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CORRELATION BETWEEN CHILD'S GENDER, BIRTH WEIGHT, MATERNAL AGE, AND STUNTING RISK UNDER FIVE:A SYSTEMATIC REVIEW

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ABSTRACT

Stunting is a problem that threatens human quality in the world. Apart from the nutritional problems of the first 1000 days of life which are unbalanced, child and maternal factors greatly influence the incidence of stunting. Objective: this study is examines the relationship between gender, birth weight and maternal age with the risk of stunting in children under five. Method: A systematic review was conducted from three database, PubMed, Scopus, and ProQuest. Keyword used were "sex of child" or "gender of child" and "birth weight" and "maternal age" and "stunting", articles published in the last five years from 2019 to 2023 in English. Article screening from titles and abstracts followed by full text review to assess article eligibility. The research design was cross-sectional and case-control studies. Article analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and JBI tool was used to assess the quality of studies. Results: From 686 article records screened, seven articles included review in this study. There are three factors that influence the occurrence of stunting, namely child's gender, child's birth weight and maternal age. Boy was more susceptible to stunting than girl births. Children with small birth weight were at risk of stunting and death, common causes due to poor health, disabilities, and maternal nutrition lifestyle. Furthermore, maternal age <18 years and >34 years increase the risk of malnutrition and death of children at birth. Conclusions: There is correlation child gender, birth weight, and maternal age on the risk of stunting. Increased knowledge and improved nutrition from pregnancy to birth contibute to improving the quality of life of children and reducing the risk of stunting.

Keywords: child's gender; child's birth weight; maternal age; stunting

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INTRODUCTION

Stunting is still a high problem that threatens the quality of humans in developed and developing countries (Hatijar, 2023). One of the associated direct factors of stunting is quality of children's at birth like size at birth and maternal health such as mother's age at pregnancy, Moreover, the gender of the child also influences of stunting (Sahiledengle et al., 2023). Poor nutritional status before and during giving birth can cause babies born with low birth weight, which we known as a risk factor for stunting (Aheto, 2020). A child is called stunted if body length/age is on a curve <-2SD from the median WHO Child Growth Standards for the same age and sex (WHO Child Growth Standards Median) (Marsaoly et al., 2021). The Ambitious World Health Assembly supports a global target to reduce chronic malnutrition (stunting) by 40% by 2025 (Ekholuenetale et al., 2020). Globally, the prevalence of stunting in 2020, 2021, and 2022 decreased by 22.7%, 22.5%, and 22.3% (WHO/UNICEF, 2023) (WHO, 2024). Stunting data in Indonesia based on the 2022 Indonesian Nutritional Status Survey (SSGI) states that the stunting rate has also decreased from a prediction of 26.92% in 2020 to 24.4% in 2021, and 21.6% in 2022 and an effort to reduce it by 3.8% per year is needed to achieve the target of 14% in 2024 (SSGI, 2023). The decline in stunting that occurs every year has not reached the established standard.

Even though there are many international policy initiatives aimed to reducing stunting rates, such as nutrition-specific and nutrition-sensitive interventions, and addressing stunting in emergency situations by UNICEF (UNICEF, 2017), there are still many factors that trigger stunting that are difficult to control. Sex of child, child's weight or size of child at birth are factors that exist in the child and are difficult to control, as well as the mother's age during pregnancy (Ahinkorah, 2021). The purpose of this systematic review to explore understanding of the relationship between the child's gender, weight at birth, and maternal age at pregnancy and the incidence of stunting.

METHOD

Literature Search and Screening Process

A literature search was conducted among databases like Scopus, PubMed, and ProQuest using keywords and MeSH terms related to sex of child; weight child at birth; and maternal age were used to search. There are restrictions that placed on the search regarding the year of publication (2019-2024), English language, and full text article. After filtered literature, duplicate entries were eliminated after uploading all the retrieved studies to a reference management software. The results were analyzed systematically from two-step that is title and abstract followed by a thorough review of all remaining articles. If any discrepancies identified during the process were resolved through further examination.

Eligibility Criteria

The collected studies underwent a selection process based on specific criteria. Only cross-sectional and case-control studies were include. The article focused on families with children under 5 years old and there is a relationship between the child's gender or sex of child, the birth weight and the mother's age which causes stunting. Only studies which reported the total number or percentage of stunted children under five years old. Reviews, case reports, case series were excluded. And only articles available in the English language were considered.

Data extraction

JBI tool was used to assess the quality of included studies. The JBI assessment covers various aspects including sample representativeness, appropriateness of research methodology, validity and reliability of the measures used, and adequacy of response rates.

Screening process and data extraction

The selection process was conducted in three stages after eliminating duplicates by mendeley reference. Firstly, papers were identified that could be potentially relevant based on their titles. Secondly, papers were identified that could be potentially relevant based on their abstracts. Finally, full texts were evaluated against the eligibility criteria to identify relevant papers. This rigorous process ensured that only relevant studies were included. Reviewers meticulously extracted data from the qualified studies using standardized methods to ensure consistency and accuracy.

Selection quality of studies

A systematic review was conducted using existing methodologies critically, specifically using the Joanna Briggs Institute (JBI) critical appraisal checklist for cross-sectional studies and case-control studies and quality assessment tools were utilized meticulously to evaluate potential bias. The analysis was carried out comprehensively including research design, samples, data collection methods, statistical analysis used and evaluation of the research.

RESULT

Literature search

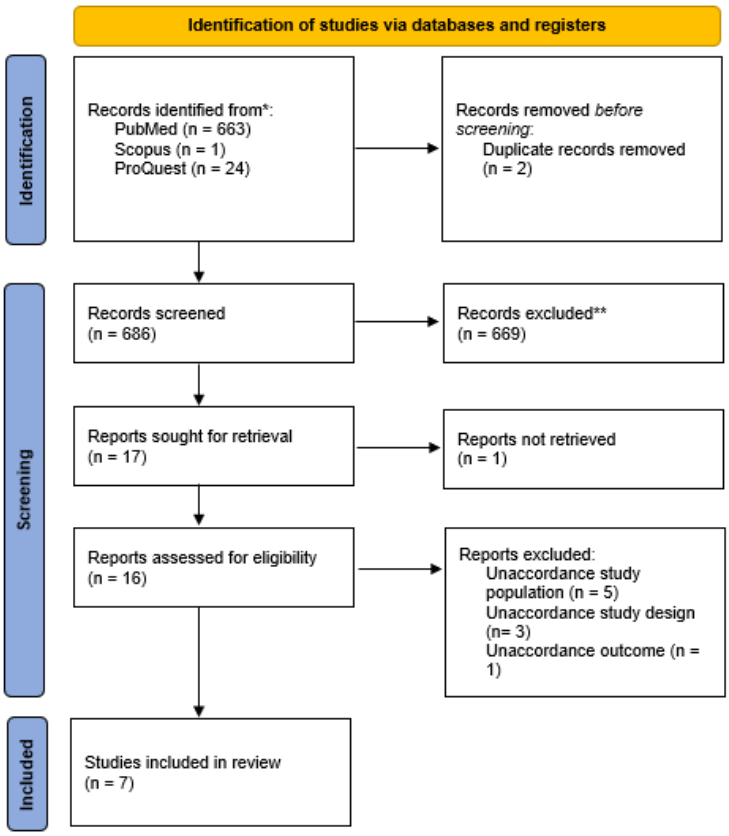

Figure 1. PRISMA flow diagram

Figure 1 shows the study screening and selection process of studies. The search for relevant studies used three databases and a total of 688 articles were identified. Article analysis followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, of which 2 articles were duplicates which removed using reference management software. A total of 686 articles remained for title and abstract screening. Subsequently, 17 articles were assessed for eliglibility. Out of these, 7 articles were include in this observation.

Characteristics of studies

Table 1 provides a summary of the features of the included studies. In total there were 7 studies, 6 of which were cross-sectional studies and 1 was a case-control design study. Articles obtained from 2019, 2020, 2021 and 2023. Sample sizes varied, from less than 200 participants to more than 10,000 participants. The included studies used secondary data analysis, direct measurements, or a combination of both. The sampling techniques used include two-stage cluster sampling, stratified two-stage sampling, consecutive sampling, multi-stage cluster sampling. The quality of the research was found to be at a moderate to high level, as assessed by the JBI tool (referenced in tables S4 and S5).

Table 1.
Characteristic of studies

Aspect	Author	Frequency
Year		
2019	(Fantay Gebru et al., 2019a)	1
2020	(Blankenship et al., 2020)	1
2021	(Amadu et al., 2021), (Ahinkorah, 2021), (Tafesse et al., 2021)	3
2023	(Abdul-Aziz et al., 2023), (Nomura et al., 2023)	2
Study Methode		
Cross-sectional study	(Abdul-Aziz et al., 2023), (Amadu et al., 2021), (Ahinkorah, 2021), (Nomura et al., 2023), (Blankenship et al., 2020), (Fantay Gebru et al., 2019b)	6
Case-control study	(Tafesse et al., 2021)	1
Sampling Technique		
Two-stage cluster sampling technique	(Abdul-Aziz et al., 2023), (Ahinkorah, 2021), (Fantay Gebru et al., 2019b)	3
Stratified two-stage sampling	(Amadu et al., 2021)	1
Consecutive sampling technique	(Tafesse et al., 2021)	1
Multi-stage cluster sampling	(Nomura et al., 2023)	1
Non Specific	(Blankenship et al., 2020)	1
Sample Size		
<200	(Amadu et al., 2021)	1
<500	(Tafesse et al., 2021)	1
<10,000	(Nomura et al., 2023), (Fantay Gebru et al., 2019b)	2
>10,000	(Abdul-Aziz et al., 2023), (Ahinkorah, 2021), (Blankenship et al., 2020)	3

Prevalence of stunting

WHO standards regarding the prevalence of stunting must be less than 20%. In research, the prevalence of stunting ranges from 28% - 41%, this means it is still less than the standards set by WHO, while 2 studies did not mention the prevalence of stunting.

Table 2.
Stunting Prevalence

Aspect	Author	Frequency
Stunting Prevalence (n(%))		
31.3%,	(Abdul-Aziz et al., 2023)	1
28%	(Blankenship et al., 2020)	1
41%	(Tafesse et al., 2021)	1
38.39%	(Fantay Gebru et al., 2019b)	1
40%	(Nomura et al., 2023)	1
Not mentioned	(Amadu et al., 2021), (Ahinkorah, 2021)	2

The Correlation Between Child's Gender, Child's Birth Weigh, and Maternal Age with Stunting

The results of the review of articles obtained, mostly stated that boys are more susceptible to stunting compared to girls [12,15,11,16,13]. In terms of baby weight at birth, there are 2 components, namely large and small birth weight (<2500 grams). There are four articles stating that stunting is influenced by the baby's birth weight being below normal weight [12,9,11,16]. Furthermore, regarding the mother's age at pregnancy, mothers aged between 15-19 years and >34 years are at risk of having stunted children [14,12,16]. It is known from this study that 2 articles stated that those aged 12 months are at risk of stunting.

Table 3.
The Correlation Between Sex of Child, Birth Weigh, and Maternal Age with Stunting

Variables	Author	Statistic Test	P-Value	Correlation
Age of child				
12 months	(Amadu et al., 2021)	Multinomial regression	<0.05	Significantly correlated
	(Fantay Gebru et al., 2019b)	Multilevel logistic regression	<0.05	Significantly correlated
12–23 months	(Tafesse et al., 2021)	Bivariate analysis	<0.993	Significantly correlated
24-35 months	(Blankenship et al., 2020)	Bivariate analyses	< 0.01	Significantly correlated
Sex of child				
Male	(Amadu et al., 2021)	Multinomial regression	<0.05	Significantly correlated
	(Nomura et al., 2023)	Bivariable and multivariable logistic regression	< 0.001	Significantly correlated
	(Blankenship et al., 2020)	Bivariate analyses	< 0.01	Significantly correlated
	(Fantay Gebru et al., 2019b)	Multilevel logistic regression	<0.05	Significantly correlated
	(Tafesse et al., 2021)	Bivariate analysis	<0.003	Significantly correlated
Female	(Amadu et al., 2021)	Multinomial regression	<0.05	Not correlated
	(Nomura et al., 2023)	Bivariable and multivariable logistic regression	< 0.001	Not correlated
	(Blankenship et al., 2020)	Bivariate analyses	< 0.01	Not correlated
	(Fantay Gebru et al., 2019b)	Multilevel logistic regression	<0.05	Not correlated
	(Tafesse et al., 2021)	Bivariate analysis	<0.003	Not correlated
Perceived size at birth				
Large	(Amadu et al., 2021)	Multinomial regression	<0.05	Not correlated
	(Blankenship et al., 2020)	Bivariate analyses	< 0.01	Not correlated
Small	(Amadu et al., 2021)	Multinomial regression	<0.05	Significantly correlated
	(Ahinkorah, 2021)	Multilevel logistic regression	<0.011	Significantly correlated
	(Blankenship et al., 2020)	Bivariate analyses	< 0.01	Significantly correlated
	(Fantay Gebru et al., 2019b)	Multilevel logistic regression	<0.05	Significantly correlated
Mother's Characteristics				
Maternal Age				
<18 years	(Abdul-Aziz et al., 2023)	Logistic regression	<0.05	Significantly correlated
15-19 years	(Amadu et al., 2021)	Multinomial regression	<0.05	Significantly correlated
	(Fantay Gebru et al., 2019b)	Multilevel logistic regression	<0.05	Significantly correlated
>34 years	(Abdul-Aziz et al., 2023)	Logistic regression	<0.05	Significantly correlated

DISCUSSION

Girls have a smaller chance of stunting than boys, this is because the biological conditions in boys experience increased morbidity and mortality (Blankenship et al., 2020), because boys need more energy than girls, if their energy needs are not met they will be susceptible to malnutrition (Amadu et al., 2021). In this case, boys need greater attention in fulfilling nutrition (Wamani et al., 2007). Other research states that in the same socioeconomic conditions, boys are more susceptible to stunting, was more likely to be found in environments wherever there are stresses like continuous infections and exposure to toxins and air pollutants (Olack et al., 2011).

Small weight in children at birth increases susceptibility to stunting and death, mortality was higher among children whose weight at birth was <2500 g compared with those whose weight was ≥2500 g at birth (Goldenberg & Culhane, 2019). Research shows that the risk of stunting and death is higher in children with low birth weight which is associated with poor health and disabilities that often occur in children with below normal birth weight (Ahinkorah, 2021). Other findings state that children with low birth weight are at risk of three indicators of malnutrition, namely stunting, underweight and wasting (Amadu et al., 2021), this is partly influenced by maternal nutrition lifestyle and practices. Hence, mothers' appropriate nutritional behaviours during the prenatal and postnatal periods are key to improving child growth (Amare et al., 2019). This finding indicates that mothers of children under 5 should continuously be educated on the best nutritional practices such as exclusive breastfeeding, complementary feeding and dietary supplementation (Madiba et al., 2019). Another possibility of small birth children is usually born from low socioeconomic status and poor health (Gebremedhin et al., 2015).

Stunting is also influenced by maternal age, based on the articles, mother aged <18 years and >34 years increase the risk of malnutrition and death of children when born (Rahman et al., 2018). Younger or older pregnant women will be at risk of pregnancy complications, because the development of reproductive organs and psycology are not mature enough, so that at the time of pregnancy, the mother can't face her pregnancy perfectly, and complications ofren occur. The risk of pregnancy will occur in mothers who give birth at the age of less than 18 years and more than 34 years and is closely related to the occurrence of preeclamsia, poor fetal growth. Other studies show that maternal age <20 years or >30 years has a greater influence on the health status of the baby, both during pregnancy and when the child is born, the prevalence of stunting in children in this study was higher in mothers who married as teenagers (42,2%) compared to mothers who married as adults (35%) (Wati et al., 2022). This shows that the age of the mother in pregnancy can lead to poor birth outcomes that hinder the potential growth of the child (Qurani et al., 2022).

CONCLUSION

This systematic review has confirmed the association between sex or gender of child, birth weight, and maternal age with the risk of stunting in children under five years of age. males, low birth weight, and maternal age at pregnancy <18 years or >34 years are significantly at greater risk of stunting and child mortality. nutritional fulfillment and increased knowledge in mothers during pregnancy until the child is born are instrumental in preventing stunting.

REFERENCES

Abdul-Aziz, S., Jnr, J. E. H., Budu, E., Aboagye, R. G., Okyere, J., Sakyi, B., Adu, C., & Bright, O. A. (2023). High-risk fertility behaviour and undernutrition among children

under-five in sub-Saharan Africa: a cross-sectional study. BMJ Open, 13(6). https://doi.org/https://doi.org/10.1136/bmjopen-2022-066543

Aheto, J. M. K. (2020). Simultaneous quantile regression and determinants of under-five severe chronic malnutrition in Ghana. BMC Public Health, 20(1). https://doi.org/10.1186/s12889-020-08782-7

Ahinkorah, B. O. (2021). Under-5 mortality in sub-Saharan Africa: Is maternal age at first childbirth below 20 years a risk factor? BMJ Open, 11(9). https://doi.org/10.1136/bmjopen-2021-049337

Amadu, I., Seidu, A. A., Duku, E., Boadu Frimpong, J., Hagan Jnr., J. E., Aboagye, R. G., Ampah, B., Adu, C., & Ahinkorah, B. O. (2021). Risk factors associated with the coexistence of stunting, underweight, and wasting in children under 5 from 31 sub-Saharan African countries. BMJ Open, 11(12). https://doi.org/10.1136/bmjopen-2021-052267

Amare, Z. Y., Ahmed, M. E., & Mehari, A. B. (2019). Determinants of nutritional status among children under age 5 in Ethiopia: Further analysis of the 2016 Ethiopia demographic and health survey. Globalization and Health, 15(1), 1–11. https://doi.org/10.1186/s12992-019-0505-7

Blankenship, J. L., Cashin, J., Nguyen, T. T., & Ip, H. (2020). Childhood stunting and wasting in Myanmar: Key drivers and implications for policies and programmes. Maternal and Child Nutrition, 16(S2). https://doi.org/10.1111/mcn.12710

Ekholuenetale, M., Barrow, A., Ekholuenetale, C. E., & Tudeme, G. (2020). Impact of stunting on early childhood cognitive development in Benin: evidence from Demographic and Health Survey. Egyptian Pediatric Association Gazette, 68(1). https://doi.org/10.1186/s43054-020-00043-x

Fantay Gebru, K., Mekonnen Haileselassie, W., Haftom Temesgen, A., Oumer Seid, A., & Afework Mulugeta, B. (2019a). Determinants of stunting among under-five children in Ethiopia: A multilevel mixed-effects analysis of 2016 Ethiopian demographic and health survey data. BMC Pediatrics, 19(1). https://doi.org/10.1186/s12887-019-1545-0

Fantay Gebru, K., Mekonnen Haileselassie, W., Haftom Temesgen, A., Oumer Seid, A., & Afework Mulugeta, B. (2019b). Determinants of stunting among under-five children in Ethiopia: A multilevel mixed-effects analysis of 2016 Ethiopian demographic and health survey data. BMC Pediatrics, 19(1), 1–13. https://doi.org/10.1186/s12887-019-1545-0

Gebremedhin, M., Ambaw, F., Admassu, E., & Berhane, H. (2015). Maternal associated factors of low birth weight: A hospital based cross-sectional mixed study in Tigray, Northern Ethiopia. BMC Pregnancy and Childbirth, 15(1), 1–8. https://doi.org/10.1186/s12884-015-0658-1

Goldenberg, R. L., & Culhane, J. F. (2019). Low birth weight in the United States. American Journal of Clinical Nutrition, 85(2), 584–590. https://doi.org/10.1093/ajcn/85.2.584s

Hatijar, H. (2023). Angka Kejadian Stunting Pada Bayi dan Balita. 12–17.

Madiba, S., Chelule, P. K., & Mokgatle, M. M. (2019). Attending informal preschools and daycare centers is a risk factor for underweight, stunting and wasting in children under the age of five years in underprivileged communities in south africa. In International Journal of Environmental Research and Public Health (Vol. 16, Issue 14). https://doi.org/10.3390/ijerph16142589

Marsaoly, O. H., Nurwijayanti, N., Ambarika, R., & Maria, S. K. (2021). Analysis of the Causes of Stunting in Toddlers in the Work Area of Gandasuli Community Health Center South Halmahera Regency North Maluku (Qualitative Study). Journal for Quality in Public Health, 4(2), 314–328. https://doi.org/10.30994/jqph.v4i2.186

Nomura, K., Bhandari, A. K. C., Matsumoto-Takahashi, E. L. A., & Takahashi, O. (2023). Risk Factors Associated with Stunting among Children Under Five in Timor-Leste. Annals of Global Health, 89(1). https://doi.org/10.5334/aogh.4199

Olack, B., Burke, H., Cosmas, L., Bamrah, S., Dooling, K., Feikin, D. R., Talley, L. E., & Breiman, R. F. (2011). Nutritional status of under-five children living in an informal urban settlement in Nairobi, Kenya. Journal of Health, Population and Nutrition, 29(4), 357–363. https://doi.org/10.3329/jhpn.v29i4.8451

Qurani, R. M., Karuniawaty, T. P., John, R. E., Wangiyana, N. K. A. S., Setiadi, Q. H., Tengkawan, J., Septisari, A. A., & Ihyauddin, Z. (2022). Correlation Between Maternal Factor and Stunting Among Children of 6-12 Months Old in Central Lombok. Journal of Public Health Research and Community Health Development, 5(2), 107. https://doi.org/10.20473/jphrecode.v5i2.23525

Rahman, M., Haque, S. E., Zahan, S., Islam, J., Rahman, M., Asaduzzaman, M. D., Haque, N., Islam, A. Z., Huda, D., & Mostofa, G. (2018). Maternal high-risk fertility behavior and association with chronic undernutrition among children under age 5 y in India, Bangladesh, and Nepal: Do poor children have a higher risk? Nutrition, 49, 32–40. https://doi.org/10.1016/j.nut.2017.10.001

Sahiledengle, B., Mwanri, L., Blumenberg, C., & Agho, K. E. (2023). Gender-specific disaggregated analysis of childhood undernutrition in Ethiopia: evidence from 2000–2016 nationwide survey. BMC Public Health, 23(1). https://doi.org/10.1186/s12889-023-16907-x

SSGI. (2023). Hasil Survei Status Gizi Indonesia (SSGI) 2022.

Tafesse, T., Yoseph, A., Mayiso, K., & Gari, T. (2021). Factors associated with stunting among children aged 6–59 months in Bensa District, Sidama Region, South Ethiopia: unmatched case-control study. BMC Pediatrics, 21(1). https://doi.org/10.1186/s12887-021-03029-9

UNICEF. (2017). Reducing Stunting In Children Under Five Years Of Age: A Comprehensive Evaluation Of UNICEF'S Strategies And Programme Performance. Globalization and Development in the Mekong Economies, April, 152–166. https://doi.org/10.4337/9781849806954.00020

Wamani, H., Åstrøm, A. N., Peterson, S., Tumwine, J. K., & Tylleskär, T. (2007). Boys are more stunted than girls in Sub-Saharan Africa: A meta-analysis of 16 demographic and health surveys. BMC Pediatrics, 7, 1–10. https://doi.org/10.1186/1471-2431-7-17

Wati, E. K., Wahyurin, I. S., Sari, H. P., Zaki, I., & Dardjito, E. (2022). Stunting Incidence in Infant Related to Mother's History During Pregnancy. Kemas, 17(4), 535–541. https://doi.org/10.15294/kemas.v17i4.29179

WHO/UNICEF. (2023). Levels and Trends in Child Malnutrition. UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates. http://www.who.int/en/