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# THE ASSOCIATION OF UNINTENDED PREGNANCY WITH STUNTING ON CHILDREN UNDER FIVE YEARS OLD: A SYSTEMATIC REVIEW

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### ABSTRACT

**Introduction:** One of the complex causes of stunting is an unintended pregnancy. Children from unintended pregnancies are at greater risk for stunting than children born from intended pregnancies. This study aims to analyze the association of intended pregnancies with stunting events in children under 5 years old.

**Methods:** This systematic review used PRISMA-P protocol (Preferred Reporting Items for Systemic Review and Meta-Analysis Protocols) in 2009. Studies were collected through search in the source data Scopus, Google Scholar, PubMed from January 2015 through May 2018. Keywords search used PICO-S (Population Intervention Compare Outcome-Study design) technique. 278 studies were found and five studies were included in this study.

**Results:** From the 5 studies reviewed, it was found that unintended pregnancies can be the cause of stunting in the range 1.25 to 2.19 times higher than the intended pregnancy.

**Conclusion:** We found a significant relationship between unintended pregnancies among 5 countries (Bangladesh, Nepal, India, Northern Malawi, and Indonesia) with stunting in children under 5 years' old.

**Keywords:** Stunting, unintended pregnancy, unwanted pregnancy, children under five years old.

### INTRODUCTION

In 2016, 155 million children stunted in the world, 87 million lived in Asia, 59 million in Africa, and 6 million in Latin America and the Carribean. Comparing the prevalence of stunting between Asia and Africa, more than half (56%) of stunting among children under 5 years old come from Asia [1]. Stunting is a chronic and recurrent condition of nutritional deficiency at the beginning of life [1,2]. Stunting is measured by comparing body height divided by age (height/age) where the result is below of 2 standard deviation of the median curve growth [2].

Maternal and family conditions such as low level of knowledge and education, genetics from mothers of height less than 145 cm, poor maternal nutrition, pregnancies under 18 years old, and inadequate antenatal care have significant relationship as the cause of stunting [3-6]. In addition, parenting also has a role in stunting, such as failure in exclusive breastfeeding, poor diet and food quality, and early delivery of weaning food [3-5,7]. Other things that could have an impact on stunting include: economic, environmental and sanitary conditions, infections, cultures and community factors [3-7].

Total unintended pregnancy in the world is 85 million. The unintended pregnancy trend of 2010-2014 was 44% of total pregnancies [8-9]. Unintended pregnancy is associated with non-optimal pregnancy care, low prenatal care, physiological and psychological stress, and negative behavior during pregnancy

(use of illegal drugs, abortion, active/passive smoking, and not taking folic acid or vitamins). Those factors can contribute to low birth weight of baby. After delivery, unintended pregnancy can cause maternal depression, parenting stress, weak emotional bond and hence, the child is not taken care of properly or delegated the nurturing to others. In recent studies, there were several diverse results about the association of unintended pregnancy with stunting [7, 10-13]. This study aimed to analyze the association of intended pregnancy with stunting among children under 5 years old.

## **METHODS**

This systematic review used PRISMA-P protocol (Preferred Reporting Items for Systemic Review and Meta-Analysis Protocols) in 2009.

### *Search strategy and study selection*

Studies were collected through search in the several databases, such as Scopus, Google Scholar, Pubmed from January 2015 to May 2018. Keywords used based on PICO-S (Population Intervention Compare Outcome-Study design) technique, resulting in some keywords: (1) “unintended pregnancy” OR “unwanted pregnancy”, (2) “stunting” OR “stunded”, (3) “children under five years old”, (4) “assosiation” OR “correlation”, (5) “quantitative study”.

### *Study inclusion criteria*

For inclusion criteria, we consider appropriate (eligibility) studies for systematic review were: (1) targeted group: unintended pregnancy or unwanted pregnancy, (2) outcomes: stunting in children under 5 years old, (3) research method: quantitative study, (4) studies written in English or Indonesian language.

### *Studi exclusion criteria*

The published literatures were screened for the title and abstract that were not-full text and irrelevant. Those articles that did not explain clearly about population, sampling, and method as stated in PICO-S were excluded. In addition, studies that did not discuss unintended or unwanted pregnancy and stunting among children under five years old were also not selected. Based on language restrictions, studies written in English and Indonesian language were invloved only. Restrictions in the year were also applied for study conducted between 2015 and 2018 and any duplicate document was also excluded.

### *Data Extraction*

Electronic database searching was conducted for 30 days from 7 April to 7 May 2018. Screening was conducted based on the relevant title and abstract from the full paper. Document selection process is presented at Figure 1. Out of 278 studies found, only five studies were included in this systematic review.

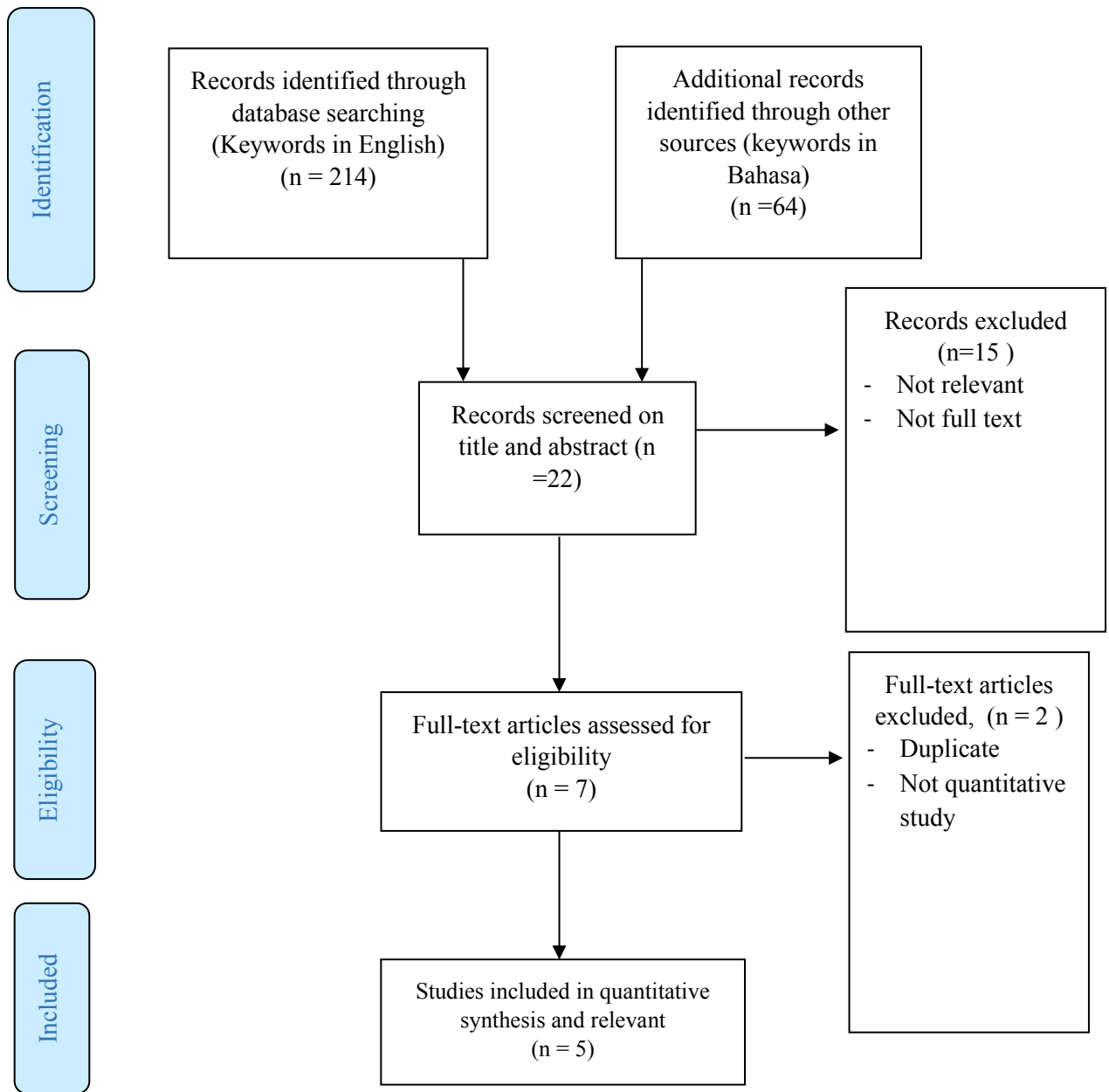


Figure 1. Preferred Reporting Items for Systematic Review

## RESULT

There were 214 studies found with keyword in English and 64 in Bahasa. Five studies met the inclusion criteria that focused on discussing intended pregnancy association with stunting among children under 5 years old. Table 1 presents characteristics of five studies involved in this systematic review.

Table 1. Result of Systematic Review

No	Title	Author	Year of publish	Method and data collection	Result
1	Is unwanted birth associated with child malnutrition in Bangladesh?	Rahman, et al	2015	Case control study. Case selections were taken from Bangladesh Demographic and Health Survey (BDHS) 2011. A total final sampel of 17,842 eligible women aged 12–49 and 6,506 children who were aged 59 months or younger at the time of the survey. Statistical analysis included Chi-square test and multivariate logistic regression.	<ul style="list-style-type: none"> <li>• There was strong association between unwanted pregnancy and stunting (OR = 1.4, p-value &lt;0,01).</li> <li>• Other factors that influenced stunting in this study were child's age, birth order, size at birth, breast-feeding, rural residence, and lack of sanitary toilet facilities.</li> </ul>
2	Adverse consequences of unintended pregnancy for maternal and child health in Nepal	Abhishek Singh, et al	2015	Case control study. The data used for the analysis were from the 2011 Nepal Demographic and Health Survey (NDHS). A total sample of 12 674 women and 5306 children born during the 5 years immediately preceding the survey. Bivariate analysis and binary logistic regression analysis were used in this study.	<ul style="list-style-type: none"> <li>• There was strong association between unintended pregnancy and stunting (OR = 1.25, value &lt;0,05).</li> <li>• The unintended pregnancy (compared with when it was intended) were more likely to receive inadequate prenatal care (odds ratio OR = 1.50). They were also more likely to opt for home births and newborns of unintended pregnancies were more likely to receive inadequate immunization.</li> <li>• Variables significantly associated with stunting were age of the child, urban-rural residence, and wealth quintiles</li> <li>• Variables significantly associated with unintended pregnancy were birh order, sex of the child and autonomy of women. while exposure to the media may decrease the number of unintended pregnancy in this study</li> </ul>
3	Effect of pregnancy intention, postnatal depressive symptoms and social support on early childhood stunting : finding from India	Upadhyay, et al	2016	Cohort study. Data from the first wave of Young Lives Study India. The analysis included 1833 children aged 5–21 months. Bivariate analysis and logistic regression models were employed in this study.	<ul style="list-style-type: none"> <li>• Children from unintended pregnancy were more likely to be stunted than children from intended pregnancy (OR = 1.76; 95%CI: 1.25– 2.48).</li> <li>• Other factors that influenced stunting in this study were small birth size, preterm, woman had less schooling and lower age at birth of the children, mother who did not go for ANC, consumed less than 90 IFA tablet and had less than 2 TT injection during their pregnancy, household non-improved toilet facility, poor ealth quintiles, and living in rural area.</li> </ul>

No	Title	Author	Year of publish	Method and data collection	Result
4	Unintended chilbearing and child growth in Nothern Malawi	Angela, et al	2017	Prospective Study. Data linked to the Karonga Health and Demographic Surveillance Site collected over three rounds between 2008 and 2011 on women's fertility intentions and anthropometric data of children. Sample of 1704 children (1-2 years) from 1701 mothers were employed in this study. Bivariate analysis was used in this study.	<ul style="list-style-type: none"> <li>• 24 % of children from unwanted pregnancies were stunted compared with 18 % of mistimed pregnancies and 17 % of those from wanted pregnancies.</li> <li>• Number of children in the household, and boys were substantially more likely to be stunted than girls.</li> </ul>
5	The Correlation of unwanted pregnancy with stunting on children aged 12-59 months in working area of Puskesmas Gangga of North Lombok District	Pamungkas, et al	2017	An observational with case control design was used in this 138 samples, recruited using consecutive sampling and study devided into 2 groups. Chi-square and multivariate used logistic regression test used in this study.	<ul style="list-style-type: none"> <li>• There was a significant association between unwanted pregnancies with stunting case on children aged 12-59 months by controlling the variables of family income, low birth weight, mother's age during pregnancy, and gestational age (OR = 2.19; CI 95%: 1.03-4.69).</li> </ul>

Studies included into the analysis were conducted in countries with high stunting cases, such as: Bangladesh, Nepal, India, Northern Malawi and North Lombok District, Indonesia. Three studies used retrospective study design (case control) and other two studies employed prospective study design (cohort). The variables used in 5 studies are similar with an independent variable of pregnancy intendedness with an outcome of stunting. In addition, other variables varied by studies, such as maternal age, maternal education, socioeconomic rates, birth weight, shelter, and others.

The samples in those studies involved child and mother. Age of children in this systematic review ranged from 0 to 59 months old with number of samples from 138 to 6.506 whereas for the mothers, between 138 and 17.842. Generally, statistical analysis used in these five studies was bivariate analysis then followed by multivariate analysis using logistic regression.

The studies showed an association between unintended pregnancy and stunting among children under 5 years old. According to a case-control study conducted by Rahman in 2015 which in Bangladesh using large data from the Bangladesh Demographic and Health Survey (BDHS) in 2011 found a significant association between unintended pregnancy and stunting with odds ratio of 1.4 and p-value <0.01 [14]. It was also supported by Singh et al study in 2015 in Nepal using large data from Nepal Demographic and Health Survey (NDHS) in 2011, using the same design showed that there was a strong and significant association between unintended pregnancy and stunting with an odds ratio of 1.25 [15]. In Indonesia, in 2017, Pamungkas also conducted a case-control study to reveal the association of unintended pregnancy with stunting and found a significant association with odds ratio of 2.19 after controlled with family income, low birth weight, and maternal age during pregnancy and gestational age [16].

Upadhyay study in 2016 in India using cohort design showed a significant result that unintended pregnancy can cause stunting by 1.76 times [17]. With the same design, Baschieri in 2017 also conducted a study in Northern Malawi and got a significant result between unintended pregnancy and the incidence of stunting, 24% of children born from unintended pregnancies would experience stunting [18].

Of the five study findings about association of unintended pregnancy with stunting, it was found that unintended pregnancy could cause stunting in the range of 1.25 to 2.19 times higher than the intended pregnancy.

## DISCUSSION

Unintended pregnancy becomes one of the factors which can increase the occurrence of malnutritions, one of them is stunting. Unintended pregnancy could increase in women with high gestational age, large numbers of children (at birth of third or more children), unexposed to media, low female autonomy and low socioeconomic status [14-18]. Girls were reported to be 27% more unintended than males which was only 23% [15]. The effects of unintended pregnancies could lead to decrease in awareness for antenatal care (OR: 1.5) [15]. Mothers with unintended pregnancy were more likely to opt for home delivery than go to seek for help from health workers (OR: 1,3) and unintended pregnancies could lead to inadequate immunization (OR: 1.18) [15]. Mothers with unintended pregnancies would also tend to behave negatively for their pregnancy such as using drugs, abortion, active / passive smoking, and not taking folic acid or vitamins, resulting in having a baby with low birth weight [12].

Many factors can lead to unintended pregnancy, such as women with high gestational age, large number of children, not exposed to media, low female autonomy, and low socioeconomic status. In Indonesia, the determinants of unintended pregnancies consist of maternal education status, maternal residence, joint living status, parity, pregnancy complications experience, contraception use, and disease history [19]. Previous study also found that economy status, parity, and distance to health care were strong predictors of

unintended pregnancy [20]. Other studies mentioned that the incidence of unmet need also had a significant association with the occurrence of an unintended pregnancy [21].

In this study, we also found that unintended pregnancy increased a risk of depression [17]. Children born from mothers with postnatal depression disorder would 1.53 times more likely to be stunting than children born to mothers without postnatal depression [17]. In another study, it also found that children born to depressed mothers could cause stunting in the range 1.6 to 2 times higher than the intended pregnancy [26-28].

This systematic review mainly discussed about the association of unintended pregnancy and stunting under five years. Five studies in Bangladesh, Nepal, India, Northern Malawi and North Lombok District, Indonesia revealed an association of unintended pregnancy with stunting where unintended pregnancy could cause stunting in the range of 1.25 to 2.19 times higher than the intended pregnancy [14- 18].

Previous research also supports the results of this study, Marson, et al in 2010, found adverse effects of unintended pregnancy when compared with intended pregnancy. Unintended pregnancy could cause inadequate antenatal care before the six month of gestation, inadequate supervised delivery, inadequate vaccination, and stunting. The study used data from five recent Demographic and Health Survey enquiries in Bolivia, Egypt, Kenya, Peru, and the Philippines [22]. Carrie, et al in 2005 also found unintended pregnancy was about 30% greater risk for stunting than children from intended pregnancies and 29% of unwanted children were found with stunting. However, this study was found no association between unintended pregnancy and stunting for infants less than 12 months [23].

Significant association of the unintended pregnancy with stunting was also described in qualitative studies. It might be due to maternal physiological and psychological stress and abortion performed by the mother that could cause premature birth and low birth weight. It might lead to weak emotional bonding between mother and unintended child, resulting in poor parenting [7]. Parenting also played an important role in the occurrence of stunting rates, such as failure in exclusive breastfeeding, poor diet and quality of food, and early delivery of weaning food [3-5,7].

From other factors affecting stunting, we can group into maternal factors, infectious factors, inadequate nutrition, inadequate breastfeeding, and the home environment. Maternal factors consist of genetic factors derived from mothers who also have short stunting, maternal weight during pregnancy, poor nutrition during pre-conception, pregnancy and lactation, infections, teenage pregnancy, maternal mental health, Intrauterine Growth Restriction (IUGR) and prematurity as well as hypertension and maternal disease [24]. Other maternal factors were less antenatal care [2,6,25], resulting in consume less than 90 IFA tablets and had less than 2 TT injection during their pregnancy [17]. Rural residence, lack of sanitary toilet facilities, and wealth quintiles were the environmental and social economic factors that can cause stunting [15,17]. Limitations of this systematic review may occur due to a lack of the keywords used for searching and the limitations of published literatures found for this study.

## **CONCLUSION AND RECOMMENDATION**

There was a significant association between unintended pregnancy and stunting among children under 5 years old, after controlling maternal factors such as high maternal mental health, gestational/ mother age, large numbers of children (at birth of third or more children), unexposed to media, low female autonomy, inadequate antenatal care, postnatal depression disorder and maternal factors (birth order, family income, size at birth), and environmental and social economic factors (urban-rural residence, lack of sanitary toilet facilities, and wealth quintiles). Unintended pregnancy should be decreased immediately because the decline in the number of unintended pregnancies not only prevents the occurrence of stunting but also can improve the quality of life of the mother and child.

To reduce unintended pregnancy, planning service should be strengthened. The services of mental health in pregnant women, maternal and paternal intention, media exposure and autonomy to maternal should be increased to prevent unintended pregnancy. Appropriate interventions should be developed to prevent stunting in children from unintended pregnancy. In addition, children from unintended pregnancy should be monitored to avoid stunting.

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