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## Factors Influencing The Growth and Development of Children with Stunting, Scoping Review

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### ABSTRACT

**Background:** Data related to stunting rates known by country include Thailand (10.5%), Sri Lanka (27.3%), Maldives (20.3%), North Korea (27.9%), Myanmar (29.2%), Bhutan (33.6%), Nepal (35.8%), Bangladesh (36.1%), Timor Leste (50.2%), India (38.4%), and Indonesia (36.4%). Referring to the results of the Basic Health Research (Riskesdas) conducted every 5 years, it is known that the percentage of stunting in Indonesia has decreased from 37.2% in 2013 to 30.8% in 2018. Growth and development are closely related to stunting are considered an important indicator of inequality in child health. This can be caused by several factors, both before and after giving birth in the developmental phase, including poor nutrition, household environment, and parents' education and economy.

**Research Objectives:** This study aims to systematically map the research carried out in this field and identify factors that influence stunting growth and development.

**Methods:** The method used is Prism Flowchart (Preferred Reporting Items For Systematic review and Meta-Analyses). It is used to describe the flow of the literature search. Article searches were conducted using 3 databases (PubMed, Wiley, and ProQuest). The inclusion criteria for articles are articles published in 2015-2020, in English and discuss the Factors Affecting the Growth and Development of Children with Stunting. The article search flow is described using the PRISMA Flowchart, while the article quality assessment is carried out using Hawker and CASP. The next stage is the preparation of data and reporting of results.

**Result:** Based on the critical appraisal results from 12 articles that have been selected through the cross-sectional method, 11 articles were obtained (A1, A2, A3, A4, A5, A6, A7, A8, A10, A11, A12) and 1 study cohort article (A9). Based on the quality of the articles that have undergone critical appraisal, it was found that several articles obtained grade B (A1, A2, A3, A4, A6, A7, A8, A9, A10, A11, A12) and 1 article received grade D (A5).

**Conclusion:** The findings from this scoping review are that the child's gender, child's age, mother's age, mother's education, mother's occupation, wealth, economy, nutritional status before and after giving birth, clean water sanitation, latrine management, hygiene, and environmental factors, have an effect on stunting which may hinder the growth and development of children in the future.

**Keywords:** *Child; Development; Stunting*

## BACKGROUND

According to World Health Organization (Ketsuwan et al., 2018) Indonesia is a country with the third-highest percentage of stunting in the Southeast Asia region. In addition, stunting rates in other countries in the Asian region include Thailand (10.5%), Sri Lanka (27.3%), Maldives (20.3%), North Korea (27.9%), Myanmar (29.2%), Bhutan (33.6%), Nepal (35.8%), Bangladesh (36.1%), Timor Leste (50.2%), India (38.4%), Indonesia (36.4%). According to the results of the Basic Health Research (Riskesdas) conducted every 5 years, the percentage of stunting in Indonesia in 2013 showed a figure of 37.2% which then decreased to 30.8% in 2018. Even though it has decreased, Indonesia is still not able to meet the standards. WHO has set the maximum stunting percentage of 20%. In other words, this indicates that the stunting in Indonesia remains an issue. Almost one in four children under 5 years of age worldwide are stunted. Stunting is a measure of chronic nutritional deficiency characterized by the presence of two standard deviations (SD) below the median height-for-age z-score (HAZ) using the WHO Multicentre Growth Reference Standards. Nearly 50% of stunted children live in Bangladesh, India, and Pakistan (Joshi et al., 2018; Krishna et al., 2018).

Data from the Indonesian Ministry of Health (Kemenkes RI) in 2016 reported that Indonesia was ranked 17th out of 117 countries that had nutritional problems or stunting. The prevalence of stunting under five in Indonesia is also the highest compared to Myanmar (35%), Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%) (Health & Labour, 2015; Health & Welfare, 2019)

The Ministry of Health of the Republic of Indonesia in 2016 described the percentage of stunting/short in Indonesia in the group of children under five as 29.0%. This is higher than the toddler group by 21.7%. According to the World Health Organization (WHO), the prevalence of stunting under five becomes a public health problem if the existing data shows more than 20%. Indonesia has not been completely free from the problem of undernourished children, especially those under five years old (toddlers) where the prevalence of stunting (short) in this group is still 37.2% until 2019, although it has decreased to 30.8% from the previous year. This figure defines that there are still 3 out of 10 children under five who are stunted. The standard target of the World Health Organization (WHO) related to stunting is a maximum of 20% of the total number of children under five in one country. Meanwhile, on the other hand, the prevalence of wasting or child's weight was very low in 2019 in Indonesia was 7.44%. Indonesia in this category is no longer in the serious category like the previous year.

The prevalence of the short toddlers' category in DIY in 2018 was 12.37% and decreased to 10.69 in 2019. The highest number of stunted children was in Gunung Kidul Regency (17.94) and the lowest was Bantul Regency (7.73). From this figure, it can be seen that the data for very short toddlers in DIY is lower when compared to Riskesdas in 2018 (21.4%). Stunting is a global burden affecting nearly 160 million children under the age of five (Kwami et al., 2019). Stunting, defined as the achievement of height below the World Health Organization (WHO) median reference standard deviation (SD) growth is the most common form of child malnutrition and affects approximately 165 million children worldwide before their 5th birthday (Islam et al., 2018).

Stunting has decreased globally by 40% over the last 2 decades. Data from the Indonesian Ministry of Health (Kemenkes RI) in 2016 reported that Indonesia was ranked 17th out of 117 countries that had nutritional problems or stunting. The prevalence of stunting under five in Indonesia is also the highest compared to Myanmar (35%), Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%) (Center of Data and Information, 2014; Health & Labour, 2015). However, there are as many as 37% of children under 5 years old living in Southeast Asia who continue to experience stunted growth with rates continuing to be higher among poor children from rural areas (Joshi et al., 2018; Krishna et al., 2018). The motor development of a child is a process by which a child acquires movement patterns and skills. Motor skills are acquired in several factors,

such as physical and neuromuscular maturation, interaction of maintenance practices, and environment (Akseer et al., 2020; Vaivada et al., 2020). Fine motor activity includes the ability to produce precise, efficient, and adaptive movements using the small muscles of the fingers, toes, lips, and tongue as well as eye and hand coordination simultaneously (Black et al., 2017, 2019).

Gross motor skills in this case are physical abilities that involve movements that use large muscles in the arms, legs, and feet (Dinkes, 2018). The movement of skeletal muscles in humans from time to time can decrease, precisely in the muscles located in the legs and arms. Leg length tends to be a determinant of muscle mass. The decrease in skeletal muscle in humans is similar to wasting where stunted children are also found to experience decreased muscle mass due to reduced leg length which will be less clinically visible when compared to wasting children (Nahar et al., 2020).

**OBJECTIVE**

The goal of this scoping study is to gather information on the factors that influence the growth of stunted children under the age of five. It is hoped that this scoping review will serve as evidence from previous studies, allowing it to be utilized as a reference for any factors that may influence the occurrence of stunting.

**METHODS**

This research was conducted by researchers based on the results of studies from articles in previous research journals, namely about the factors that affect the stunted growth and development in children.

Tabel 1. *Framework scoping review*

<i>P (Population)</i>	<i>E (Exposure)</i>	<i>O (Outcome)</i>	<i>S (Study Research)</i>	<i>P (Population)</i>
Toddler	The factor which influences children's growth and development	Stunting	Qualitative Quantitative	Toddler

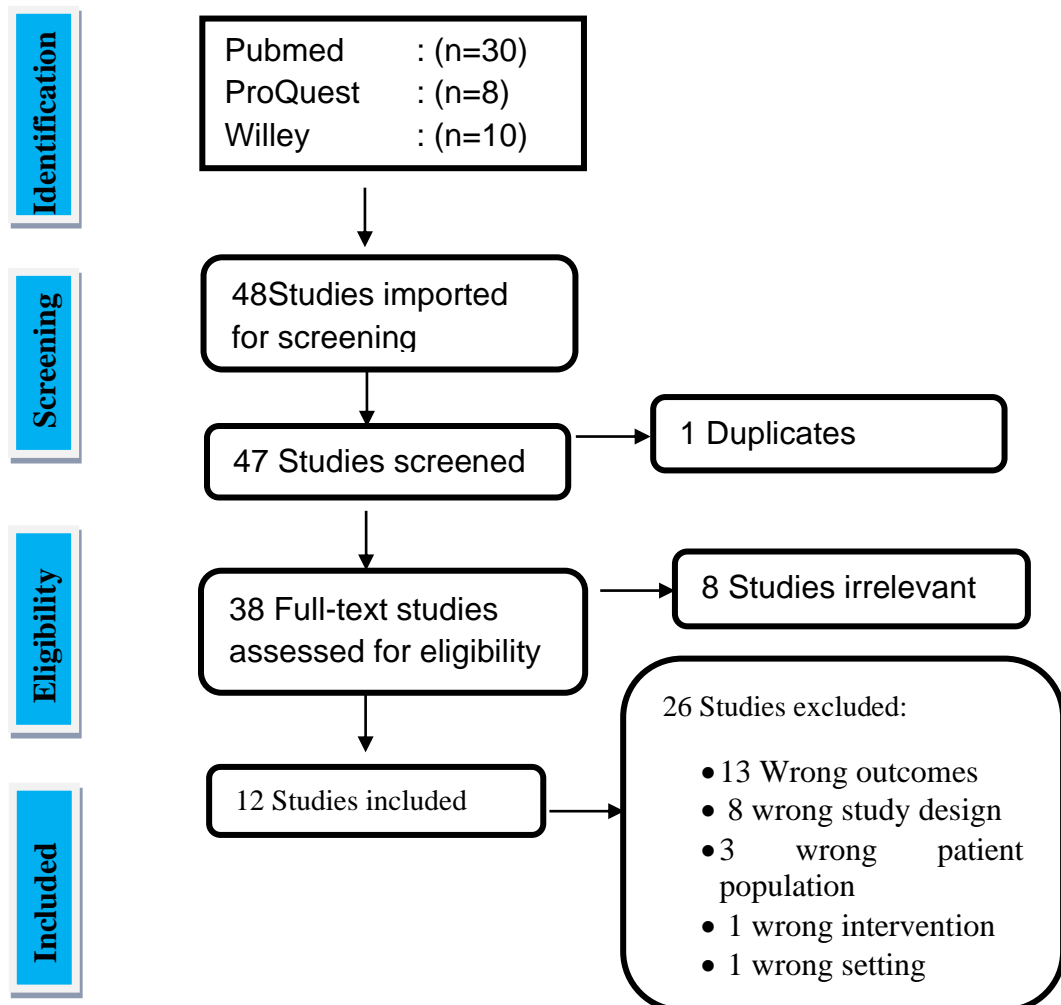
Based on the framework above, the selected scoping review questions are as follows:

1. What is the average age, mother's education, and economy in stunting?
2. How is the growth and development of stunted children?

The databases used in the source search are PubMed, Wiley Online Library, and Proquest. The search was carried out using the Wiley Online Library database which was accessed through the UNISA Library. PubMed is accessed through Google and Proquest is accessed through PNRI. The search strategy is to enter keywords in the search process. This keyword entered is "Child\* OR Children\* OR Toddler\* AND grow\* OR development\* OR progress\*". The inclusion criteria in the article search are articles published from 2015 to 2020, articles in English, and discussing factors that affect child growth and development in stunting. The exclusion criteria were articles in the form of opinion articles and articles published under 2015 (Gatica-Domínguez et al., 2019; Gosdin et al., 2018).

There were 48 articles identified after searching all databases. PRISMA is a system for keeping track of and recording the number of sources that have been checked, selected, or deleted for later use in a systematic review or meta-analysis. PRISMA is a system for keeping track of and recording the number of sources that have been evaluated,

chosen, or deleted for later use in a systematic review or meta-analysis (KeMenkes, 2018).



**Fig 1.** PRISMA Flowchart

Based on the final screening results from the prism flow chart, 12 articles were chosen as being of good quality, and were then entered into the charting data table (Table 2 Data Charting), where data extraction was performed to classify several points or parts of the article, such as research objectives, design research, sample size, and study results.

**Table 2.** Data Charting

No	Author/ Year/Title/ Grade	Country	Aim	Type of Research	Data Collection	Participants/ Sample Size	Result
A1	Risk factors for stunting among children under five years: a cross-sectional population-based study in Rwanda using the 2015 Demographic and Health Survey	Rwanda	To Identify the risk factors of stunting in Rwanda.	Quantitative	Demography and Health Survey	Total 3594 children under 5 years old	A total of 3594 children under 5 years were included; where 51% of them are men. The prevalence of stunting was 38% (95% CI: 35.92 - 39.52) for all children. In the adjusted analysis, the following factors were significant: boys (OR 1.51; 95% CI 1.25 - 1.82), children aged 6-23 months (OR 4.91; 95% CI 3, 16 - 7.62), and children aged 24 years - 59 months (OR 6.34; 95% CI 4.07 - 9.89) compared to those aged 0 - 6 months, low birth weight (OR 2.12; 95% CI 1.39 - 3.23 ), low maternal height (OR 3.27; 95% CI 1.89 - 5.64), basic education of the mothers (OR 1.71; 95% CI 1.25 - 2.34), illiterate mothers (OR 2.00; 95% CI 1.37 - 2.92), history of not taking deworming during pregnancy (OR 1.29; 95% CI 1.09 - 1.53), poorest household (OR 1.45; 95% CI 1.12 - 1.86; and OR 1.82 ; 95% CI 1.45 - 2.29 respectively).
A2	Ethnic inequalities and trends in stunting prevalence among Guatemalan children: an analysis using national health surveys 1995 – 2014	Guatemala	To compare the population of original toddlers and non custom in its relation to stunting, and to explore ethnical intersectionality based on wealth and residence	Quantitative	Questionnaire and measurement protocol	Five national health surveys conducted between 1995 and 2014 were analyzed	The overall prevalence of stunting decreased by 9.8 percentage points (95% CI - 16.4 to - 3.3) from 1995 to 2014. The slope index for absolute inequality in stunting - which corresponds to the difference in prevalence between the richest and poorest households - ranges from - 52.9 up to - 60.4 percentage points, with no significant change over time. Children in rural areas were consistently shorter than in urban areas, but children native to rural areas were significantly worse off than the other groups. Indigenous

children in the poorest group of family wealth consistently show the highest prevalence of stunting, compared to all other groups. Time trends in stunting were assessed using the annual absolute change average (AAAC). The fastest decline was observed among native children of the middle wealth tertile (AAAC = - 1.21 percentage points per year (pp/y); 95% CI -1.45 to -0.96) followed by non-natives were also from the middle tertile (AAAC = - 0.80 pp./y; 95% CI - 0.99 to - 0.60). The prevalence of stunting in the two poorest tertiles of indigenous children in 2015 was similar to that presented by non-indigenous children in 1995, 20 years earlier. In the richest tertile, the situation of indigenous children is much worse than that of non-indigenous children 20 years earlier.

A3	Water, Sanitation, and Hygiene: Linkages with Stunting in Rural Ethiopia	Rural Ethiopia	To explore the correlation between stunting and WASH factor, considering the descriptive factor (potential confounding factor identified in the literature) which specifically for Ethiopia context to inform the design and implementation in handling stunting.	Quantitative Questionnaire	The children under five years old from 3200 households in four area in Ethiopia as part of the larger study and integrated program led by children fund of United Nation (UNICEF).	By referring to the z-scoring of the World Health Organization (WHO), the average stunting rate in the sample is 47.5%. This study also takes into account demographic and social-behavioral factors, such as age, gender of the child, and gender of the primary caregiver, in addition to handwashing behavior and drinking water facilities. Evidence recommends several measures that can be used to improve maternal and child handwashing behavior with a focus on access to clean water. The higher stunting rate with increasing age of children highlights the need for further interventions, such as efforts to improve nutrition and WASH behavior which is considered the most effective.
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A4	Trends in inequalities in child stunting in South Asia	South Asia	To analyze the social-economy inequality in Stunting in South Asia and the difference investigated related to the factors in individual level, nanny, and household (bad food diversity, low education of the mother, and household poverty)	Quantitative	Questionnaire	55.459 children age 6-23 months from Demography and Health Survey in Bangladesh, India, Nepal, and Pakistan (1991-2014).	Socio-economic hardship is associated with an increased risk of stunting, regardless of the type of loss. Poor children with inadequate diets and mothers with low education put children at greater risk of stunting. Although stunting rates declined in the most deprived groups, socio-economic disparities were largely maintained over time and in some cases worsened, ie between wealth quintiles. The disproportionate burden of stunting is experienced by the most disadvantaged children. Worsening inequality, i.e. those with socioeconomic inequalities, is a concern in countries with substantial stunting burdens.
A5	Stop stunting: improving child feeding, women's nutrition and household sanitation in South Asia	South Asia	Aiming at increase on feeding children, women's nutrition, and household sanitation as the priority field of investment for preventing stunting on children in South Asia	Quantitative	Questionnaire	A group of children, parents variable	Recent analysis shows that poor diet in children in the first years of life, poor nutrition of women before and during pregnancy, and poor sanitation practices in households and communities, are the main drivers of stunting. This is most likely due to conditions underlying women's status, food insecurity, poverty, and social inequality.
A6	Early childhood development and stunting: Findings from the MAL - ED birth cohort study in Bangladesh, 2019	Bangladesh	To find out the development difference of early childhood (PAUD) between stunting (age length) z-Score [LAZ] <-2) and without obstacle (LAZ ≥ -2) children in Bangladesh	Quantitative	Questionnaire	Children Under 5 Years Old	Stunting children had significantly lower ECD scores than their non-stunted peers in terms of cognitive P = .049), motor (P < .001), language (P < .001), and social-emotional (P = .038), with boys having significantly lower fine motor skills than girls (P = .027). Maternal schooling and BMI were significant predictors of ECD. Similar to stunting, underweight children had developmental deficits in all domains (cognitive: P=.001; fine motor: P=.039, and P<.001 for gross and total motor skills; expressive

							communication: P=.032; total language: P=.013;socio-emotional development.
A7	Trends and determinants of stunting among under-5s: evidence from the 1995, 2001, 2006 and 2011 Uganda Demographic and Health Surveys	Uganda	To describe the stunting trend during childhood period among toddlers in Uganda and to asses the impact of mother's education, welath, and residence on stunting.	Quantitative cross-sectional	Questionnaire	The size of weighted sample is 14.747 children age <5 years old and data analysis beaming cross and collected from Demography and Health Survey of Uganda (UDHS) in 1995, 2001, 2006, and 2011	The weighted sample size is 14,747 children. The prevalence of stunting is known to have decreased from 44.8% in 1995 to 33.2% in 2011. UDHS reported stunting of 38% occurred in 1995, underestimating the decline due to the transition from Center for Health Statistics/Centers for Disease Control and Prevention standards to WHO standards. . However, one in three children in Uganda was still stunted in 2011. The Southwest, Midwest, Kampala, and Middle East regions had the highest odds of being stunted. Born in a poor or middle-income household, to a teenage mother, with no secondary education. associated with stunting. Other predictors of persistent stunting included small birth size, male sex, and age 2 years - 3 years.
A8	Determinants of stunting in Indonesian children: evidence from a cross-sectional survey indicate a prominent role for the water, sanitation and hygiene sector in stunting reduction	Indonesia	To identify the factors related to stuntind on kids age 0-23 months in Indonesia for becoming the basic of policy design and the right response program.	Cross sectional	Questionnaire	Total 1366 children were involved	The prevalence of stunting and severe stunting were 28.4% and 6.7%, respectively. Multivariate analysis conducted on the determinants of stunting identified a significant correlation between household MCK (Public bathing, washing, and toilet facilities) and household water treatment (P. for correlation = 0.007) after controlling for potential covariates. In households drinking tap water, the adjusted odds for stunted children were three times higher than if the household used unrepaired latrines (adjusted odds ratio 3.47, 95% confidence interval 1.73-7 .28, P < 0.001); However, in households that drank boiled water, the adjusted odds for



							stunting were not significantly higher than if those households used unrepaired latrines (adjusted odds ratio 1.27, 95% confidence interval 0.99-1.63, P = 0.06). Other significant risk factors were male gender, older child age and lower wealth quintile. Risk factors for severe stunting include male gender, older child age, lower wealth quintile, no antenatal care in health facilities, and mother's participation in making decisions about what food to cook at home.
A9	Risk factors of stunting among children living in an urban slum of Bangladesh: findings of a prospective cohort study	Bangladesh	To identify the risk factor of stunting among children who live in urban slum area of Bangladesh	Cohort perspective study	Questionnaire	In the amount of 265 children listed and followed up in this cohort study	A total of 265 children were enrolled and followed up in this cohort study from birth to 24 months of age. The average age of mothers in this study was around 25 years (SD 4.9) and 18.6% of mothers did not attend school while 44% attended school for at least 5 years. About 35% of poor households, but 76% of all households use proper toilets. Among the study participants, 51.3% were women. The average birth weight was 2.75 kg (SD 0.41) and the average length was 48.05 cm (SD 2.05). Their mean LAZ and WAZ scores at birth were -1.08 (SD 1.02) and -1.31 (SD 0.92) respectively. At birth, about 18% of children are stunted (LAZ <-2SD). This proportion increased progressively over time and at 24 months of age, nearly 48% of participants were stunted with an overall mean LAZ of -2.03 (SD 0.93).
A10	Handwashing, sanitation and family planning practices are the strongest underlying determinants of child stunting in	East India	To identify the strongest determinant factor among custom children in the village of Jharkhand and Odisha, India	Cross sectional study	Interview	1227 children age 6 – 23 months and their mother	In the adjusted model, the strongest protective factors for linear growth included cooking outdoors rather than indoors (HAZ +0.66), birth spacing 24 months (HAZ +0.40), and handwashing with a cleaning agent (HAZ

<p>rural indigenous communities of Jharkhand and Odisha, Eastern India: a cross-sectional study</p>	<p>+0.32). The strongest risk factors were later birth order (HAZ 0.38) and recurrent diarrheal infections (HAZ 0.23). Our results indicate several risk factors for shaky linear growth in indigenous communities in Jharkhand and Odisha. Interventions that can improve children's growth abilities include reducing exposure to indoor air pollution, increasing access to family planning, reducing diarrheal infections, improving handwashing practices, increasing access to income, and improving health and sanitation infrastructure.</p>			
<p>A11 The co - India occurrence of anaemia and stunting in young children</p>	<p>To identify basic determinant factor and the form of other malnutritions</p>	<p>Quantitative Questionnaire</p>	<p>Population of children age 6 – 18 years old</p>	<p>In 2 populations of children aged 6 - 18 months in Bihar, India, (n = 5,664) and 6 - 36 months in Lambayeque, Peru (n = 688), we measured the frequency of occurrence of anemia and stunting. We compared this value with the value expected by chance, the product of the prevalence of anemia and stunting using the chi-square test. We also constructed a logistic regression model for each condition. The frequency of occurrence in the Indian population was 21.5%, and in the Peruvian population, it was 30.4%, which is similar to the coincidental expected frequencies of 21.3% (p=.97) and 31.5% (p=.85). ). In Peru, anemia is associated with age and the consumption of treated water. Stunting was associated with age, gender, dietary diversity, hand washing, the language used, and wealth. In India, anemia is associated with age, gender, caste, dietary diversity, and household hunger. Stunting was associated with age, gender, caste, wealth, and maternal illiteracy.</p>

							Despite some of the same underlying factors, anemia and stunting are more independent than is usually assumed. Interventions targeting children based on one condition can eliminate children with other forms of malnutrition.
A12	Early childhood development coming of age: science through the life course, 2017	London	Sustainable development for children to develop the intellectual skill, creativity, and prosperity needed to become a healthy and productive grown up people	Quantitative	Questionnaire	Age of children under 5 years old	Among the baseline determinants of stunting assessed in the regression-decomposition analysis, an increase in asset index scores is a consistent and strong supports for improving linear growth outcomes. Improved parental education is also a strong predictor of increased child growth. The underlying determinants of stunting, decreasing open defecation rates, improving sanitation infrastructure, and increasing access to maternal health services, including optimal antenatal care and delivery in health facilities or with skilled birth attendants, all play a role in increasing child growth overall. substantial. However, the magnitude of variation described by each differs substantially between countries. At the immediate level, changes in several maternal characteristics were successful in predicting moderate reductions in stunting, including parity, the interval between pregnancies.

All articles that have been selected are then entered into a table for inclusion of key criteria. such as title/name of researcher, purpose and type of research, data collection, sample size, and research results (Mbuya & Humphrey, 2016; Saxton et al., 2016; Stewart et al., 2013). A total of 12 articles will be a critical appraisal by the author. The author assesses the quality of articles based on grades A, B, C, and D. To distinguish the category of good articles (grade A), quite good category (grade B), poor category (grade C), and bad category (D). Later, each scoring point will be represented by a number 0-3 with qualifications:

0: Very Poor,

- 1: Poor,
- 2: Fair,
- 3: Good

**Table 3.1 Assessment Range of Critical Appraisal Qualitative Study**

Range of Assessment	Grade	Category
	A	Good
	B	Good Enough
	C	Poor
	D	Bad

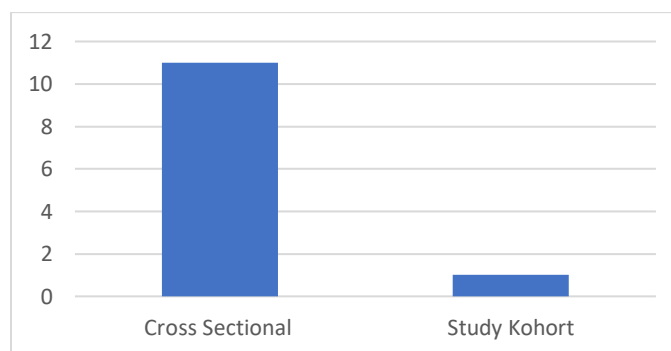
**Tabel 3.2 Penilaian Skor Jurnal dengan Hawker**

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
<b>Total</b>	21	23	19	20	9	24	24	24	21	24	24	19
<b>Score</b>	B	B	B	B	D	B	B	B	B	B	B	B

Grade A : 28 - 36  
 Grade B : 19 - 27  
 Grade C : 10 – 18  
 Grade D : 1 – 9

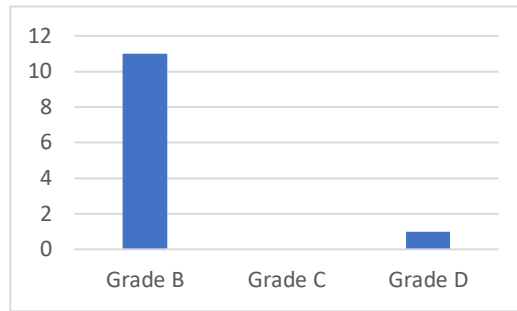
## RESULTS

Based on the results of critical appraisal of 12 articles that have been selected by cross sectional on 11 articles (A1, A2 A3, A4, A5, A6, A7, A8, A10, A11, A12), study cohort 1 article (A9).



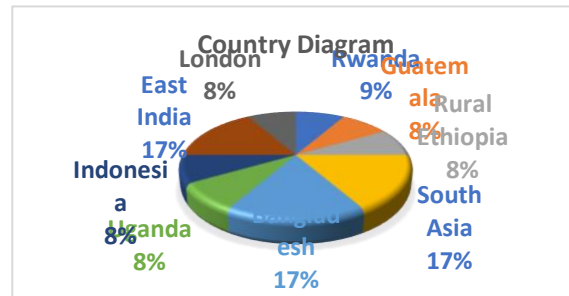
**Fig 2.** Diagram Based on Study Design

Based on the quality of the articles that have been undertaken critical appraisal, it was found that a number of articles gained grade B (A1, A2, A3, A4, A6, A7, A8, A9, A10, A11, A12), 1 article obtained grade D (A5).



**Fig 3.** Diagram Based on The Quality of Article

Based on the critical appraisal, 6 research articles have been conducted in Asian countries such as Bangladesh (2), Indonesia (1), India (2), Guatemala (1), based on countries on the European continent had 1 article London (1), Continental countries Africa contained 5 articles Uganda (1), Rural Ethiopia (1), South Asia (2), Rwanda (1).



**Fig 4.** Articles Based on Country

## DISCUSSION

### 1. Factor of Child

#### a. Gender

The results of the research by Alphonse (Nshimiyiryo et al., 2019) that the factors that affect stunting are categorized from child factors: gender where boys are at a higher risk of stunting than girls. Status of nutrition can be revealed by ‘biological fragility’ due to boys are expected to grow at a slightly faster rate than girls and their growth may be more easily affected by nutritional deficiencies or other diseases, the age group of children has a significant relationship with stunting compared to age group of children older than 24-59 months (Vaivada et al., 2020). Gender is another predictor of stunting and severe stunting in children that aged 6-23 months, it is due to boys are more likely to be stunted or severely stunted compared to girls, it supports the previous findings in the region with oriented explanations on historical patterns of treatment (Nkurunziza et al., 2017)

From the other predictors of stunting, boys are significantly more likely to be stunted in all four surveys, it is in line with the finding in ten countries of sub-Saharan African where boys have consistently higher rates of stunting. Previous epidemiological studies in neonatology found that higher morbidity and mortality occurred in boys than girls, thus it indicates boys are generally more susceptible (Yang et al., 2018). Boys are more susceptible to stunting than girls.

#### b. Child’s Age

The study of (Nshimiyiryo et al., 2019), it showed that increasing child age had a significant relationship with stunting. Children aged 6 - 23 months, they had a lower

risk of stunting, compared to those aged 24 - 59 months. children 6 -23 months old who were not fed a minimum number of times per day, children who were not fed eggs, dairy products, fruits and/or vegetables and children from house holds without access to improved sanitation The rate of exclusive breastfeeding during the first six months was high in Rwanda (87%), which might have a protective effect against stunting at an early age. The gradual increase in stunting in children under 5 years in Rwanda was due to inappropriate dietary supplementation during the weaning period when infants must undergo the transition from exclusive breastfeeding to complementary foods in the child's meals.

Stunting occurs in the first 1000 days, from conception to two years of age, when linear growth is most sensitive to nutritional deficiencies and environmental stresses (Aguayo & Menon, 2016). During the first 1000 days, from conception until about 6 months of age, the child is completely dependent on the mother for nutrition, either through the placenta during pregnancy or through breast milk during the first 6 months of exclusive breastfeeding. However, the largest proportion of stunting occurs during the complementary feeding period (6 - 23 months), the 1000 day transition period from exclusive breastfeeding for the first 6 months of life, to consume a variety of family foods while breastfeeding continues. Adequate complementary feeding is very important to support optimal physical growth and brain development in children. Complementary foods should be rich in nutrients and given food frequently to prevent stunting.

Recent data show that less than 25% of children aged 6 - 23 months in Afghanistan, Bangladesh, India, Nepal and Pakistan are given food that meets the minimum requirements in terms of frequency and diversity (United Nations Children's Fund). The current study found that only 30% of children between the ages of 18-23 months obtained appropriate complementary foods and food must be in terms of frequency and variety. In the bivariate analysis, stunting and severe stunting were associated with inappropriate complementary feeding practices but this was not significant in the multivariate analysis. According to research, children under than 12 months, older children were significantly more likely to be stunted, consistent with findings in Nepal and Burundi, for children aged between 24 and 35 months. The stunting rate increases with age (minimum up to 3 years) and it is in line with cumulative development and growth pursues limitation.

## **2. Mother Factor**

### **a. The Age of Mother**

Teen mothers were more likely to have stunted children. Younger women tend to have less child-rearing knowledge or experience; in addition, they may have not nished secondary education. The majority of the population is made up of mothers between the ages of 20 and 30. It's probable that children with adolescent mothers have a higher risk of being stunted. Teenage mothers are more likely to be first-time mothers (Nshimiyiryo et al., 2019; Yang et al., 2018).

### **b. Education**

When children of ignorant mothers were compared to children of educated mothers, children of uneducated mothers were more likely to be severely stunted. and for children from low-income families versus children from higher-income families.

The level factor of household is the education of the head of the household, food insecurity, socioeconomic status, drinking water sources, time to the public health center, the number of household members and the number of children aged less than 5 years in the household, ownership of fertile land can affect stunting. Children born to uneducated mothers are more likely to be stunted and severely stunted than educated mothers. Children born by mothers who are not educated, they are more likely to experience

stunting and are severely stunted compared to mothers with high school education. Children whose mothers cannot properly assess nutritional status are more likely to experience stunting and severe stunting than those whose mothers have knowledge about preventing stunting in children. Besides, the common parental level factors associated with stunting and the incidence of severe stunting in Burundi, maternal marital status (live in pairs) was found to be associated with severe stunting.

The prevalence of severe stunting was higher in children whose mothers did not complete elementary school (19.4%) or finished elementary school (8.3%) compared to high school graduates (3.0%). Mother's education had a significant positive effect on child development compared to mothers who did not attend school. Children born to mothers who completed primary school had significantly higher cognitive abilities, receptive communication and social-emotional skills compared to mothers who did not attend school. Mother's education in upper secondary or higher education (middle and above) had significantly higher scores on expressive communication and total language scores, compared to mothers who did not attend school (Nahar et al., 2020).

### **c. Occupation**

A research study by Age, the head of the household's employment situation, family size, and the education level of stunting dads all play a role. Stunting is more likely in children born to unemployed or underemployed parents, according to this research study. The labor of parents can have an impact on their children's growth and development, for example, if the parents do not work, the child will be unable to receive adequate nutrition, which will impede their growth and development. Children's nutrition can be met by working parents so that their children's growth and development are not hampered.

### **3. Factor of Economy and Wealth**

Economic growth is a must and important for every country, especially to generate government revenues that can be invested in social policies and programs, it is equally important to create investment policies and programs that can help accelerate progress in improving child feeding, women's nutrition and household sanitation. The household level factors are the education of the head of the household, food insecurity, socioeconomic status, drinking water sources, time to the public health center, the number of household members and the number of children aged less than 5 years in the household, ownership of fertile land can affect stunting.

Children in the lowest wealth quintile has more than eight times to be severely stunted than children in the highest wealth quintile. Children from poorer households are significantly more likely to be severely stunted than richer households; the prevalence is about 2.3% among the highest quintile to 17.0% among the lowest wealth quintile (Torlesse, 2016).

### **4. Environmental Factor**

The availability of inadequate drinking water sources tends to be smaller than those who use better water sources. Children who live in households and they drink treated water, they are not significantly more likely to be stunted if the household uses improper latrines. The prevalence of severe stunting is significantly higher among children who live in households with poor latrines compared to those who have improved, households that do not dispose of their child's feces safely compared to those use it, households that do not use soap for washing hands compared to those use it, and households drink untreated water compared to those who treated.

A history of the use of deworming during pregnancy is associated with the decrease of risk of stunting. This association is assumed due to reduced helminth infections during pregnancy and increased absorption of nutrients by the mother. However, there is no statistically significant relationship between stunting and the availability of better

sanitation and water in households, which are considered by most interventions to improve hygiene and prevent the spread of diseases and worms/parasites. According to Alphonse, there is no statistically significant association between stunting and better sanitation and water availability in households, which is considered by most interventions to improve hygiene and prevent the spread of diseases and worms/parasites. This study found access to clean water and availability of hygienic toilets as intermediate risk factors for stunting which may indicate a weak association. According to Alphonse (Nshimyiryio et al., 2019) found that lack of better toilets was a major risk factor for stunting.

Environmental factors such as access to water and sanitation, there is some evidence associated with a reduction in diarrhea rates, which are also predictors of child nutrition. One such study included a multi-village project in Ethiopia, 11 villages were selected for health, education, WASH interventions, or an integrated approach using health, education, and WASH. The intervention group that received integrated health, education, and WASH activities showed a significant reduction in stunting associated with the increase of access to WASH services and maternal knowledge about causes of diarrhea and hygiene practices. Hygiene practices can be related to environmental cleanliness, the actual presence of toilets, and other environmental factors such as humidity and dryness (though the latter is beyond the scope of the factors investigated in this review). Defecation carelessly, when it is associated with the absence of toilets and/or efficient use of toilets, it shows that there is significantly associated with stunting in Ethiopia, most of the trial participants already have access to basic latrines, better sources of drinking water, and show the low defecation carelessly rates at baseline may have resulted in a weaker association of WASH and stunting.

The need for further investigation about the certain WASH factors in relation to access quality (access to facilities, hand washing activities). Stunting is the cause of about one million child deaths every year. For children who survive, stunting in infancy and early childhood causes lasting damage, including increased morbidity, poor cognition and educational performance in childhood, short stature in adulthood, increased risk of perinatal and neonatal death. for women, lower productivity and reduced income in adults and - when accompanied by excessive weight gain later in life - an increased risk of chronic disease. Therefore, stunting inhibits the growth and development of the entire community.

## CONCLUSION

The findings from this scoping review revealed that the child's gender, child's age, mother's age, mother's education, mother's occupation, wealth, economy, nutritional status before and after childbirth, clean water sanitation, latrine management, hygiene, environmental factors could affect stunting and could inhibit the growth and development of children in the future. There was a gap between the results of review articles, the factors that influence stunting are the child's age, the mother's occupation, the family economy, and finally environmental factors. In reality, research in industrialized countries has found that environmental factors affect kid growth and development, so future studies in nutritional difficulties in children should include male volunteers or husbands. Besides, there are no studies that discuss family support. Hence, it is necessary to conduct the research related to family support. Further, this research focused on developed countries, so that the following research needs to examine developing countries.



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