



A systematic review of strategies to overcome undernutrition in children in developing countries

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Abstract

Introduction: Undernutrition is a problem in child health around the world, especially in developing or low and middle-income countries. This systematic review aimed to identify various programs to overcome undernutrition in children under five years old in developing or low and middle countries.

Methods: This study used PRISMA guidelines and searched the literature in several electronic databases. The criteria were limited to descriptive studies, cross-sectional and experimental studies published in 2015-2019.

Results: National programs called JUNTOS and CRECER in Peru and unconditional child cash grant (CCG) in Nepal have shown successful result in reducing undernutrition in children and reducing stunting by >12% as well as studies in India and Pakistan at communities level through programs of participatory and learning action (PLA), creches, home visits, CARING trial, and the REFANI-P.

Conclusion: The program should be performed at all levels and be focused on socioeconomic factors, health accessibilities, and education.

Keywords: undernutrition, under-five children, program, developing countries

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INTRODUCTION

The problem of undernutrition is still a major health problem globally, especially in developing and lower-middle-income countries, such as Indonesia, India, Bangladesh, and others (Huicho, et al. 2016). Children with undernutrition can experience growth failure or even death if left untreated. Nearly 20 million children in the world suffer severe undernutrition, and \pm 1 million of them die every year (Ruwandasari, 2019). World Health Organization (WHO) states that countries in Asia are the biggest contributors to children with undernutrition by 68%, followed by African countries by 28% (WHO, 2019). The nutritional status of children in Indonesia has been recorded regularly in Indonesia (Hadju, et al. 2017). Indonesia Basic Health Research data in 2018 showed the prevalence of under-five children with undernutrition status in Indonesia was still high at 17.7% (Indonesia Ministry of Health, 2018).

Undernutrition is considered a problem that can limit the child's ability to learn, resulting in lower academic achievement compared to children with proper nutrition (Sinurat, et al. 2018). Normal nutritional status would be achieved if the nutrient intake needs are met optimally (Aritonang, et al. 2016). Nutrition problem is caused by factors that are directly or indirectly interrelated. To measure the nutritional status based on Body Mass Index (BMI) with a calculation of the number of a

person's weight and height (Amelia & Harahap, 2019). Children with poor nutrition will find it difficult to experience gross motoric improvement compared to children with good nutritional status (Ibnu, et al. 2019). Poor nutrition will leave children underweight, weakened, and vulnerable to infections, primarily due to the epithelial integrity and inflammation (Wicaksono, 2016).

The direct factors are infection and insufficient nutrition, while the indirect factors include the lack of accessibility and quality of health services, parenting, environmental sanitation, and household food security. The causes of undernutrition in children under five directly include inadequate intake of food and their accompanying infectious diseases (Rahman, et al. 2018). The main problem is the low level of education, knowledge, and income. Failure of growth and development in children can have a serious impact in the future, which is irreversible. Furthermore, children with growth disorders will also experience lower intelligence.

Indonesia provides health accessibility for public in the form of community health service centers. The main basic health services aim to improve the health and

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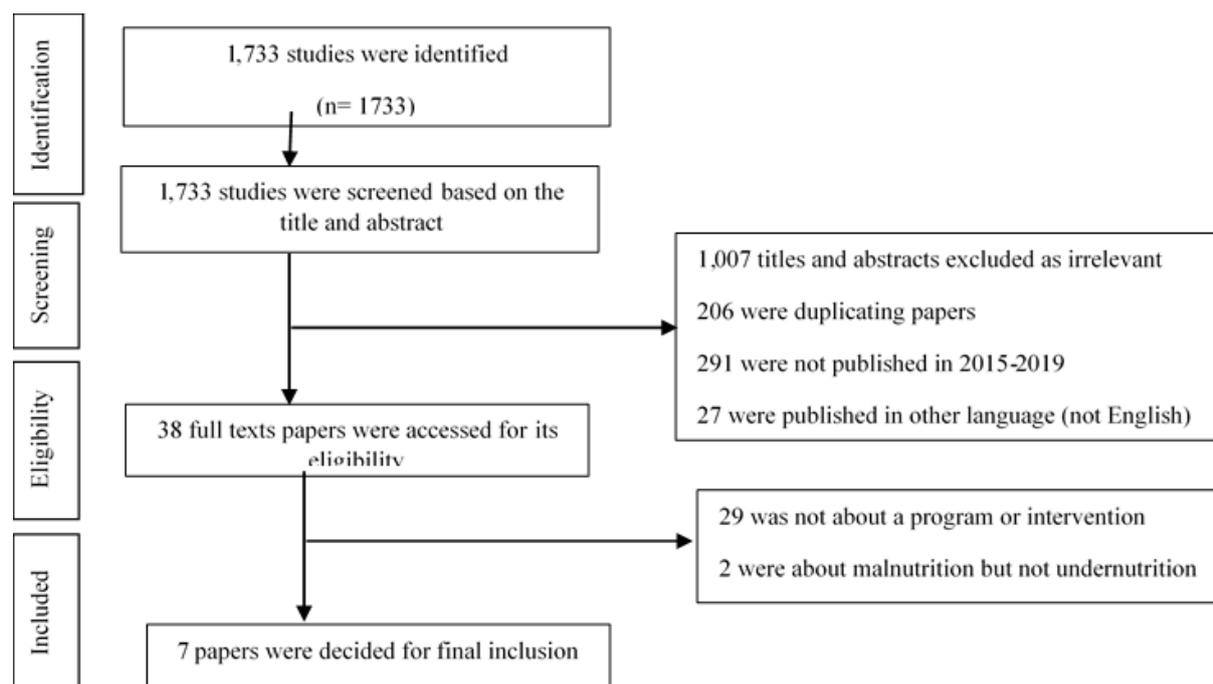


Fig. 1. Selection and quality appraisal process of articles for systematic review

nutritional status of children to prevent early child death and low physical quality. Health care is one of the indirect factors that influence the nutritional status. Various policies, programs, and research in other countries successfully treated undernutrition can be a lesson. Thus, cases of undernutrition in Indonesia can be solved. This study aimed to identify and review various strategies to overcome undernutrition in children in developing or lower-middle-income countries.

METHODS

Several electronic databases were used to search relevant articles, namely SCOPUS, CINAHL, Science Direct and Springerlink. The searching process in those databases used several keywords combination with OR and AND, such as “undernutrition”, “children”, “strategy”, “health worker”, and “low-middle-income countries”. The searching was limited to English language, research and review articles, and published in recent 5 years respectively in 2015 to 2019.

The articles screening was based on inclusion and exclusion criteria, including articles that investigated various programs or intervention to solve undernutrition problem in each country. Furthermore, articles that investigated the policy and issues in children with undernutrition were also included. Articles were excluded if they investigated about undernutrition in school-age children, adolescents, adults or even elderly. In addition, articles that investigated malnutrition with obesity were also excluded. The first stage of screening was done in the title and abstract. Same articles were

removed. The next screening was done by reviewing the full-text articles. Thus, only 7 articles were selected.

RESULTS

As many as 7 articles were included for a final review. Based on an in-depth review of all articles, the authors found several programs to address the incidence or prevalence of children with undernutrition carried out at the national and community level.

For national program, one of the countries noted to be successful in reducing undernutrition was Peru. Peru has several national programs and policies to achieve national targets in the management of undernutrition. Through the JUNTOS program in 2005, followed by The Integral Nutrition Program in 2006, and The National Strategy for Poverty Reduction and Economic Opportunities (CRECER) in 2007, Peru has succeeded in reducing the under-five mortality rate (U5MR) from 27.7% to 16.7% and stunting prevalence from 29.2% to 17.5% in 8 years. In addition, The SIS Comprehensive Health Insurance System since 2002 also played a role in Peru’s achievements (Nair, et al., 2017).

Programs that have had the most impact in Peru are JUNTOS and CRECER. JUNTOS is a conditional cash transfer program provided to low-income families to improve access and contribution to the health services and education. This program sets requirements for families who receive cash transfers, including requiring pregnant mothers to do antenatal care at least once every two months, followed by post-natal care immediately after delivery. In addition, every infant and toddler have to attend a health and nutrition clinic as a

monitoring program for growth and development of infants and toddlers, including immunization activities, administration of iron, vitamin A and worm medicine. The JUNTOS program is also complemented by a women's empowerment program, particularly in the economic field to ensure sustainability. On the other hand, CRECER is a program focusing on reducing stunting by focusing on addressing poverty and urban-rural gaps, such as economic, environmental, educational and agricultural issues (Fenn, et al. 2015).

The Government of Nepal also has an unconditional CCG program to treat undernutrition in children. A research conducted in five districts measured the impact of the CCG program on indicators of growth and nutritional status of children from 2009 to 2015 on a cross-sectional survey. The results show a positive trend where the growth graph for height for age, weight for age, and weight for height z scores have linear growth. In addition, the CCG program has also succeeded in reducing the number of stunting, underweight and wasting which means this program has successfully overcome undernutrition in the community (Renzaho, et al. 2019).

In the other hand, it is also known several programs in the community level. For example, there are several studies in India conducted in community setting with various platforms. One of the researches examined the effectiveness of the PLA program in groups of women combined with home visits compared to the Creches program for children aged 6 months to 3 years combined with PLA and home visit programs. This non-randomized study measured wasting, underweight, and stunting in children aged 6 months to 3 years. The study was conducted for 3 years and showed significant results in both treatment groups (Egata, et al. 2014).

Another study in India, namely CARING trial conducted an interventional study for pregnant women. This study was a cluster randomized controlled trial study in the third-trimester pregnant women group where the outcome was measured in infants starts since they were born to the age of 2 years old. The interventions were started at 72-hour postnatal visits and continued at 3, 6, 9, 12 and 18 months after giving birth as well as a home visit once during the 3rd trimester of pregnancy and monthly visits for children less than 2 years and 2-3 PLA meetings. One outcome of the study revealed that fewer children with underweight at 18 months in the intervention group compared to the control group (Nair, et al., 2017).

Pakistan also has REFANI-P protocol study with a similar mechanism as JUNTOS in Peru, where the target of this program is the rural poor (Fenn, et al., 2015). This program offers poor people the choice of receiving cash or fresh food vouchers to improve food availability and health in the family. The results of the research measured include health and nutritional outcomes and health behavior. Unfortunately, the results of this study

cannot yet be accessed because the research is ongoing.

DISCUSSION

Cases of undernutrition are still a major problem of children's health in developing and middle-low-income countries, such as Bangladesh, Ethiopia, Vietnam, India, Pakistan, Nepal, Peru and also Indonesia (Harris, et al. 2017; Huicho et al., 2016; Nair et al., 2017). Some programs have been developed in several developing countries to solve ongoing cases of malnutrition, such as cash-transfer programs. Research in India, Peru, and Nepal has shown the effectiveness of cash transfer programs. Although the prevalence of undernutrition is still relatively high, there has been a significant decrease. However, the program is integrated with other programs, such as complementary food programs and health insurance to improve health access; thus, the community can prevent the occurrence of undernutrition caused by disease.

The cash transfer program is one of the strategies widely applied in various developing countries because socio-economic factors are still the main cause of the high prevalence of malnutrition in lower-middle-income countries, namely poverty and low food security (Tasnim, 2019). Other factors contributing to the cause of undernutrition are infectious and non-infectious diseases due to the lack of access to health service, both during maternal pregnancy to infancy (Salam, et al. 2015).

The JUNTOS and CRECER program from Peru became a very comprehensive program combining a cash transfer program. It is a program aiming to improve access and health monitoring and is complemented by a women's economic and education empowerment program (Salam, et al. 2015). However, there is a limited exploration of supporting factors and the barrier emerging during the program run, both in terms of the community.

At the community level, several local interventions have been developed, although the numbers are still limited. The idea to integrate programs to improve health access and increase knowledge through health education is the basis for the development of the interventions. Education and knowledge are known as one of the causes of undernutrition cases in children, especially the education of mothers and grandmothers as child caregivers (Tasnim, 2019). Therefore, there is needed an intervention that can increase the knowledge of the mother (and grandmother) as the primary caregivers of the children.

PLA interventions combined with home visits and Creches in India became an effective program in dealing with cases of undernutrition. CARING trials similar to PLA programs also have similarities in their interventions. Although the observation period is shorter,

this study is better in its design, which is a cluster RCT. One outcome of the study showed that the intervention group found fewer children with wasting and underweight than the control group (Nair, et al., 2017).

CONCLUSION

Strategies to solve undernutrition problems in developing countries are at various levels, from the

national to the community level. The strategy focuses on efforts to resolve the factors causing malnutrition, including social and economic problems and access to health and education. Further research is needed to explore the supporting factors and barriers in implementing the program, both in terms of the target community and health workers as program implementers.

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