

The Effect of Mother's Educational Level and Stunting Incidence on Toddler: A Meta-analysis

Meta Analisis: Pengaruh Tingkat Pendidikan Ibu terhadap Kejadian Stunting pada Anak Balita

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ABSTRACT

Background: Stunting is defined as the growth and development of children who fail due to chronic nutritional deficiency, occurs since the child is still in the womb until the age of 2 years, has an impact on the child's growth becoming shorter for his age and experiencing low cognitive impairment. One of the causes of stunting is the low level of education in the mother. Mothers with low education tend to be less knowledgeable about nutritional intake before pregnancy, during pregnancy, and after delivery, so it has an impact on children born with stunting compared to mothers with higher education.

Objectives: The study was conducted to analyze the effect of mother's education on the incidence of stunting in children under five.

Methods: This study used a meta-analysis study with PICO as follows: P = children under five aged 0-59 months, I = mothers with low education, C = mothers with higher education, O = stunting. Article searches were conducted using electronic databases, namely PubMed and Google Scholar. The search for articles was carried out using the keyword and Mesh method as follows "Maternal Education" AND "stunting" AND "children". Articles submitted for this meta-analysis study are full-text using a cross-sectional study design. Articles were analyzed using the Review Manager 5.3 application.

Results: As many as seven articles from 2017-2021 have been analyzed using PRISMA diagrams. Articles from various journals were found to be from Pakistan, Ethiopia, Rwanda, Burundi, and Nepal. Research studies show that the mother's low education level affects the risk of children under five experiencing stunting by 3.01 times compared to mothers with higher education levels (aOR = 3.01; 95% CI = 1.92 to 4.73), with statistical significance ($p = 0.000$).

Conclusions: The lower the education of the mother, the more influential it is on the occurrence of stunting in children under five.

ABSTRAK

Latar Belakang: Stunting didefinisikan sebagai pertumbuhan dan perkembangan anak yang gagal karena kekurangan gizi kronis, terjadi sejak anak masih berada di dalam kandungan hingga usia 2 tahun, berdampak pada tumbuh anak menjadi lebih pendek untuk seusianya dan mengalami gangguan kognitif yang rendah. Salah satu pengaruh terjadinya stunting adalah faktor tingkat pendidikan rendah pada ibu. Ibu dengan pendidikan rendah cenderung menjadi kurang pengetahuan terkait asupan gizi sebelum hamil, selama hamil, dan setelah melahirkan, sehingga berdampak pada anak lahir dengan stunting dibanding dengan ibu pendidikan tinggi.

Tujuan: Studi dilakukan untuk menganalisis pengaruh pendidikan ibu terhadap kejadian stunting pada anak balita.

Metode: Penelitian ini menggunakan studi meta-analisis dengan PICO sebagai berikut: P = anak balita berusia 0-59 bulan, I = ibu pendidikan rendah, C = ibu pendidikan tinggi, O = stunting. Pencarian artikel dilakukan dengan menggunakan database elektronik yaitu PubMed dan Google Scholar. Pencarian artikel dilakukan dengan metode kata kunci dan Mesh sebagai berikut "Maternal Education" AND "stunting" AND "children". Artikel yang masuk untuk studi meta-analisis ini berupa full-text menggunakan desain studi cross sectional. Artikel dianalisis menggunakan aplikasi Review Manager 5.3.

Hasil: Didapat sebanyak 7 artikel dari tahun 2017-2021 yang telah dilakukan analisis menggunakan diagram PRISMA. Artikel dari berbagai jurnal ditemukan berasal dari negara Pakistan, Ethiopia, Rwanda, Burundi dan Nepal. Studi penelitian

menunjukkan tingkat pendidikan rendah pada Ibu berpengaruh terhadap besarnya resiko anak balita mengalami stunting sebesar 3,01 kali dibanding pada Ibu dengan tingkat pendidikan tinggi (aOR=301; CI 95%= 1,92 hingga 4,73), dengan signifikansi secara statistik ($p=0,000$).

Kesimpulan: Semakin rendah pendidikan pada Ibu akan semakin berpengaruh terhadap terjadinya stunting pada anak balita.

Kata kunci: Tanpa kelaparan, Pendidikan, Stunting, Meta analisis

INTRODUCTION

Stunting is a reflection of the failure in children to archive their genetic height potential, with children too short for their age. Stunting is also be considered as a cumulative effect of physical and cognitive defects caused by chronic malnutrition, recurrent infection, parenting practice, and inadequate feeding practice, which can be prevented by improving the nutrition status of women and in the golden age of the babies (First 1000 days of life). Stunted children before age 2 are at risk of failing to reach their developmental potential with a higher risk of disease and decreased cognitive and physical development, affecting their learning potential. Early stunting can also lead to increasing overweight/obesity and non-communicable diseases during the teenager and adolescence period¹. Stunting is a nutritional problem that starts in early life, as height/age Z-score <-2 as the indicator (Deviation Standard) for this matter based on the children's growth standard². Multi-factor causes have been recognized for stunting. Direct causes can be from children's inadequate intake and infections during childhood life, meanwhile, the indirect causes can be from mother's education level, problems with parenting practice, poor hygiene and sanitation, and low antenatal care³.

Attempts to accelerate stunting prevention must continue to be carried out to achieve the 2030 No Hunger SDGs target by ending all forms of malnutrition and hunger and achieving food security. The measure of malnutrition in children will be an image of the progress of the nation in the world. Poor measures of nutrition in the first 1000 days of life will inhibit children's growth and cognitive abilities which has an impact on reducing children's performance and productivity during school and work life in the future. As many as 33 countries in the world have estimated that there are 30% of stunted children by 2020. UNICEF sets the percentage of stunting for countries in the world as follows: 1) $\geq 30\%$ (very high); 2) 20 - $<30\%$ (high); 3) 10 - $<20\%$ (medium); 4) 2.5 - $<10\%$ (low) and; $<2.5\%$ (very low). In 2020, there were three regions with a very high prevalence of stunting in the world with one-third of children in the region stunted, namely in West and Central Africa at 32.5%, East and South Africa at 32.3%, and South Asia at 31.8%. Meanwhile, two regions in Europe, Central Asia, and North America have a low prevalence of stunting, consisting of Eastern Europe and Central Asia at 8.1%, Europe and Central Asia at 5.7%, North America at 3.2%, and Western Europe at 2.8%⁴.

Stunting is a widely accepted indicator of a decrease in the productivity of the people of a country in the future. Short children will generally grow up to be children who are less educated, have low incomes and quality of life, and are prone to non-communicable diseases. Malnutrition conditions can lead to the

consequences of lost costs, both excess and malnutrition. The costs caused by the incidence of malnutrition include the costs lost due to premature death and low levels of education so that people's productivity becomes low. In the long run, over-nutrition can lead to degenerative diseases. Huge losses can arise due to the high cost of treatment for diseases, such as diabetes, stroke, heart disease, hypertension, and others⁵.

Nowadays, there are many studies that explain the factor causing stunting is the level of education in mothers. Stunted children are experienced by many mothers with low levels of education. Without realizing it, the high level of education in mothers will have an impact on the mother's knowledge and ability regarding health care, especially understanding the problem of maternal nutritional intake before pregnancy, during pregnancy, and after giving birth. The importance of education for women is because women who have higher education will be more likely to give birth to smart children, reduce poverty, and be better able to provide the best for their families, especially by preventing children from being born stunted. Previous research stated that the most dominant factor causing stunting in children aged 24-59 months is the level of education of Ibu⁶. Another study also stated that there is a relationship between the level of maternal education and the incidence of stunting in children⁷.

Meta-analysis is a quantitative approach method that aims systematically to review the results of previous studies and produce a conclusion from the results of the study in the study. This method can be used to analyze the central variations and trends of research results throughout the study as well as to correct errors and biases in the research body. The results of the original study will later be converted to one or more common metrics called effect measures, which are then combined throughout the results of the study. The results of this combination make it possible to synthesize the results of the study by displaying different sizes of the same construction or reporting the results in different ways⁸. Many primary studies have been found that examine the relationship between maternal education and the incidence of stunting in children under five. A deeper analysis needs to be carried out to obtain a convincing conclusion. This study aims to analyze how much risk maternal education is to the incidence of stunting in children under five.

METHODS

Subject and Methods

This systematic review and meta-analysis were carried out by searching for articles through an electronic database by PubMed and Google Scholar

published in 2017-2021. Article search was conducted for one month using keywords and Mesh "Maternal Education" AND "stunting" AND "children". The eligibility criteria used in selecting articles were based on PICO (Patient, Intervention, Comparison, and Outcome). The population of this study was children under five aged 0-59 months. The intervention was a low education mother. The comparison is mother with higher education. The result was stunting in children.. The inclusion criteria in this study were free full text articles with cross-sectional research designs, publication of English-language articles in the last five years, the relationship size used was Adjusted Odds Ratio (aOR) or Odds Ratio (OR). Data processing was carried out with the Review Manager application (RevMan 5.3) to calculate the size of the effect and heterogeneity in determining the combined study modes and forming the final result of the analysis. The steps in the article search can be seen in Figure 1.

RESULTS AND DISCUSSION

This literature review used PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) diagrams as the main framework to better organize and document the entire process and recording used in the study. The search for articles was obtained through databases by PubMed and Google Scholar. A total of 758 searches for articles were found. There were 29 articles that meet the criteria requirements for further full-text review. Articles that met the criteria were reviewed and decided only 7 articles met the inclusion criteria meta-analysis of the effect of maternal education levels with the incidence of stunting in children under five. The search for articles began with collecting article notes that further filtered through certain criteria, article notes that were not English-language research articles and were not free will be excluded in this phase. Some other criteria that could also be excluded in the search results were:

- Written before 2017
- Does not show logistic regression statistics
- Does not show aOR or OR value
- Other stunting-related issues

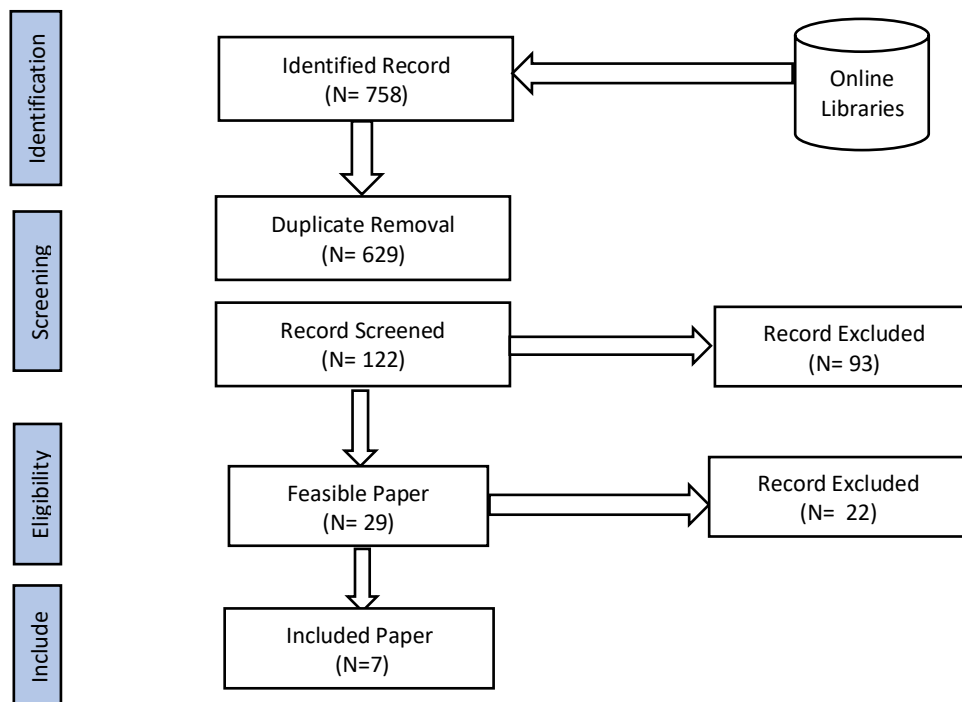


Figure 1. PRISMA flow diagram

List of Article Publications

As seen in Table 1, there were seven articles selected for research in this study as data sources for a meta-analysis of the effect of maternal education levels

on the incidence of stunting in children under five. These articles are spread across several Countries namely Pakistan, Ethiopia, Rwanda, Burundi and Nepal.

Table 1. List of the articles publication

Authors	Title	Population	Result	Year	Country	Name of Journal
Abeway et al.	<i>Stunting</i> and Its Determinants among Children Aged 6–59 Months in Northern Ethiopia: A Cross-Sectional Study ⁹	410	Low Education of Mothers with Stunting Incidence (aOR: 0,2 CI 95%: 0.10-0.42)	2018	North Ethiopia	Journal of Nutrition and Metabolism
Binagwaho et al.	Trends in burden and risk factors associated with childhood <i>stunting</i> in Rwanda from 2000 to 2015: policy and program implications ¹⁰	3538	Low Education of Mothers with Stunting Incidence (aOR: 0.84 CI 95%: 0.68–1.05)	2020	Rwanda	BMC public health
Gonete et al.	<i>Stunting</i> at birth and associated factors among newborns delivered at the University of Gondar Comprehensive Specialized Referral Hospital ¹¹	422	Low Education of Mothers with Stunting Incidence (aOR: 0.48, CI 95%: 0.118-2.018)	2021	Ethiopia	PloS One
Khan et al.	Determinants of <i>stunting</i> , underweight and wasting among children < 5 years of age: evidence from 2012-2013 Pakistan demographic and health survey ¹²	3071	Low Education of Mothers with Stunting Incidence (aOR: 1.59, CI 95%: 0.88–2.88)	2019	Pakistan	BMC Public Health
Nepali et al.	Nepal: a secondary data analysis of four Nepal demographic health surveys from 2001 to 2016 ¹³	16.606	Low Education of Mothers with Stunting Incidence (aOR: 1.92, CI 95%: 1.28-2.89)	2019	Nepal	BMC nutrition
Nkurunziza et al.	Determinants of <i>stunting</i> and severe <i>stunting</i> among Burundian children aged 6-23 months: evidence from a national cross-sectional household survey, 2014 ¹⁴	6199	Low Education of Mothers with Stunting Incidence (aOR: 2.0 CI 95% 1.3-2.9)	2017	Burundi	BMC pediatric
Tariku, et al.	<i>Stunting</i> and its determinant factors among children aged 6–59 months in Ethiopia ¹⁵	1295	Low Education of Mothers with Stunting Incidence (aOR: 1.24, CI 95%: 0.85–1.79)	2017	Ethiopia	Italian Journal of Pediatrics

Forest Plot

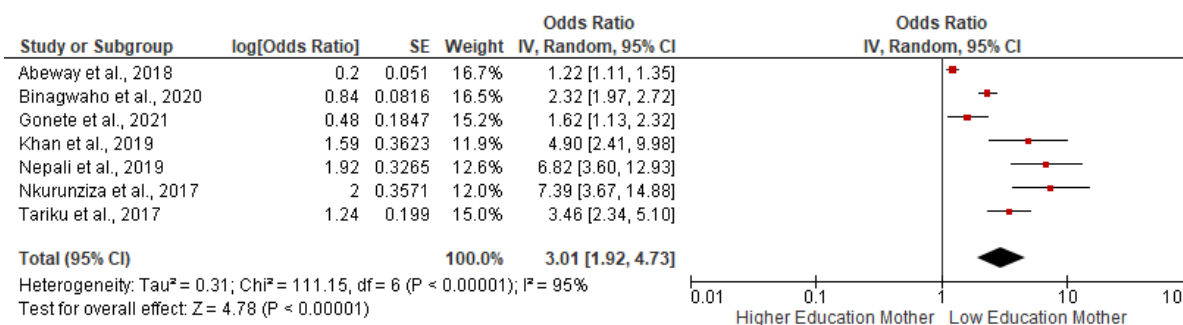


Figure 2. Forest plot the effect of maternal education level on stunting in children under five

Based on Figure 2. it can be seen that the low level of education in mothers affects the incidence of stunting in children under five by 3.01 times compared to highly educated mothers with statistically significant

levels ($p = 0.000$). Heterogeneity and research show $I^2 = 95\%$ so that the distribution of data are declared heterogeneous (random effect model).

Funnel Plot

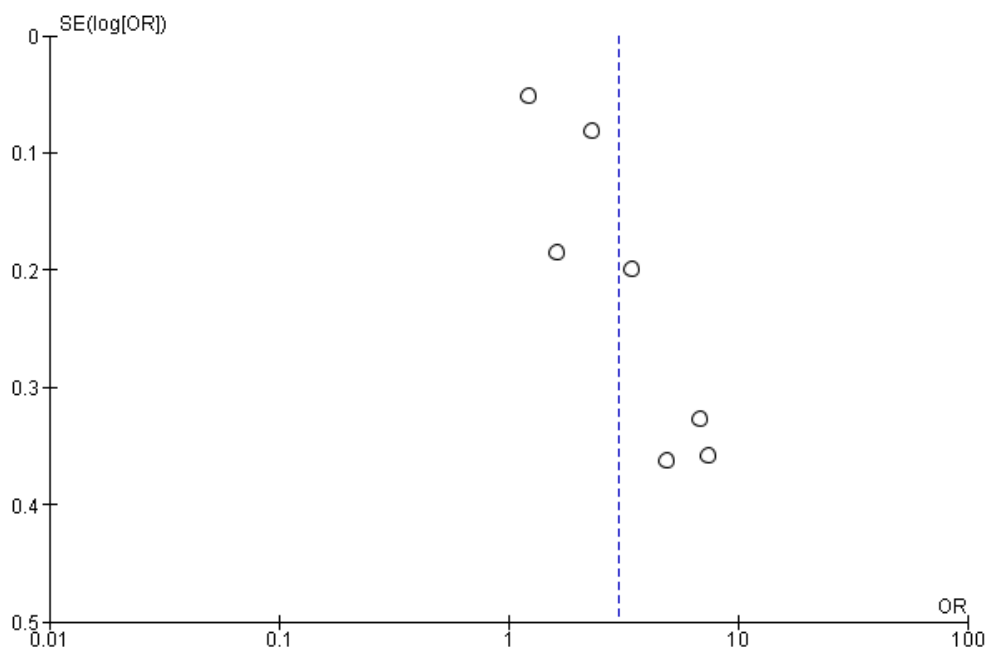


Figure 3. Funnel plot influences maternal education level with the incidence of stunting in children under Five

Based on Figure 3, there is a publication bias characterized by the lack of symmetry of the right and left plots, where three plots are on the left and four plots are on the right. The plot to the left of the graph has a standard error between 0 and 0.2. The plot on the right has a standard error between 0.2 and 0.4. Bias also occurs from the imbalance between the study distances on the right and left on the plot funnel.

The systematic review represents a structured scientific approach to conducting a literature review of previous research studies that addressed focused questions based on the desired PICO (Patient, Intervention, Comparison and Outcome). Systematic review is closely tied to meta-analysis, that is, a statistical method of combining data from previous studies¹⁶. The measure of effects is a simple way to quantify the difference in mean between two groups that aims to interpret and report the effectiveness of an interpretation when compared to a comparison (other interventions or not given interventions). The size of the effect is a value that reflects the magnitude of the effect of the treatment or the strength of the relationship between the two variables in the meta-analysis by calculating the size of the effect for each study, then assessing the consistency of the effect throughout the study. Measures of effects may represent the impact of interventions, such as the impact of maternal education levels on stunting events in this study¹⁷. A meta-analysis of the results of the study can be seen from the forest

plot diagram and funnel plot. Forest plots show a view of information from each study studied and estimates of the overall results by visually showing the magnitude of the variation (heterogeneity) between the study results. The plot funnel is used to demonstrate possible publication bias, showing the relationship between the size of the study effect and the sample size or standard error of the effect size of the various studies studied¹⁸.

The results of a meta-analysis of the level of maternal education on the incidence of stunting in children under five showed that mothers with low education levels were at 3.01 times the risk of having stunted children. Statistical results (aOR=3.01; CI 95%= 1.92 to 4.73; $P=0.000$). Previous research stated that the prevalence of stunting is related to the educational status of Ibu¹⁹. Children with mothers without formal education become more susceptible to acute malnutrition compared to children of educated mothers, because educated mothers are well-informed about the nutritional and health needs of children and mothers are better able to make decisions in choosing health services to improve children's health²⁰. Another study in Nairobi stated that 40% of children who experience stunting are dominated the most because of the strong predictors of Ibu²¹ education. Similar research in South Africa states that maternal education has an indirect effect on stunting events dominated through antenatal socioeconomic and environmental status²².

Stunting is virtually a chronic malnutrition problem in children that can be prevented. WHO recommends nutritional education and increased daily energy and protein intake for malnourished pregnant women, so as to reduce the risk of neonates with low birth weight. Balanced energy and protein supplements can provide roughly 25% of the total energy supplement as proteins for the prevention of adverse perinatal in malnourished women. This effort will increase birth weight by 41 grams and reduce the risk of stillbirth by 40% and premature birth by 21%. Nutrition education and promotion is an intervention to improve the health of mothers, newborns, and children that can be done through the provision of community-based services in preventing child stunting. The program may include behavior change communication and strategies for community mobilization that can be delivered by health workers or trained community workers, and implemented locally in homes, villages or community groups. In addition, it is necessary to have a firm government commitment to equity efforts in preventing and dealing with child stunting. For example, the state participates in the Scaling Up Nutrition Movement (SUN) which is committed to addressing the causes of malnutrition inequality that are common in all countries, and ensuring equality and nondiscrimination for everyone and no one is left behind. Members of the SUN Movement support the implementation of policies that reduce nutritional inequality, especially among women and girls, and eliminate discriminatory laws and practices. Also, it seeks to involve representatives of vulnerable communities in the decision-making process²³.

Coverage and attention to maternal education need to be included in the agenda for formulating stunting prevention interventions for all countries, because mothers with higher education will improve the level of health of their families including stunting prevention. Education in mothers is very influential in the selection of nutrition for a family; educated mothers will be selective in providing food for their children. A previous study explained that the level of maternal education affects the incidence of stunting in children under five; the level of education has an important role in causing stunting, mothers with higher education will have the advantage of being easier to absorb health information²⁴. Education in women can reduce chronic malnutrition and be a guarantee of a better standard of living²⁵. Even the nutrition of children born with basic educated mothers has a lower chance of 94% for children experiencing growth health compared to children with mothers who are not educated to basic level²⁶. The hope is this research can be an interesting finding about the importance of education for women to increase their role capacity in the household. More attention to nutritional intake to reduce the prevalence of stunting is very important for every country that wants to reduce its prevalence. It is known that the cause of stunting is multifactor so that the countermeasures must also be multisectoral. Stunting caused by low education in mothers can be the basis for increasing cooperation and hard work from various parties, especially the important role of the world of

health and education to collaborate in eradicating stunting both in cases of stunting nationally and internationally in the future and achieving the SDGs 2030 target to reduce all forms of malnutrition including stunting.

CONCLUSIONS

The results of this meta-analysis study concluded that mothers with low education levels were at risk of 3.01 times having stunted children compared to being highly educated. The lower the level of education in mothers, the more influential it will be on the incidence of stunting in children under five.

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CONFLICT OF INTEREST

All authors have no conflict of interest in this study.

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