

## Evaluation Context and Mechanisms of Stunting Intervention In Locus Area: A Systematic Review

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### ABSTRACT

Prevention of stunting both nutrition-sensitive and specific could be delivered based on local context and mechanism. The objectives of the systematic review are to evaluate the context and mechanism component of the stunting intervention in locus area. The selection process for systematic Reviews, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), periode 2015-2020. Searching in PubMed and Scinapse. The keywords "Stunting and Randomized Control Trials. Article on quality assessment by Grading of Recommendations on assessment Development and Evaluation (GRADE). PRISMA methods shows that 23 eligible article high qualities GRADE. Annuals Average Rate Reducing stunting is 6,32% for grouping effectual intervention and 0,85% for grouping ineffectively intervention. The context of intervention should be in line with six component. The context of intervention should be in line with infant feeding (90,9%), Vitamin A supplementation and iron-folic acid (81,8), infectious disease treatment (63,3%), promotion growth monitoring (100%), Management Integrated Infan Disease (54,5%) and food security (81,18%). The mechanism of intervention delivery by strong political commitment (100%) and multi-sectoral approach (90,9%). Evaluation of stunting intervention could be carried out by local context. The mechanism of intervention should be delivered by political commitment, multisectoral, community base integrated, increase coverage, and better compliance

### Key Messages:

- This systematic review evaluates the effectiveness of stunting interventions based on local context and mechanisms, analyzing 23 high-quality articles from 2015-2020
- Effective stunting interventions were associated with strong political commitment (100%) and a multi-sectoral approach (90.9%), with significant impact on reducing stunting rates.
- The findings suggest that stunting interventions should be tailored to local contexts, focusing on infant feeding, vitamin supplementation, and disease treatment, with a strong emphasis on political commitment and community-based approaches.

### ARTICLE INFO

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## INTRODUCTION

Stunting is believed to be one indicator of well-being while assessing social inequality. In South Sulawesi, the decline in the prevalence of stunting was very slow (5.2%), from 40.9% to 35.7% during 2013-2018. In 2019, SUSENAS 2019 (SSGBI) integrated Toddler Nutrition Status Study was carried out, and the result is known that the prevalence is 27.67% or down 3.1% compared to the results of the 2018 Basic Health Research of 30.8%<sup>1,2</sup>

The basis for the importance of conducting systematic reviews of stunting intervention evaluation is because until now it has been known based on previous research evidence from cross sectional studies and randomized control trials (RCT), that stunting interventions with the best efficacy are a combination of sensitive and specific interventions<sup>3</sup>. Increasing the output of interventions (out come) can be done by expanding the context and clarifying the mechanism or context plus the mechanism is the same as the output (out come)<sup>4,5</sup>. Each stunting intervention must be evidence based obtained through a systematic review of a number of publications based on the population of children under five (0-59 months), interventions (sensitive-specific combinations), the comparison is natural interventions (natural interventions), outcomes (out come ) is a decrease in stunting from the experimentation.

Best practices in each location can be referred to as limited to the similarity of program components, but cannot be fully replicated the same, elsewhere, due to differences in context and mechanism. The best way to align program components with context and mechanism is through three-phase realist evaluations (identification of theoretical programs, testing theoretical programs and refining theoretical programs)<sup>6,7</sup>. The objective of the literature review of stunting interventions is to evaluate the context and specific mechanisms of program components that have the best efficacy in reducing stunting

## METHOD

### Search strategy

The source of this systematic review is by accessing a database that specifically contains journal article publications in English, covering the health sector. Based on these criteria researchers only use two search domains as follows:

- a. Scinapse (<https://scinapse.io>)
- b. PubMed: (<https://www.ncbi.nlm.nih.gov/pubmed/>)

The search term in the database is the word "Stunting AND Randomized" with restrictions on articles published during the last five years (2015 to 2020), articles in English, using to the guidelines for Preferred Reporting Items for Systematic Reviews (PRISMA).

### Inclusion And Exclusion

A total of 76 articles were selected with the principles available Population data, Interventions, Comparators, objectives and study design or PICOS. The selection results with the PICOS method found 26 articles that met the requirements and issued 50 articles did not meet the requirements because it did not include PICOS criteria. Furthermore, from the 26 articles selected, only choose articles with high quality using GRADE (Grading of Recommendations Assessment, Development and Evaluation) criteria. Exclusion criteria are articles which; risk of bias, inconsistencies, indirectness and precision. If one of the four components is found to be indicative of a decrease in quality (moderate, Low). If no indication of a decrease in quality is found then the category is high (Hight).

### Data Extraction

Data analysis in this systematic review is focused on identifying the stunting intervention components of selected articles and developing a theoretical program that can be used for stunting interventions at different places and times. The identification of the stunting intervention components is based on the criteria of sensitive and specific intervention components by Ruel and Alderman, 2013. Based on the criteria of the intervention components, matching the criteria of intervention components in all selected articles uses the Glossary of terms Appendix 2, arguing that they have not there is the same naming among all authors of the components of the interventions concerned. The researcher establishes a match based on the similarity of the activity even though it is given a different name by the author.

The next stage the researcher lists the variables and categories (Operational Definitions) for the purposes of descriptive analysis of the article content, Appendix 3. This list is used to input SPSS data entry. The researcher uses the SPSS application, with reasons for the benefit of analyzing the correlation between

variables or components of the intervention. Correlation analysis on this systematic review is used to simplify the components of the previous intervention (Ruel and Alderman 2013) as 16 components become smaller according to statistical analysis. So that this simplification does not eliminate the substance of the previous intervention component the researcher uses factor analysis.

The preparation of theoretical programs in stunting interventions is based on the results of factor analysis to compile leading intervention components, which are believed to be able to provide efficacy in reducing evidence-based stunting. This theory program is then used as a reference for replicating stunting prevention interventions and evaluating stunting prevention intervention programs.

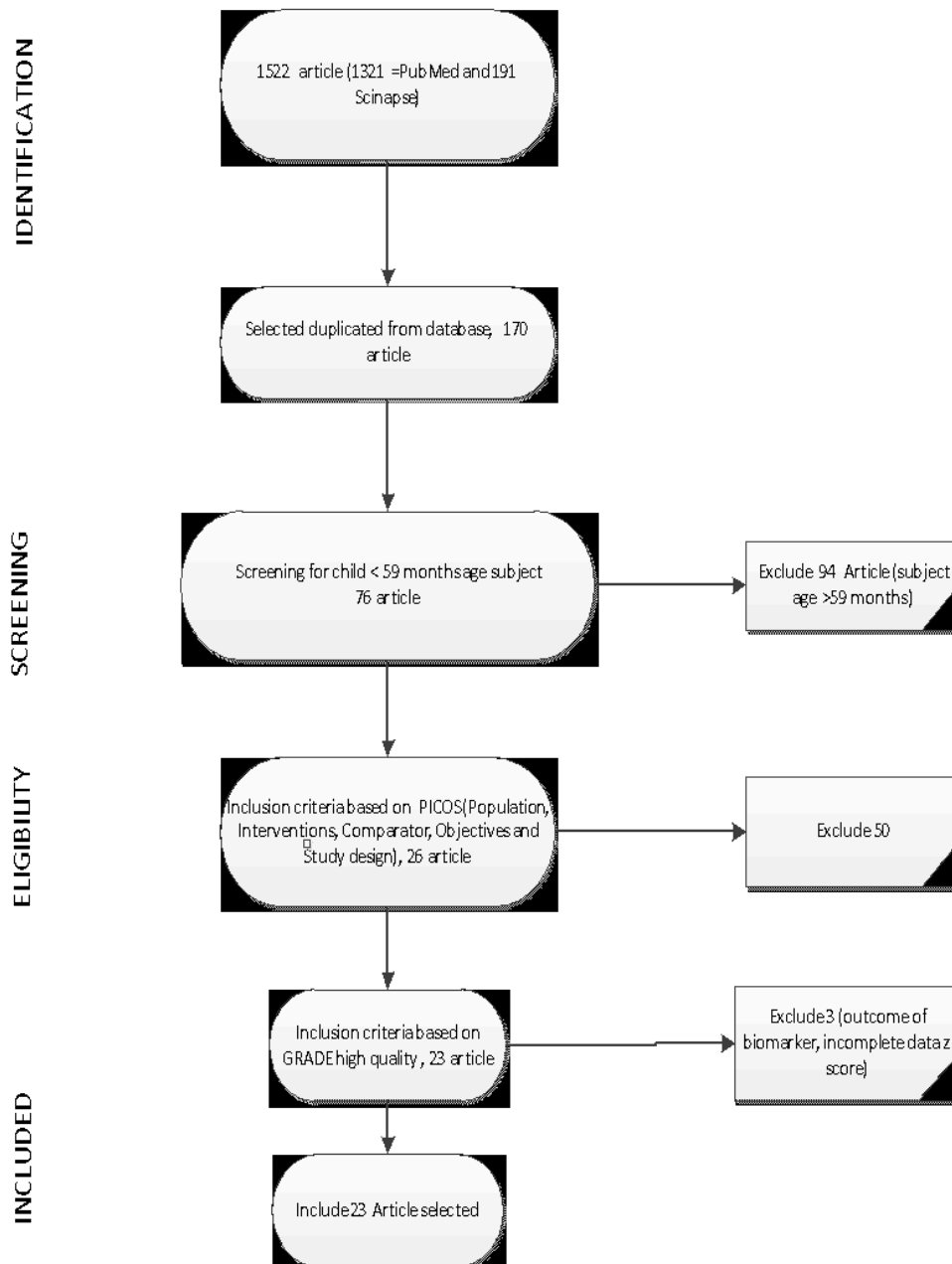


Figure 1. Steps for Systematic Review

## RESULTS

### Article source identification and selection

Based on the results of the identification of articles from the PubMed and Scinapse search engines, all randomized-based articles were collected between 2015 and 2020. The total number of articles was 1522 articles (Table 2). Selection, Election, Eligibility and Eligibility are included in the article according to the PRISMA statement, so that 23 eligible articles are found (Figure 1)

### Quality Description of selected articles

The quality of studies in all selected articles is high degrade the quality of the evidence. All articles have sensitive and specific intervention components according to criteria. The causality between the intervention component and the outcome (decrease in stunting) is very strong. This basis enhances the belief that if the context and mechanism can be known the basis of its formation it can also be replicated elsewhere (Table 1)

### The Context of Components Intervention

Simplification makes it easier for researchers to compile a theoretical program as a basis for evaluating stunting interventions. Only six components of the intervention that meet the requirements; Child Feeding (90.9%), Vitamin A and IFA Supplementation (81.8%), Treatment of Infectious Diseases (63.6 %) (4) Promotion of Child Growth (100%) (5) Integrated Management of Infan Diseases (54.5%) and (6) Food Security (81.8%) Factor analysis is performed to determine which intervention groups can make the strongest contribution (Figure 1)

### The Mechanism of Stunting Intervention and Theory Program

The mechanism for stunting intervention is a series of processes carried out in each component of the intervention. This series of processes, systematically includes 5 stages, namely problem assessment, problem cause analysis, intervention, monitoring and evaluation. The results of each stage are different for each component of the intervention. The equation is only in the activity stage. The theoretical program was developed from factor analysis to find a combination of interventions that can reduce stunting (Figure 1)

In a theoretical program, it must be ensured early on that the infectious disease has been completely eliminated, before any feeding interventions are carried out. So the intervention is not effective if the infectious disease cannot be controlled. There are two main activities, namely treating the sick in an integrated manner and preventing the uninfected from staying healthy.

Vitamin A supplementation is a very important thing to do both for children under five and postpartum mothers. IMID is a preventive effort to prevent children from getting sick. The second intervention is the promotion of children's growth. The third program is food security which includes household food security.

### Annual Average Rate Reducing Stunting

Based on the effective intervention component, it is known that AARR > 4% is listed in table 2

**Tabel 2.** Annual Average Rate Reducing (AARR) Stunting (%)

Annual Average Rate Reducing (AARR) Stunting (%)						
Category	AARR	n	Minimum	Maxmum	Mean	Std. Deviation
Effectively	Percen Point AARR	11	4.20	10.00	6.32	1.89
Ineffectively	Percen Point AARR	12	-5.90	5.20	.85	3.08

The annual reduction in stunting can be achieved between 4.20% to 10%, with an average reduction of 6.32%. It can be estimated that if the intervention program is carried out well, then 95% of the output will range from 4.33% to 8.21% percentage points per year.

## DISCUSSION

The systematic results of this review found that there were 23 articles believed to be literature worthy of discussion to find an adequate stunting intervention component. A percent of the literature has good

quality (high) because there is no risk of bias, is consistent, is directly related to the reduction in stunting, and has very high precision and good quality publication. The stunting intervention component was found to be six as a combination of sensitive and specific interventions respectively, child feeding, supplementation of vitamin A and folic acid, treatment of infectious diseases (specific components). Sensitive components are food security, promotion of child growth, and Integrated Management of Infant Disease (IMID). If the six components of this intervention are carried out, it can reduce the stunting prevalence between 5.23% to 7.80% points per year. This figure is in accordance with WHO targets above 4% points per year.

The theoretical program that can be built based on the findings of the intervention component can be seen in Figure 2. The specific intervention program above gives much better results than the sensitive intervention program. The stunting intervention evaluation document should be directed towards the measurement of the underline context. Political commitment is characterized by the regular program of the local government in stunting prevention efforts. Local political commitment is also very important, especially for regions with decentralized systems like Indonesia. Open broad access to all parties to work together to overcome nutritional problems of mothers and children. Infant Feeding (IF), as much as 100 percent of all interventions classified as effectively reducing stunting, namely 11 artillery from 10 countries (Bangladesh, Ghana, Guatemala, Ethiopia, Madagascar, West Africa, Indonesia, Malawi, and the Philippines) While in a group of countries that are unable to achieve a reduction of > 4 percent, only 75 percent of this IFA intervention is supposed to apply. Supplementation of vitamin A and IFA (90.9% versus 50%) reduced stunting by 40%. The opposite only applied 50%. The objective in this systematic review is children aged 0-59 months, although the interventions carried out in several studies between them have started since pregnancy. Malaria is the most prominent infectious disease and is endemic in the Country and research location. Handling infectious diseases is a part that must be controlled during their research. Cases of infectious diseases like in Indonesia are upper respiratory tract infections and diarrhea. Food security, from the research group effective and not yet effective (72.7% versus 66.6%) Stunting interventions are very important to ensure that the target household's food security is met. Promotion of monitoring the growth of children, from effective and ineffective research groups. Growth monitoring is early detection of child growth and development. Growth disturbance can be prevented before it happens if it. The Integrated Management of Infant Disease (IMID) of the research group is effective and not yet effective. This activity is carried out only on subjects who are known to have experienced illness and require intensive care. Not all subjects have done and received services from the IMID team

Based on the process of simplifying the intervention component of this systematic review, it has been excluded from the list of interventions. The loss of the list in the theoretical program is not meant to negate its activities. This is because there are several activities whose activities are the same or similar to nutrition education and consultation.

The limitation of this systematic review is limited access to the article database makes it impossible to conduct meta-analyses using sample subjects as units of analysis. Factor analysis in this systematic review is to simplify the intervention components. The bias from this systematic review stems from limited data and supporting information from the documented article reviewed and each article has a different style in publication. Bias was minimized by supplementing data extraction guidelines from article documents to data entry programs. The articles are not assessed in pairs, so there is an opportunity for the reviewer's perception to be biased.

## **Conclusion**

Stunting interventions should be based on evidence from a systematic review with the Realist Evaluation approach. The components of the stunting intervention program are six, namely child feeding, supplementation of vitamin A and folic acid, treatment of infectious diseases, food security, promotion of growth monitoring, and Integrated Management of Infant Diseases (IMID). The stunting intervention program evaluation instrument document was developed in two parts, the first part is an instrument to measure the quality and quantity of performance achievements of the intervention components and the second part is an explanation of the context associations (C) mechanism (M) and outcomes (O)

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## **Conflict of Interest**

The author declare no conflict of interest

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Tabel 1. Intervensi Stunting berbasis Randomized Control Trial

Category intervention		Peneliti *)	years	contry	The number Intervention sensitive **)	The number Intervention spesifik***)	Annual Average Rate Reducing	GRADE
effecacy	1	Deanna K Olney, et al <sup>8</sup>	2018	Guatemala	8	5	7.3	high
	2	Shana Shafiques, et al <sup>9</sup>	2016	Bangladesh	8	5	10	high
	3	Aulo Gelli, et al <sup>10</sup>	2018	Malawi	8	8	7	high
	4	Eshani Kandpal, et al <sup>11</sup>	2016	Philipina	8	6	5.2	high
	5	Parul Christian, et al <sup>12</sup>	2015	Bangladesh	8	5	4.2	high
	6	Devi Safitri Effendi, et al <sup>13</sup>	2020	Indonesia	5	7	7.8	high
	7	Seth Aduh-Afarwah, et al <sup>14</sup>	2016	Ghana	5	7	6.2	high
	8	Emanuela Galasso, et al <sup>15</sup>	2019	Madagaskar	6	8	4.25	high
	9	Parul Christian, et al <sup>16</sup>	2016	Bangladesh	7	6	4.25	high
	10	Yunhee Kang, et al <sup>17</sup>	2016	Ethiopia	5	4	8.1	high
inefficacy	11	Susan B Roberts, et al <sup>18</sup>	2017	Aprika Barat	4	3	5.23	high
	12	Jef L Leroy, et al <sup>19</sup>	2018	Burundi	7	7	3.5	high
	13	Malay K Mridha, et al <sup>20</sup>	2015	Bangladesh	8	6	3.9	high
	14	Lindsey M Locks, et al <sup>21</sup>	2016	Tanzania	7	7	0.53	high
	15	Herman B Lanou, et al <sup>22</sup>	2019	Burkina Faso	8	3	-2.2	high
	16	Laura Adubra, et al <sup>23</sup>	2019	Mali	7	6	2.8	high
	17	Grace K M Muhoozi, et al <sup>24</sup>	2017	Uganda	5	6	-5.9	high
	18	Bindi Borg, et al <sup>25</sup>	2019	Kamboja	5	0	1.93	high
	19	Peter C Rockers, et al <sup>26</sup>	2018	Zembia	2	4	2	high
	20	Tantut Susanto, et al <sup>27</sup>	2019	Indonesia	3	4	0	high
	21	Kathrine G Dewey, et al <sup>28</sup>	2017	Bangladesh	4	1	-0.35	high
	22	Freddy Houngebe, et al <sup>29</sup>	2017	Burkina Faso	0	2	2.3	high
	23	Lars T Fadnes, et al <sup>30</sup>	2016	Uganda	1	0	-1.5	high

\*) Eligible articles 62-84



\*\* = Nutrition Counseling Education, immunization, promotion of child growth, integrated management of sick toddlers, Child Feeding, Vitamin A supplementation and folic acid (IFA), Additional food and fortification.

\*\*\* = treatment of malaria, provision of nutrient-dense foods, provision of worming, sanitation hygiene, social safety nets, family planning, food security, access to health services, empowerment of women and psychosis stimulation.

GRADE = Grading of Recommendations, Assessment, Development and Evaluation.

High: The quality of the research is very good so it is very convincing on the estimated impact found