that regular *antenatal care* (ANC) visits can prevent stunting in children. Health workers can carry out interventions such as administering iron tablets, checking hemoglobin (Hb) levels, and effective nutritional education about nutrition and the consequences of anemia during pregnancy if it is not treated, which can reduce the risk of stunting in the future46. They can reduce the risk of future stunting with appropriate ANC (46 , 47).

Recurrent infections in children have long-term impacts on linear growth [44]. A study found that a history of infectious diseases, such as frequent diarrhea in the last three months or ARI, can help prevent stunting in toddlers; toddlers who do not have a history of infectious diseases have a lower risk of experiencing stunting [17]. This finding is in line with the results of other studies which show that toddlers with a history of infectious diseases, such as frequently experiencing diarrhea in the last three months [37] or having a history of ISPA [40] have three times the risk of experiencing stunting . In toddlers, there is a causal relationship between infection and nutritional status; toddlers with poor nutritional status are more susceptible to infection, while infection can also affect nutritional status, where malnourished children have lower immune systems, are more susceptible to disease, and may experience worse nutritional conditions [16].

Based on the findings studied, several policy

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implications can be intervened to overcome the problem of stunting in toddlers. The policy implications include various aspects such as nutritional intake, education, sanitation, *hygiene practices* and maternal care during pregnancy. Policy implications that can be implemented, such as increasing nutritional intake for toddlers with appropriate complementary feeding programs and ensuring toddlers get adequate nutrition during the golden period of child growth, can be combined with an educational approach to mothers regarding the practice of providing complementary foods, exclusive breastfeeding, and complete basic immunization. Education and the role of parents regarding good care and health care practices can help prevent malnutrition in their children. In addition, an effective health monitoring program is needed for mothers before, during and after pregnancy as well as monitoring children's health. Other programs that can help children avoid stunting include improving sanitation facilities in households and good hygiene practices to prevent infectious diseases in children, which directly affect children's linear growth.

There are limitations faced in this study, including generalizing the results because stunting *conditions* can be influenced by local factors that may not be reflected in the literature that has been reviewed, and each study has different standards in terms of defining research variables. Another limitation regarding the data source used in this research is that it only uses one database , namely Google Scholar .

CONCLUSIONS

The aspect of parenting that has been most researched and is closely related to cases of stunting in toddlers in East Java Province is the parenting style applied by the mother. Mothers' knowledge regarding the practice of exclusive breastfeeding, providing MPASI, and providing food intake for toddlers is closely related to the incidence of stunting and child growth and development. Apart from that, other factors contributing to stunting in toddlers include the socio-economic conditions of the family, the history of the toddler's birth, the mother's pregnancy history, sanitation and *hygiene practices* and the history of infectious diseases in toddlers. Overcoming the stunting *problem* requires comprehensive efforts involving various parties through holistic nutrition and health programs.

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All authors have no conflicts of interest to declare in this research.

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