THE EFFECT OF MULTIMICRONUTRIENT INTAKE ON INFANT GROWTH: LITERATUR REVIEW

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ABSTRACT

Introduction: The high prevalence of anemia in pregnant women in developing countries has been widely recognized as an important public health problem. Caused by negative consequences for pregnancy outcomes and their impact on maternal mortality. Currently, food intake and micronutrient studies (MMN) in various countries show that, in addition to anemia, deficiencies such as vitamin A, zinc, vitamin B12, iodine, and folate are also widespread and have a negative impact on pregnancy outcomes. Stunting (dwarf) is a condition of failure to thrive where a toddler has a length or height that is less when compared to his age.

Methods: This study uses the design used is Literature review. Articles were collected through Cochrane, Science Direct, Pubmed, Elseiver, Proquest (Links came from the library unhas.ac.id) Pubmed, WHO, Google Scholar. The keywords used are MMN, pregnant women, growth and development of children.

Results and Discussions: Based on the reading of the article, it was shown that the need for micronutrients (MMN) at the time of preconception, pregnancy to pregnancy outcomes was very important to be able to influence growth and development in children. The provision of multi micronutrient supplementation (MMN) single nutrient, or a combination of 2-3 nutrients during pregnancy does not have an impact on the baby's body length. However, early assistance or preconceptions about contributing to an increase in the baby's body length.

Conclusions: Giving MMN since early pregnancy greatly affects the growth and development of children.

Keywords: MMN, infant growth

I. INTRODUCTION

Stunting is the most common manifestation of malnutrition that starts in the womb until early childhood/school(1),(2). Stunting determination is measured in general provisions of the 2005 WHO anthropology standard. Used for children aged 0 to 24 months. Based on the length of the body (PB) according to the age of more than minus two standard deviations (≤- 2 SD) median standard of growth of children from WHO(3).

Globally, around 149 million children under five suffer from stunting(2). In 2 010, an estimated 171 million children (167 million in developing countries) were stunted to around 100 million by 2025(4), While editing in Africa has stagnated since 1990 by around 40% and a slight improvement was anticipated, Asia showed a dramatic decline from 49% in 1990 to 28% in 2010, nearly halving the number of stunted children from 190 million to 100 million. but this is still a big problem that must be dealt with seriously(4). The prevalence of short toddlers in Indonesia tends to be static. The results of Basic Health Research (BHR) in 2007 showed the prevalence of short toddlers in Indonesia at 36.8%. In 2010, there was a slight decline to 35.6%. However, the
prevalence of short toddlers increased again in 2013 to 37.2% and finally based on BHR in 2018 the prevalence of Stunting in Indonesia reached 30.8% (5), (6).

Factors contributing to or related to stunting, in general, have been examined in various studies. Based on the results of research conducted by Fatemi et al., 2019 showed a significant relationship between stunting and maternal occupation and chronic illness. In addition, a significant relationship was found between family income, milk consumption and animal protein in food (7). Also, the chance of stunting is inversely proportional to the birth interval and duration of exclusive breastfeeding (8), body length at birth did not receive postnatal maternal vitamin A supplementation and family food sources, unavailability of latrines, socioeconomic (9), (10).

In trials in Bangladesh, MMN supplementation before and after childbirth resulted in increased LAZ (Length-for-age Z-score) and reduction in stunting up to 3 months of age, but not afterward and had no impact on cognitive and motor function at 2 years (11). A positive effect was found on chest circumference based on the two studies included, the relative risk of adjusted stunting was 14% lower in children whose mothers used IFA supplements compared with those whose mothers did not use. In addition, the adjusted relative risk of stunting was significantly reduced by 23% when antenatal IFA supplementation began ≥6 months with ≥90 IFA supplements used during pregnancy, antenatal IFA supplementation significantly reduced the risk of stunting (12), (13). The combined effect of consumption of micronutrient-rich foods and supplementation of vitamin A is stronger on the possibility of stunting reduction than the separate effects of each (14). Another study stated that the prevalence of stunting among children who received MMN powder was significantly lower than those not given MMN powder, this intervention reduced stunting by around 38% (15). Recent research conducted in Bangrai Regency, Central Sulawesi, proves that pregnant women who get MMN intervention produce better pregnancy outcomes and the average body length of babies born to MMN group mothers is longer (16).

II. METHOD

Searching for articles is done by computer through an online database that provides free journal articles in PDF format, such as Public Health Nutr. BMC Public Health. Pubmed, Proquest, Google Scholar, ScienceDirect. Int J Environmental Health Res Public Health. PLoS One, Nutrients, Am J Agric Econ, J Nutr., Am J Clin Nutr., J Trop Pediatr, Bmj, Eur J Clin Nutr, Arch Pediatr Adolesc Med., Nutr Clin Pract., And other Sources such as Textbooks from the library, UNICEF report, WHO, Indonesian Ministry of Health, Thesis and Dissertation. In reviewing the article using the PICOS principle (participants, interventions, comparisons, results, research designs) so the keywords used are multi micronutrients as the first word; the second word is pregnant women, the third word is the growth and development or outcome of pregnancy. Research subjects are starting preconception, pregnant women with the result are changes in the length of the baby's body born or HAZ score.

The literature review technique in this article only synthesizes not synthesizing the results statistically (meta-analysis), but the final conclusions obtained can be justified scientifically as an effort to overcome the stunting problem.

III. RESULT

After tracking articles through Public Health Nutr. BMC Public Health. Pubmed, Proquest, Google Scholar, ScienceDirect. Int J Environmental Health Res Public Health. PLoS One, Nutrients, Am J Agric Econ, J Nutr., Am J Clin Nutr., J Trop Pediatr, Bmj, Eur J Clin Nutr, Arch Pediatr Adolesc Med., Nutr Clin Pract., And other Sources such as Textbooks from the library, UNICEF report, WHO, Indonesian Ministry of Health, Thesis and Dissertation. Then around 300 journals were gathered. From around 130 journals, around 107 journals were selected according to the criteria, so a selection was made to review them, which then numbered 43 journals. But after more in-depth journal screening, only 18 journals were obtained. However, due to limited writing, we only display a few journals. Table 1 shows the search results that can be written in this article that previous studies relating to multimicronutrient interventions have been carried out in an effort to tackle the problem of stunting in various countries.

Table 1. Results Study articles related to multimicronutrient interventions

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<th>Author</th>
<th>Design</th>
<th>results</th>
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<td>Roberfroid D, et al, 2008</td>
<td>A double-blind randomized controlled trial</td>
<td>Maternal UNIMMAP modestly but significantly increased fetal growth. The resulting benefit on infant growth and survival needs to be assessed. The possible...</td>
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lack of benefit and potential harm in primiparous women should be further investigated.

Early food supplementation in pregnancy reduced the occurrence of stunting during 0-54 months in boys, but not in girls, and prenatal MMS increased the proportion of stunting in boys. These effects on postnatal growth suggest programming effects in early fetal life. Antenatal multmicronutrient supplementation has a significant positive effect on the head circumference of children under 5 years. No impact of the supplementation was found on weight, height, WAZ, HAZ, and WHZ.

The greatest impact on the risk reduction of child stunting was when IFA supplements were started d6 months with 90 supplements that were used. In this Bangladeshi trial, maternal pre- and postnatal MM supplementation resulted in improvements in LAZ and reduction in stunting through 3 mo of age, but not thereafter and had no impact on cognitive and motor function at 2 year.

The use of the multiple micronutrient powder showed some benefits in reducing stunting in short term. But to effectively solve the problem of chronic malnutrition, the strategies should address globally different causes including socio-economic assets of the family, food quality, maternal nutrition, sanitation, and mothers’ education.

Owning small livestock and a refrigerator, knowledge of micronutrient-rich foods and higher parental education had strong associations with households’ micronutrient-rich food consumption. Children from households that consumed micronutrient-rich foods and received more diverse diets were less likely to experience stunting. The combined effect of micronutrient-rich food consumption and vitamin A supplementation was stronger on the likelihood of stunting reduction than the separate effect of each.

Antenatal IFA supplementation significantly reduced the risk of stunting in Nepalese children age <2 years. The greatest impact on the risk reduction of child stunting was when IFA supplements were started d6 months with 90 supplements that were used.

The combined effect of micronutrient-rich foods and supplementation of vitamin A is stronger on the possibility of reducing stunting than the effect of each (14), a study conducted by Roberfroid et al. stated that birth weight and birth length were significantly higher in the UNIMMAP (UNICEF / WHO / UNU international multiple micronutrient preparation group)(17), as well as research conducted by Widasari et al., that Pregnant women who get MMN intervention produce better pregnancy outcomes. The nutritional status of women before pregnancy is very important to achieve mother and fetal welfare and also considered as the most important thing for governing fetal growth (16).

Various empirical evidence mentioned that it is very important to provide supplementation of micronutrients from the preconception period, not only during pregnancy. On the other hand, various studies have proven the

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<th>Study Description</th>
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<tr>
<td>Barrie M, et all, 2009</td>
<td>Review of methods and characteristics of studies included in the meta-analyses</td>
<td>The study was conducted in various ways, both in the form of research designs, subjects and where the research was conducted. Research conducted by Nisar et al., Found that antenatal IFA supplementation significantly reduced the risk of stunting in Nepali children aged &lt;2 years. The biggest impact on reducing the risk of child stunting is when IFA supplements are started for 6 months with 90 supplements used(13). Scientists and policymakers have begun to recommend replacing Fe-folic acid supplementation with multi-micronutrients (MMN) in each health and nutrition intervention package in pregnant women. MMN is given to increase birth weight and growth of children. The combined effect of consumption of micronutrient-rich foods and supplementation of vitamin A is stronger on the possibility of reducing stunting than the effect of each (14), a study conducted by Roberfroid et al. stated that birth weight and birth length were significantly higher in the UNIMMAP (UNICEF / WHO / UNU international multiple micronutrient preparation group) (17), as well as research conducted by Widasari et al., that Pregnant women who get MMN intervention produce better pregnancy outcomes. The nutritional status of women before pregnancy is very important to achieve mother and fetal welfare and also considered as the most important thing for governing fetal growth</td>
<td>Nisar Y Bin, et all, 2016</td>
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superiority of multi-micronutrient supplementation in increasing pregnancy outcomes when compared to the supplementation of iron-folic acid tablets. This shows that if an intervention is given during pregnancy, then the critical period (preconception) has been missed. In addition, it needs to be considered to supplement iron, folic acid with various other micronutrients in the form of multi-micronutrient supplements given since the preconception(18).

Interventions for pregnant women with a single nutrient or a combination of 3 to 3 nutrients or multi-micronutrient (MMN) or nutrition education program interventions do not always have an impact on increasing the baby's body length. However, supplementation from the beginning of pregnancy provides significant results in increasing body length(19). The results of a meta-analysis conducted from the Maternal Micronutrient Supplementation Study Group (MMSSSG) study in several poor countries also showed that there was no significant impact between multi-micronutrient administration with birth length(20). No supplementary effects were found on body weight, height, WAZ, HAZ, and WHZ. Multimicronutrient supplementation in this study was not carried out since the preconception (12).

V. CONCLUSION

The provision of multi-micronutrient supplementation (MMN) single nutrient, or a combination of 2-3 nutrients during pregnancy does not have an impact on the length of the baby's body. However, early administration or preconception in pregnancy has an impact on increasing the baby's body length.

REFERENCES

16. Widasari, Lucy; Chalid, Maisuri T.; Jafar, Nurhaedar; Thaha AR. Effects of Multimicronutrient and IFA Supplementation in Prec 5 years of Age : A Retrospective Cohort Study from Nepal. Nutrients. 2016;