Stunting incident prevention: a systematic literature review

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Abstract

Introduction. Stunting incident prevention is important to ensure the quality of the future generation. With excellent future generations, Indonesia can compete with other nations and survive future challenges. Unfortunately, some provinces in Indonesia still had high stunting incident prevalence. The aim of this study is to provide information about the influential contributors of stunting incidents qualitatively and quantitatively and to provide recommendations for stunting incident prevention.

Materials and Methods. The researchers applied for a systematic literature review with a modified PRISMA procedure. The third criterion was that the articles had to be non-systematic literature review articles, published from 2017 until 2022.

Results. This process eventually led to 20 relevant articles: 15 quantitative articles and 3 qualitative articles. From the reviewed quantitative and qualitative research articles, the researchers found twelve influential factors of stunting incidents. Among these twelve factors, the reviewing results found two top factors with OR values more than 12 times. They were family income and the number of children and the ages of the children.

Conclusions. The researchers found that the most prominent factors of stunting incidents during the observations in qualitative research were parent education, early marriage, dietary system, economic and social status. Although statistically, the top influential factors were family income and the number of children, and ages of children, the minor contributors must be considered. On the other hand, the efforts to improve parent education require interventions from the government.

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Introduction

Stunting incidents must receive specific attention from mothers, fathers, surrounding families, and the government. Stunting incident prevention is important to ensure the quality of the future generation.[1] With excellent future generations, Indonesia can compete with other nations and survive future challenges. Unfortunately, in Indonesia, a developing country, the prevalence of stunting incidents is also high, higher than 13%. Stunting is observable in children aged younger than 5 years old. During this period, if a children experience interrupted growth, the child is likely to suffer from stunting. Stunting incident brings negative impacts on cognitive function, academic performance, and physical performance.[2,3] Stunting also increases the risk of chronic disease in a country if the prevalence is higher than 39%.[4] Stunting is also correlated to degenerative diseases in the final phase of an individual life.

The stunting incident was high, with 164.8 million cases.[5] Some provinces in Indonesia also still have high stunting incident prevalence, for example, Nusa Tenggara Timur and Gorontalo.[6] Stunting is identical to low family income. Explained that stunting was identical to nutritional intake.[7] Explained that low family income influenced the nutrition intake provision of a pregnant mother.[8] For example, a low-income family might have problems meeting the minimum threshold of an essential amino acid.[9]

The government has also responded to suppress the increased rate of stunting incidents. For example, the government promoted the Gerakan 1000 HPK.[10] Unfortunately, this program could not significantly decrease stunting incident prevalence. Some provinces in Indonesia still had high stunting incident prevalence.

With this research, the researchers aimed to provide information about the influential contributors to stunting incidents qualitatively and quantitatively; and to provide recommendations for stunting incident prevention.[11]

Materials and Methods

The researchers applied for a systematic literature review with a modified PRISMA procedure.[12] In this research, the researchers applied some inclusion criteria for the reviewed articles. The first criterion was an article that analyzed the correlated factors of stunting incidents. The second criterion was articles that only took children aged younger than 5 years old in Indonesia. The third criterion was that the articles had to be non-systematic literature review articles, published from 2017 until 2022.

The researchers used the inclusion criteria in the modified PRISMA procedure, starting from finding the articles, checking the duplication, screening the obtained articles, and reviewing the obtained articles. In each step, the researchers applied more specific steps. They were i) using specific keywords – influential factors of stunting incidents in Indonesia and ii) only taking the accessible articles.

The researchers applied the keywords on Literature search was collected through Cochrane, Science Direct, Pubmed, Elseiver, Pubmed, CDC, Google Scholar to find relevant articles. The search process found 6.940 results based on the given keywords. Then, the researchers read the titles to determine which articles focused on the influential factors of stunting incidents in Indonesia. The results were 97 articles. Among these articles, the researchers checked the abstracts one by one to determine the applied method. In this process, the researchers excluded any systematic literature review articles. This process eventually led to 18 relevant articles: 15 quantitative articles and 3 qualitative articles. Then, the researchers reviewed the twenty articles to provide information about the influential contributors of stunting incidents qualitatively and quantitatively; and to provide recommendations for stunting incident prevention. Figure 1 shows the strategy for searching and selecting the articles according to the PRISMA flow diagram.

Results

This section consists of reviewing results from quantitative and qualitative articles and the discussion to provide information about the influential contributors of stunting incidents qualitatively and quantitatively, and to provide recommendations for stunting incident prevention. Here, the researcher provided the results of the reviewed quantitative research articles to provide insights about the influential and correlated factors of stunting incidents. Data characteristics of all studies that meet the inclusion criteria are compiled in Table 1.

In this section, the researchers provided the results of the reviewed qualitative articles about stunting incidents. The results are useful in providing explanations about policies and strategies to deal with stunting incidents in Indonesia.

A study by Saputri and Tumangger

Saputri and Tumangger (2019)[13] found that the government of Indonesia had issued policies and strategies to suppress and prevent stunting incidents. However, the policies did not seem to effectively suppress and decrease stunting incidents. They found that many Indonesian citizens and the program executors of the policies did not have excellent cognition about stunting incidents. For example, mothers, most mothers did not even know and were not aware of stunting. They argued that they had limited socialization, so the mothers did not know the influential factor, the effect, and the preventive actions of stunting incidents.

The same problem was also observable in the medical workers. The researchers found many medical workers did not have excellent knowledge about stunting and the mandated policies of preventing stunting incidents by the government. These two problems made lower community participation in the integrated-health care service. The other problems due to the lack of excellent stunting knowledge of the medical workers led to inaccurate administration of complementary meal administration and lower innovation to find the preferred biscuit taste for mothers' complimentary meals. Low medical worker quality also led to low innovation of blood-boosting tablets for mothers. Most mothers found the tablets sickening. Low medical worker quality also led to poor management of the integrated healthcare service. For example, the integrated health care services did not have scales to measure the height of children and adequate room to provide stunting socialization.

A study by Ulfah & Nugroho

Ulfah and Nugroho (2020)[14] qualitatively found that the sources of stunting incidents were early marriage, low education, and income problems. In the research, the researchers found that most women on the research site married when they were aged 18 years old. Some research respondents married younger than 18 years old. The situation got worsened because the married spouses did not have adequate knowledge about nurturing children. Most married spouses at this age also did not have jobs or adequate houses. Based on the observation, these married spouses also had lower education.

The implications of these poor situations led to low awareness of the informants to visit antenatal care and integrated health service care. Although the integrated health care service might have poor service performance, parents could have gotten slight information to prevent stunting incidents. For example, by visiting the integrated health care or POSYANDU, young married spouses could get information about complementary meals. In the research, the respondents seemed only to focus on findings jobs they could do to earn money. In this case, their earnings seemed incapable of meeting the maternal needs, for example, by providing complementary meals. They thought that complementary meals were not efficient, so they remained to consume common daily meals for pregnant mothers.

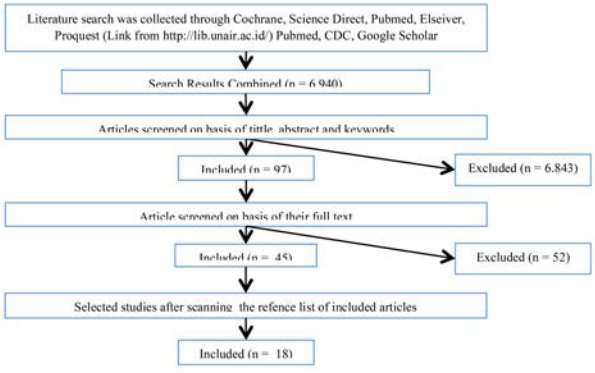

Figure 1. PRISMA flow diagram.

Table 1. Characteristics of included studies.

No	Author/Years	Population	Types of study	Finding
1	Torlesse et al. (2016)[32]	Children aged 0-23 months	Quantitative research with a cross-sectional approach	Statistically found evidence of sanitation and water treatment and stunting incident correlation. The obtained P-value was 0.007, lower than 0.05. The researchers found that children drinking untreated water might have a higher stunting risk of 3.47 times.
2	Arvastami et al. (2017)33	Children aged of 12–23 months	Quantitative study with survey method	Underweight birth had a 1.74 higher risk of stunting. The value was higher than the normal weight birth that might suffer from stunting 1.27 times.
3	Badruddin et al. (2017)34	Children aged 5 years	Quantitative research with a cross-sectional approach	A simultaneous influence between parent education, family economic situation, and the stunting incident.
4	Ramadhan & Ramadhan (2018)35	Children who are cared for by mothers of productive age between 18-50 years	Quantitative study with survey method	Breastfeeding was correlated to stunting incidents. with a P-value of 0.006 lower than 0.05. A strongly correlated factor of stunting incidents when the parents were unemployed. with a P-value of 0.003. lower than 0.005.
5	Mugianti et al. (2018)36	Stunting children aged 25-60 months	Quantitative study with descriptive	Boys would have a higher possibility of suffering from stunting incidents. Lack of exclusive breastfeeding administration and lower education of mothers and fathers influenced the stunting incidents. The researchers also found that that lack of energy intake and/or lack of protein intake influenced the stunting incidents and a positive co relation between infectious disease and stunting incidents.
6	Simbolon et al. (2019)4	Children under-five years	Quantitative study	Underweight made babies have a higher possibility of suffering from stunting. However, the researchers did not provide statistical evidence to support the finding. In addition, the researcher found also a family with this characteristic had a higher possibility of suffering fro stunting.
7	Titaley et al. (2019)37	Children aged 0–2 years	Quantitative study with survey	Babies born lower than 2500 grams had a higher possibility, 2.55 higher times, of suffering from stunting. the researcher found that the crelation between the number of children, the ages of children, and the stunting incidents. They proved families with more than three children younger than 5 years old had the possibility of suffering from stunting 1.33 times. They also found babies aged between 12 and 23 months could suffer from stunting 1.89 times. furthermore Lower antenatal care visit frequency had a higher risk of suffering from stunting 1.22 times and male children had a higher possibility of suffering from stunting 1.33 times.
8	Ernawati (2020)38	All stunting toddlers in 12 Locus Stunting Villages	Quantitative study with descriptive	Untreated sanitation was correlated to stunting incidents. underweight made babies have a higher possibility of suffering from stunting. The researcher found short mothers would have higher possibilities to have stunted children. They also found lack of exclusive breastfeeding administration and lack of energy intake and/or lack of protein intake influenced toward a high rate of stunting incidents.
9	Zakaria et al. (2020)31	Children aged 24-59 months	Quantitative research with a cross-sectional approach	The researcher found families with short birth spaces, less than 2 years, had a higher possibility of suffering from stunting 12.62 times. They also found that education could suppress stunting incidents.
10	Flynn et al. (2020)5	Children under five	Quantitative research with a cross-sectional approach	The researcher found a correlation between maternal height and stunting incidents. Mothers with shorter heights than 150cm had a higher possibility to bear stunted children 2.844 times. Mothers with middle-upper arm lengths shorter than 23.5cm and heights shorter than 150cm even had higher possibilities to bear stunted children, 2.936 and 1.769 times.
11	Basri & Hadju (2020)8	Infants aged 0–23 months	Quantitative research with a cross-sectional approach	Exclusive breastfeeding influenced the stunting incident, P-value lower than 0.05.
12	Akbar et al. (2021)39	Children aged 0-59 months	Quantitative study with survey	The researcher found a untreated sanitation was correlated to stunting incidents. They claimed a linear correlation between the number of children and stunting incidents but they did not provide statistical evidence. They also found that education could suppress stunting incidents.
13	Sartika et al. (2021)40	Infants age 0-11 months	Quantitative research with a cross-sectional approach	Babies born lower than 2500 grams had a higher possibility, 4,12 times, of suffering from stunting. In addition found that incomplete immunization caused children to suffer from stunting 2.65 times.
14	Maulidiana & Sutiati (2021)9	Children age 24–59 month	Quantitative study with a case-control study approach	A higher possibility of suffering from stunting for underweight birth, 7.11 times higher. Statistically found correlation between breastfeeding administration and stunting incidents. In their research, mothers breastfeeding for less than 6 months had a higher possibility of having stunted children 5.34 times. They found a correlation between a lack of essential amino acid intake and stunting incident. P-value of 0.05 and proved that families with lower incomes than the minimum regional wage had a higher possibility to have stunted children 12.06 times.
15	Huriah et al. (2021)41	Children under five	Quantitative study with a case-control study approach	The correlation between underweight birth and stunting incidents was categorized as a strong correlation because the obtained P-value was 0.041.

A study by Christina *et al.*

Christina *et al*. (2022)[15] also qualitatively found that dietary systems, economic, social status, and education make children stunted. The researchers found that the respondents did not provide adequate dietary meals for the children. For example, parents that had toddlers with incomplete teeth should have breastfed their toddlers and provided soft meals. The meals should not be spicy and should not have high-fat content. Unfortunately, the parents did not practice this excellent dietary system recommendation. Parents also did not provide adequate vegetables and fruits for the toddlers.

The incapability of the parents to implement an excellent dietary system did not only deal with their lack of awareness but also their economic and social status. Most respondents were from families with low earnings, so they had difficulties providing excellent dietary meals. Thus, parents could only provide common daily meals for their children. The parents also admitted that the meals for the children were not different from the meals the parents consumed.[27,28] In this research, the researchers also found something unexpected in families with moderate incomes. These families argued that excellent dietary meals for the maternity period were expensive meals.[29] This argument went against the reality that the most important was the nutrient of the meals. Therefore, this perception should be improved by involving related parties to provide education. This finding also emphasized that the respondents had poor education, so they could not realize the most important parts of excellent meals, the nutrient of the meals.

Discussion

From the reviewed quantitative and qualitative research articles, the researchers found twelve influential factors of stunting incidents. Among these twelve factors, the reviewing results found two top factors with OR values more than 12 times. They were family income and number of children and ages of children. Parents with better incomes or earnings would have better meal variety for consumption purposes during the maternity period. However, parents with low incomes would find it difficult to provide various meals for maternal consumption purposes.[19-21] Unfortunately, the income factor was not the sole contributor to the stunting incident. The reviewing results found that low-income families with excellent parent education could struggle to meet nutritional adequacy for the maternity period. The review results found that even families with moderate incomes would also have stunted children if they did not understand the excellent nutrient for pregnant women and children. The results of other studies also reveal that families with low income will cause the nutritional needs of children not to be met so that the risk of stunting can occur.[22-24]

Based on the qualitative research review results, the researchers found that education played an important role in managing the most influential factors of stunting incidents. For example, parents with excellent education would be more aware of marital responsibilities. Thus, after they were married, they would be aware of their family's future. They would struggle to find better jobs with better incomes so that the mothers could have adequate nutrition during their maternity period.[25,26] In this case, excellent education could also make parents aware that male children and female children, boys and girls, have different minimum nutrition amount intakes.[27,28] The review results found that stunting was mostly observable in boys. Thus, parents must be aware of the nutritional intake necessities of boys and girls.

The efforts to ensure adequate nutritional intake also dealt with exclusive breastfeeding administration. Parents that had excellent education would be aware that breastfeeding had various excellent nutrition. Therefore, parents with excellent education could ensure that their babies received breast milk for six months. The results of the same study also revealed that parents with excellent education also knew that having children more than three with short spaces among the children, for example, less than 2 years, might increase the risk of having stunted children.[29,30] The evidence was the high OR value, 12.62.[31] Individuals with better education would also recognize the impacts of married at younger ages. For example, young-aged marriage could increase the risk of having underweight babies which this situation would increase the risk of having stunted children, 1.74 to 7.11 higher risk.

Although the field research evidence was legit, in this literature review the researchers did not find any legit statistical correlation between education and stunting incidents. The researchers assumed that the education of the parent indirectly influenced the stunting incidents. However, from this discussion, the observable question dealt with how parents could improve their education. Married spouses that became the parents of the children might not have adequate time to learn about stunting prevention. Therefore, the government must participate and intervene in this matter so that the parents could be educated properly and prevent stunting incidents.

In this research, the researchers recommend the government initiate the early prevention of committing young marriage at the education level. Junior High School and Senior High School-aged children must be aware of the negative impacts of young-age marriage. The negative impacts will not only be observable on themselves but also on the offspring they will have. As stated previously, early marriage highly contributed to the underweight birth rate which this matter influenced stunting incidents. The other urgency of preventing early marriage is about economic social status stability. Most younger parents had no idea about parenting and nurturing their children. The reviewed articles also found that most younger parents were not prepared to take on the responsibilities as parents. This situation logically contributes to the increased stunting incident.

During the educating process, the government must ensure that the educators have the eligible qualities and are responsible for providing the information and education related to stunting prevention, stunting problems, and maternal health. The government must also encourage educators and medical workers to innovate. Thus, they can produce better strategies and methods for educating parents and candidates about parents or products, for example, meals, to prevent stunting incidents. The government must also consider the minor contributors of stunting incidents as potential stunting incident contributors. The government must also design preventive programs based on each influential factor of stunting incidents.

Strengths and limitations

This literature review is about preventing stunting in children in Indonesia by knowing the causes of stunting and this document can be used to guide recommendations on how to address stunting. The strength of this review lies in the systematic approach taken, but we recognize some limitations. First, a limited amount of information is available on the topic. The second limitation of the method is that the literature included excludes literature reviews and experimental studies. Third, the results of a literature review conclude the causes of stunting but do not discuss the underlying causes of stunting.

Conclusions

From the reviewing process, the researchers found twelve influential factors of stunting incidents from the reviewed qualitative articles. Then, the researchers found that the most prominent factors of stunting incidents during the observations in qualitative research were parent education, early marriage, dietary system, and economic, and social status. Although statistically, the top influential factors were family income and the number of children, and age of children, the minor contributors must be taken into account. The efforts to prevent stunting incidents should also prioritize parent education because excellent education can suppress other influential factors of stunting incidents. On the other hand, the efforts to improve parent education require interventions from the government. The government must ensure the medical staffs are qualified to provide education about stunting. The government must also encourage medical staff to innovate to create better strategies, programs, and products based on the influential factors of stunting incidents.

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