



The Given of Fermented Drink Fortified with Fe-Zn (INTAKE) for Under-5-Year-Old Children as Integration of Research Products and Stunting Prevention Program: An Action Research

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Abstract

INTRODUCTION: Stunting is one priority for nutritional and health problems in Indonesia.

AIM: This research was action research aimed at improving the nutritional status of the community, especially in supporting stunting reduction programs through specific nutrition interventions using local functional foods and determine, whether the program can be implemented in a proper setting.

METHODS: The research was conducted in the working area of Tempel 2 Public Health Center (PHC Tempel 2), Sleman Regency, DI Yogyakarta using an action research approach. This study was involved 26 children aged 12–59 months who were living in the PHC Tempel 2, Sleman, Yogyakarta Special District Province. This product was given every day for 3 months with a daily dosage of 100 mL/day. The consumption was monitored using food diary to identify the compliance rate of the products.

RESULTS: The consumption of INTAKE significantly increased the growth of the subjects which included height (91.94 vs. 95.13 cm), weight (12.75 vs. 13.63 kg), and nutritional status of height for age z-score (-1.348 vs. -0.933) 3 months after the intervention.

DISCUSSION: Although several factors such as eating behavior can affect the nutritional status of children, the INTAKE intervention can provide an alternative food supplement for children besides the programs that have been provided by the government.

CONCLUSION: The provision of fermented milk with iron-zinc fortification (INTAKE) had a positive intake for the growth of children under 5 years old. The intervention was feasible to be carried out over a longer period. However, considering the nutrition-related behaviors of the children, it should be considered administering different supplementary food while maintaining consistent nutrition education to enhance the success of the programs. Collaboration between academicians, health offices, and industry also proposed a good impact.

Edited by: Ksenija Bogoeva-Kostovska
Citation: Helmyati S, Wisnusanti SU, Wigati M, Aryanti L, Suseno Suseno, Suwignyo B. The Given of Fermented Drink Fortified with Fe-Zn (INTAKE) for Under-5-Year-Old Children as Integration of Research Products and Stunting Prevention Program: An Action Research. Open Access Maced J Med Sci. 2022 Mar 15; 10(B):812-815. https://doi.org/10.3889/oamjms.2022.8346

Keywords: Action research; Stunted children; Child growth

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Received: 20-Dec-2021

Revised: 01-Mar-2022

Accepted: 05-Mar-2022

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Funding: This study was supported by Program Flagship Prioritas Riset Nasional untuk Perguruan Tinggi 2021 (National Research Priority Flagship Program for University 2021) held by National Research and Innovation Agency on behalf of Dr. Helmyati (grant number: 5966/UN1.DITLIT/DIT-LIT/PT/2021).

Competing Interests: The authors have declared that no competing interests exist

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Introduction

Stunting is one priority of nutritional and health problems in Indonesia. At present, the prevalence of stunting in Indonesia is 30.8% based on the 2018 basic health research [1]. The government plans to reduce the stunting rate in the National Medium-Term Development Plan year 2020–2024 to 14%. It takes a large and well-coordinated effort to achieve this number.

Specific interventions in accelerating stunting reduction require an intervention approach of the First 1000 Days of Life (DoL). The one-life cycle approach is very important in efforts to reduce stunting in Indonesia. This is because the problem of stunting is multifactorial and occurs due to chronic malnutrition in various age groups [2]. Therefore, the prevention of stunting cannot only target groups of stunted children. Involvement of one life cycle starting from girls (adolescent), pregnant

women, and children under 2 years old becomes a critical window in specific interventions for stunting prevention and treatment [3].

Nutritional problems that are determinants of stunting can occur in the three vulnerable populations. Adolescent girls will be prospective mothers who are prone to anemia. Likewise, pregnant women who experience malnutrition can increase the risk of death and deliver a stunted child. Under 2 years old, children often have difficulty accessing nutritious food so that they cannot achieve optimal growth and development. Micronutrient deficiency can affect children's brain development and immunity, thereby increasing the risk of stunting [4].

In response to the problems, specific nutrition-based intervention using functional food was developed in 2017 and scientifically proven to enhance child growth. This also is the chance to implement the novelty from the previous researches. Several years earlier, the research team from Gadjah Mada University

had conducted a study on the effect of synbiotic Tempel milk intervention to reduce anemia in adolescent girls (patent granted) [5] giving Fe-Zn fortified synbiotic milk to stunting children (results have been published and patent granted) [6], development of an easy-to-use GAMA-KIDS stunting detection tool at Paysandu (patent application process) [7], and the production of high functional eggs of Fe and Zn through modification of chicken feed. All of these studies are expected to be innovative interventions for all populations involved in the 1000 DoL cycle to prevent and treat stunting.

This research was an activity with an action research approach, namely, research that applies the results of previous studies. This series of studies is part of a road map that aims to improve the nutritional status of the community, especially in supporting stunting reduction programs through specific nutrition interventions. The research approach is carried out in one life cycle, especially the first 1000 DoL, starting with young women, pregnant women, and children under 2 year old.

This research was action research aimed to improve the nutritional status of the community, especially in supporting stunting reduction programs through specific nutrition interventions using local functional foods and determine whether the program can be implemented in a real setting. Action research is conducted based on a study location and focuses on understanding how the intervention is carried out, as well as the role of stakeholders or figures who play an important role in receiving, interpreting, and responding to the given intervention [8]. Therefore, in this research, quantitative and qualitative studies will be carried out to obtain complete information regarding the given intervention.

Methods

Program preparation and implementation

The research was conducted in the working area of Tempel 2 Public Health Center (PHC Tempel 2), Sleman Regency, Yogyakarta Special District Province, Indonesia using an action research approach [8] and a mix-methods design with a mixture of quantitative and qualitative. Through this activity, researchers were expected to be able to find out how the effectiveness of the product in helping improve community nutrition in a real setting.

This study was involved 26 children aged 12–59 months who were living in the PHC Tempel 2, Sleman Regency, Yogyakarta Special Province, Indonesia. The selection of respondents was carried out by quota sampling which was carried out randomly by officers from the PHC Tempel 2 and Posyandu (Integrated Health Service). Before the children were involved as the research subject, their parents needed

to fill the informed consent to declare their willingness to participate in this program. This research obtained ethical clearance with number KE/FK/1114/EC/2021 from Ethical Committee, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada Indonesia.

Fermentation drink with Fe-Zn fortification (INTAKE)

This product has been in development since 2012 and has gone through the stages of laboratory, pre-clinical, and clinical trials. The advantages of this product are 1) it contains synbiotics (pre and probiotics) for gastrointestinal health, and 2) it contains iron and zinc which are good for toddler growth. The production of this product is already published elsewhere [6].

This product was given every day for 3 months with a daily dosage of 100 mL/day. The consumption was monitored using food diary to identify the compliance rate of the products. The enumerator will document their consumption per week and calculate the consumption percentage.

Anthropometric measurement

Anthropometric measurement was conducted before the intervention was given to the children. It consisted of weight and height measurement and nutritional status (weight for age [WAZ], height for age [HAZ], and weight for height [WHZ]). Weight measurement was conducted by a nutritionist using calibrated weight digital scale. Meanwhile, height measurement was also conducted by a nutritionist using a microtome. The data were analyzed to nutritional status using the WHO Anthro Plus software.

Statistical analysis

The data were compiled using Microsoft Excel and analyzed using R Studio. Descriptive data were presented in frequency and percentage for gender, mother's education, occupation, and family income and in means for mother's, children's age, weight, height, WAZ, HAZ, and WHZ. The difference between anthropometric indicators for each evaluation time was conducted using paired t-test. A significant difference was indicated with $p < 0.05$.

Results

Twenty-six children under 5-years-old were given INTAKE intervention for 3 months with the monthly anthropometric measurement as a program monitor. This program is a single intervention, pre-post

evaluation so that it was only involved one group as intervention subjects. The characteristic of the subjects involved in this research is shown in Table 1.

Table 1: Characteristics of subjects given INTAKE

Characteristics	n = 26 (%)
Gender	
Male	14 (53.84)
Female	12 (46.15)
Child age (months)	35.50 (22)
Mother's age (years)	32.95 ± 6.25
Mother's education	
Junior high school	2 (7.69)
Senior high school	18 (69.23)
Undergraduate/master/doctoral	4 (15.38)
NA	2 (7.69)
Mother's occupation	
Labor	1 (3.84)
Civil servant	1 (3.84)
Entrepreneur	2 (7.69)
House wife	16 (61.53)
Private sector	2 (7.69)
Income	
<Rp 1,000,000	7 (26.92)
Rp 1,000,000–2,000,000	11 (42.30)
Rp 2,000,000–3,000,000	3 (11.53)
Rp 3,000,000–4,000,000	1 (3.84)
NA	4 (15.38)

Monitoring of the program was conducted monthly based on the anthropometric measurement and nutritional status as its indicators. The changes in anthropometric of subjects from pre-intervention, 1 month, 2 months, and 3 months after given the intervention are presented in Table 2.

Table 2: Changes in anthropometric indicator of INTAKE's subjects

Anthropometric indicators	Pre-intervention	M1	M2	M3
Height (cm)	91.94 ± 7.47 ^a	93.07 ± 7.18 ^b	94.77 ± 6.86 ^c	95.13 ± 6.81 ^d
Weight (kg)	12.75 ± 2.39 ^a	13.17 ± 2.50 ^b	13.53 ± 2.54 ^c	13.63 ± 2.43 ^c
WAZ (z-score)	-1.187 ± 1.15 ^a	-0.984 ± 1.12 ^b	-0.889 ± 1.03 ^b	-0.890 ± 1.03 ^b
HAZ (z-score)	-1.348 ± 1.14 ^a	-1.211 ± 1.10 ^b	-0.856 ± 1.15 ^c	-0.933 ± 1.09 ^c
WHZ (z-score)	-0.619 ± 1.09 ^a	-0.478 ± 0.98 ^a	-0.784 ± 1.11 ^a	-0.514 ± 0.91 ^a

Different superscripts between groups indicate significant differences, M1: 1 month after receiving the intervention, M2: 2 months after receiving the intervention, M3: 3 months after receiving the intervention. Data were presented in mean ± SD.

INTAKE consumption within intervention periods (12 weeks) are documented on the Figure 1.

Discussion

The research subjects were under 5-year-old children and did not differentiate by stunted status. All subjects received INTAKE and measured their height, weight, and nutritional status. The consumption of INTAKE was significantly increased their height, weight, and HAZ after 1, 2, and 3 months of intervention, while it also increased their WAZ 1 month after the intervention. WHZ did not significantly change during the intervention phase (Table 2).

Fermented milk with iron and zinc fortification seemed to have a positive impact on the growth and nutritional status of the children according to HAS z-score. The result was in line with our previous

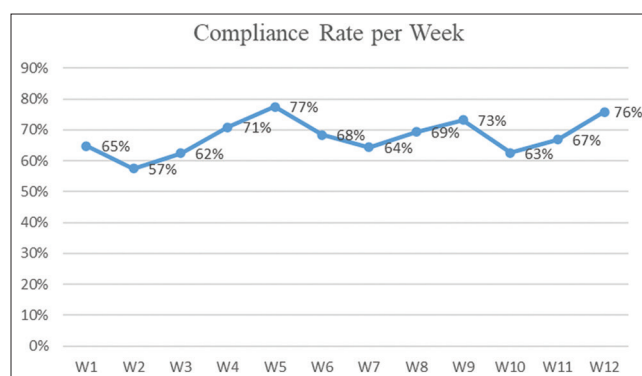


Figure 1: Compliance rate of INTAKE

research. This intervention product was originally developed for stunted children [6]. The research, in 2018, showed that the product, either it was fortified with an iron-zinc combination or without fortification, improve the growth of the children. After going through the further development process, the same product was given to young children without classifying their stunted status. However, according to pre-measurement before the intervention began, most of the children could be classified as having the normal height for their age. It was supported by the average measurement of HAZ which was a -1.348 z-score. It should be noticed that other factors might interfere with the growth of children under 5-years-old, including feeding practice, dietary behaviors, iron, and zinc status [9].

This research would like to assess whether implementing INTAKE could be accepted by the subjects. The researchers collaborated with PHC Tempel 2 and local producers to support the production of INTAKE. It was distributed by the research team in a *Posyandu* once a week. Some obstacles faced in this process are the boredom of children in consuming INTAKE and the lack of parental support. This activity was also carried out during the COVID-19 pandemic so that meeting in person with parents and subjects was very limited. To overcome the obstacles, the research teams were intensively coordinated with health officers from PHC Tempel 2 and health cadres.

Children are known to have their eating preferences [10]. At the beginning of this study, it was known that all children did not have a rejection of the taste of INTAKE. However, boredom began to occur when the children were asked to consume INTAKE every day for 2 months. Some parents also showed a negative attitude and did not support this research. This is due to the limited interaction between researchers and parents so that understanding of the safety and benefits of the product is still limited. The interaction was restricted during pandemic [11] that most of the communication was conducted online while not all parents were willing to have remote communication using mobile apps. The location of the INTAKE distribution is also in one of the *Posyandu* to serve subjects from two villages. To increase effectiveness, INTAKE is given once a week

for consumption for 7 days. This adds to the challenge of parental support for research.

This research partnered with small businesses in the research location. This is by the paradigm of stunting reduction that is multi-stakeholder and increases the potential for collaboration, including the business world [12]. The current Indonesian government has also adopted the Penta helix concept, where unity between government, media, community, academia, and industry can increase the chances of successful public programs [13].

The provision of INTAKE is an additional food similar to the supplementary feeding program that has been implemented by the government so far [14]. The program that has been implemented consists of two types, namely, the provision of biscuits and local supplementary food as nutritional education to parents. The provision of biscuits as an additional food is limited to toddlers with nutritional problems [15]. In addition, the implementation of this program is also hindered by the boredom of toddlers in consuming biscuits every day [16]. The existence of INTAKE given to all toddlers is expected to be a new supplementary food alternative to prevent boredom. The researcher's subjective assessment of the implementation of this intervention suggested that there should be a combination of several supplementary foods for children.

Conclusion

The provision of fermented milk with iron-zinc fortification (INTAKE) had a positive intake for the growth of children under 5-years-old. The intervention was feasible to be carried out in a longer period. However, considering the nutrition-related behaviors of the children, it should be considered to administer different types of supplementary food while maintaining consistent nutrition education to enhance the success of the programs. Collaboration between academicians, health offices, and industry also proposed a good impact. We declare no conflicts of interest in this study.

Acknowledgment

We would like to thank National Research and Innovation Agency, who funded this study. We would also thank all member of PHC Tempel 2, enumerators, all subjects, and their parents who willing to be involved in this research.

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