



The Effect of the Food For Baby & Kids Application on the Nutritional Status of Babies Aged 6-12 Months

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ABSTRACT

The global incidence of stunting in 2020 was 149.2 million children under the age of 5 who were stunted, 45.4 million children were underweight, 38.9 million children were overweight in the world, and in Indonesia, it was 21.6%. One of the factors causing stunting is the lack of appropriate feeding during complementary foods for breast milk due to the mother's lack of knowledge and skills regarding complementary foods for breast milk. Food For Baby & Kids (FFBK) is a web-based e-health innovation idea as complementary foods for breast milk information guide. This study aims to determine the effect of the FFBK application on the nutritional status of babies aged 6-12 months. This research method is quasi-experimental research with a one-group pretest-posttest Design. Samples were taken based on the purposive sampling technique, with as many as 15 mothers of babies aged 6-12 months. The instruments used were the FFBK application and questionnaire. The data analysis used was univariate, and bivariate analysis was used using the paired sample t-test. The research results showed significant differences in the nutritional status of babies before and after using the FFBK application. The mean dietary status before (-0.533) increased to (-0.208). The results of statistical tests using the Paired Sample t-test showed a p-value of 0.002 for nutritional status. The research conclusion is that the FFBK application influences the nutritional status of babies aged 6-12 months. It is hoped that mothers can use the FFBK application as a source of information and apply it in their daily lives.

INTRODUCTION

Ending all forms of malnutrition problems by 2030 is one of the targets of achieving the Sustainable Development Goals (SDG's). Nutrition is the basis and foundation in various aspects that contribute to the development of a nation related to the quality of Human Resources (International Food Policy Research Institute, 2016). The United Nations Children's Fund (UNICEF) together with the World Health Organization (WHO) and the World Bank Group explained that as many as 7.6 million deaths of babies and children under five years old were mostly caused by malnutrition. Globally in 2017, around 22.2% or 151 million children under five years old experienced stunting, 7.5% experienced malnutrition, 51 million and 16 million experienced malnutrition, and 5.6% or 38 million experienced obesity (JME, 2018). In 2020, globally there were 149.2 million children under the age of 5 who were stunted, 45.4 million children were underweight, and 38.9 million children were overweight (WHO, 2021).

Riskesdas data from 2018 shows that nutritional problems in Indonesia include 30.8% of children under five years experiencing stunting, 3.9% of malnutrition, 13.8% of malnutrition and 3.1% of overnutrition. The prevalence of stunting in Indonesia is 21.6% in 2022 with a target of 14% in 2024. The prevalence of nutritional problems in children under five years in D.I.Yogyakarta in 2018 experienced 21.4% stunting,

2.5% malnutrition, 13% malnutrition and 2.2% overnutrition. The highest prevalence of protein energy deficiency (PEM) in toddlers is Kulon Progo Regency at 12.33%, Yogyakarta City 8.4%, Bantul 8.04%, Gunung Kidul 7.34%, and the lowest prevalence in Sleman Regency 7.33% (Dinkes DIY, 2017).

The impact of malnutrition, apart from death and morbidity, will also cause growth and development disorders which, if not addressed early, can result in permanent damage, such as physical disabilities, mental retardation and intelligence resulting in low quality of human resources and economic productivity (Brhane & Regassa, 2014). In Indonesian children, the phenomenon of growth failure or growth faltering begins to occur at the age of 4-6 months when babies start to be given complementary breast milk and continues to worsen until the age of 18-24 months, due to giving food too early and inappropriately which causes toddlers are malnourished and if not treated become malnourished (Kemenkes RI, 2022). Other research shows that the average variation and frequency of complementary feeding is still low in Ethiopia, Zambia and India (Owino et al., 2018).

The Indonesian government's efforts to improve nutritional status are contained in the National Medium Term Development Plan for the 2015-2019 period, through a socialization program on infant and young child feeding practices to achieve targets related to providing complementary foods for breast milk in the right quantity, quality and right manner feeding time (Kemenkes RI, 2022). The reason why MP-ASI practices are still not optimal is the lack of knowledge, lack of information, and lack of family skills, especially mothers with toddlers, regarding how to care for children, including the practice of feeding children where mothers still don't know about the right time for feeding, the menu. what is good, and in what quantities to meet children's nutritional needs, as well as what food ingredients are of good quality to meet children's nutritional needs (Wang et al., 2015).

The research results (Yuliana & Mulyani, 2019), stated that the mother's level of knowledge regarding MP-ASI raises the problem of a causal relationship with inappropriate provision of MP-ASI, resulting in poor nutritional status. Efforts to improve the health and nutritional status of toddlers through improving knowledge and behavior in providing MP-ASI are an inseparable part of efforts to improve nutrition (Chao, 2018).

Nowadays, with the digitalization system and advances in the world of Information and Communication Technology (ICT), it must be utilized to create a health service system development and implement digital health applications (Marwah & Mittal, 2017). There are many initiatives related to the use of e-Health in Indonesia, both personal, mobile and web-based (websites), which are being developed. e-Health application innovations such as Dokterku, Klik Dokter, Halodoc, and other online health consultation services (Mackert et al., 2014).

Advances in the world of ICT can optimize efforts to increase knowledge in the form of information regarding nutrition education which aims to encourage positive behavioral changes related to food and

nutrition (Hermann et al., 2016). E-Health has the potential to provide greater insight and understanding regarding early feeding practices in children, children's eating behavior, and the development of internet-based public health interventions. The results of research in Norway state that the e-Health application is the right tool to convey information about healthy feeding practices to toddlers for mothers and increase fruit and vegetable intake in toddlers by more than 80% (Giglia & Binns, 2014).

A web-based e-health innovation, namely Food for Baby & Kids (FFBK), is an information guide related to complementary foods for breast milk. It is hoped that this application will be able to provide information and increase mothers' knowledge regarding giving complementary foods for breast milk to babies properly and correctly, which will have an impact on improving the nutritional status of babies aged 6-12 months. This research aims to determine the effect of the Food for Babies & Kids (FFBK) application on the nutritional status of babies aged 6-12 months.

METHOD

This research is quasi-experimental with a one-group pretest-posttest Design. The study was conducted in February 2020, and the population was mothers with babies aged 6-12 months. The sampling technique is purposive sampling. The sample in this study was mothers who had babies aged 6-12 months and settled in the Donomulyo Village area, Kulon Progo Regency. The sample size was 15 respondents. The instruments used were the FFBK application and questionnaire. The ethical test was carried out by the Health Research Ethics Committee of 'Aisyiyah University of Yogyakarta with ethical clearance number No.1453/KEP-UNISA/II/2020. The data collection method was carried out by observing periodically for 4 weeks. Each respondent is required to open the application at least once a day and post a menu of complementary foods for breast milk consumed by the baby on the FFBK Application to assess compliance with the intervention. The data analysis used was univariate, and the bivariate analysis was done using the paired sample t-test.

RESULT

The characteristics of research respondents are described in the form of a frequency distribution.

1. Characteristics of Respondents and Subjects

Based on the results of research from 15 respondents and subjects, the following data on the characteristics of respondents and subjects were obtained:

Table 1. Characteristics of Respondents and Subjects in Donomulyo Village, Kulon Progo

Variable	Total (n)	Percentage (%)
Characteristics of Respondents		
Age		
≤25 years	4	26,7
>25 years	11	73,3
Education		
Low education (never attended school, elementary or middle school)	5	33,3
Higher Education (High School, Diploma, Bachelor, Masters or Ph.D.)	10	66,7
Socioeconomic		
High income, IDR 2,500,000.00 – IDR 3,500,000.00 per month	5	33,3
Low income, ≤ IDR 1,500,000.00 per month	10	66,7
Characteristics of Subjects		
Gender		
Female	9	60
Male	6	40
Infectious Diseases		
Yes	0	
No	15	100

The results of the univariate analysis showed that most respondents' characteristics were 11 people (73.3%) aged > 25 years, 10 people had higher education (66.7%), 10 people had an income of ≤ IDR 1,500,000.00 per month (66, 7%), many subjects were female, nine people (60%), 15 people (100%) did not have infectious diseases.

2. Nutritional Status Before and After Using the FFBK Application

Based on research results from 15 respondents, nutritional status data was obtained before and after using the FFBK application, as follows:

Table 2. Nutritional Status Z-score Weight/Age Before and After Using the FFBK Application in Donomulyo Village, Kulon Progo

Responden	Nutritional Status Z-score Weight/Age	
	Pre	Post
1	-1,2	-0,5
2	-2,11	-1,4
3	-2	-1,56
4	1,91	1,36
5	0,09	0,36
6	0,5	0,9
7	-0,13	-0,22
8	0,2	0,45
9	-1,89	-1,33
10	-1,38	-1
11	0,67	0,8
12	0,11	0,6
13	-2,44	-1,7
14	-0,44	-0,22
15	0,11	0,33

Table 2 explains the continuous data on the nutritional status (Z-score) of Weight/Age of respondents' babies before and after using the FFBK application. Most of the nutritional status (Z-score) of Weight/Age is in the good nutritional status category with a nutritional threshold (Z-score) of -2 Elementary schools up to 2 elementary schools.

3. Differential Test of the Effect of the FFBK Application on Nutritional Status

The normality test in this research aims to prove that the data is normally distributed and suitable for continuing analysis. This research used a group Pretest-Posttest Design, so the normality test was carried out using the difference in nutritional status before (pre) and after (post) using the FFBK application. The normality test used the Shapiro-Wilk test because the number of respondents was <50. The results of the normality test obtained a p-value for nutritional status of 0.120, and this shows that the data is normally distributed.

The different tests in this study aim to determine the effect of the FFBK application on nutritional status; because the data is normally distributed, the researchers used a different test with the Paired Sample t-test.

Table 3. Different Paired Sample t-Test of Nutritional Status Before and After being Given the FFBK Application in Donomulyo Village, Kulon Progo

Variable	Mean	Std. Deviation	Deviation	p-value
Pre	-0,533	1,244	-0,324	0,002
Post	-0,208	0,994		

The results of the analysis using the Paired Sample t-test showed that the p-value for nutritional status was 0.002. This indicates that the FFBK application influences nutritional status.

DISCUSSION

1. Characteristics of Respondents and Subjects

Respondent Characteristics

a. Age

The majority of respondents in this study were >25 years old, namely 11 people (73.3%). Age is the level of development that is used as a benchmark for an individual's activities and as a reference for physiological function (Notoatmodjo, 2016). The older you are, the more mature a person's level of maturity and strength will be in thinking and working (Wawan & Dewi, 2019). The results of this research are in line with Hanum's research where the majority of respondents (71.1%) were mothers in the age range of 26-35 years (Hanum, 2019). It is hoped that with the large number of mature mothers in this study, mothers will have the ability to understand, think patterns and maturity in behaving and carrying out their parenting roles, especially good nutritional parenting, so that it will also have a good impact on the nutritional status of babies aged 6-12 months.

b. Education

The majority of respondents' educational levels in this study were highly educated, namely 10 people (66.7%). Higher education usually makes it easier for mothers to experience behavioral changes in maintaining health. However, one of the experiences is that knowledge about giving complementary foods for breast milk is influenced by the mother's formal education, which influences changes in health attitudes

to care more about vitamins for children and families (Hanum, 2019). Education has a close relationship with mothers' knowledge regarding nutritional parenting. Lack of knowledge and ability to apply good nutritional parenting patterns in daily life is one of the causes of malnutrition disorders (Handayani, 2017). The large number of highly educated mothers in this study will be able to absorb information related to nutritious food and nutritional parenting patterns in the FFBK application well and be able to apply and implement their knowledge in everyday life. Mothers who know nutritious food tend to have children with good nutritional status. The mother's level of nutritional expertise will influence the child's care attitude, and caring for food choices can be interpreted as a good dietary parenting pattern.

c. Socio-economic

The majority of the socio-economic conditions of respondents in this study were low income, $\leq$ IDR 1,500,000.00 per month, namely 10 people (66.7%). Low family income results in an inability to meet nutritional food needs, resulting in malnutrition, which, if not addressed, can have a negative impact on children's growth (Kumalasari et al., 2015). Adequate family income will support children's growth and development, because parents can meet their needs for nutritious food (Handayani, 2017). However, to meet the needs of children for nutritious food does not necessarily require expensive costs, parents can use food that comes from the area where we live or more often we hear about local food, which is relatively much cheaper and can be purchased. accessible to all groups.

Subject Characteristics

a. Gender

The majority of subjects in this study were female, namely nine people (60%). The nutrients needed by male toddlers are different from those required by female toddlers due to differences in the tissue found in the body and the types of activities carried out (Azizah, 2014). Differences in gender and age in toddlers will affect the value of nutritional status. However, with the standard growth calculations in the FFBK application, namely, Weight/Age, Length/Age, and Weight/Length based on age and gender in accordance with anthropometric standards, it is hoped that nutritional status assessment in children. The difference between gender and age of toddlers does not have much influence on the results of this study.

b. Infectious Diseases

The condition of the subjects in this study was not moderate or had infectious diseases as many as 15 people (100%). Communicable diseases are a direct cause that affects infant nutrition. The role of parents is significant in preventing the occurrence of infectious diseases such as diarrhea and upper respiratory tract infections. Contagious diseases can disrupt linear growth by first affecting the nutritional status of children under five. This occurs because infectious diseases can reduce food intake, disturb the absorption of nutrients, cause direct loss of nutrients, and increase metabolic needs (Noorhasanah et al., 2020).

Good nutrition will produce quality human resources, namely healthy, intelligent, physically strong, and productive. Improving nutrition is needed throughout the life cycle, starting from pregnancy, babies, children, toddlers, elementary school children, teenagers, adults, and old age (Marmi, 2016). The age of 0-24 months is a period of rapid growth and development, so it is often termed the golden period as well as the critical period. The golden period can be realized if, during this period, babies and children receive appropriate nutritional intake for optimal growth and development (Widiastuti et al., 2020).

2. Nutritional Status (Z-score) Weight/Age of Babies Aged 6-12 Months Before and After Using the FFBK Application

Based on the research results outlined in Tables 2 and 3, we can see that from continuous data on the nutritional status (Z-score) of the baby's Weight/Age before and after using the FFBK application, the average dietary status (Z-score) of the baby's Weight/Age was obtained before using the application. The FFBK was -0.533, and after using the FFBK application, the average nutritional status (Z-score) of the baby's weight/age increased to -0.208. So, it can be concluded that there was a significant increase in the nutritional status (Z-score) of Weight/Age of babies aged 6-12 months after respondents used the FFBK application. The average result (Z-score) of the baby's nutritional status before respondents used the FFBK application was -0.533, indicating that the nutritional status category of the respondents was good nutrition.

After 1 month of using the FFBK application, the average (Z-score) Weight/Age of the baby's nutritional status increased to -0.208, indicating that the nutritional status category of the respondents remained well-nourished. However, there was a significant increase (Z-score) in Weight/Age, namely (-0.324) after using the application. The results of this research are in accordance with the research results (Helle et al., 2019) that e-health applications have the potential to provide greater insight and understanding regarding the development of internet-based health (nutritional status) interventions. Other research also states that e-health is a strategy that can be a guide for parents in optimizing children's nutritional intake (Campbell et al., 2016).

The results of research in China state that e-Health is a digitalization system from advances in the world of information and communication technology that can monitor and evaluate compliance with the implementation of additional nutritional intake programs for children (Ying Yang Bao) remotely (Wu et al., 2017). Other research also states that e-Health can optimize efforts to increase knowledge in the form of information regarding nutrition education which aims to encourage positive behavioral changes related to food and improve nutritional status (Hermann et al., 2016).

The use of e-health technology offers innovative opportunities to strengthen community-based growth monitoring and make it more effective in tackling child malnutrition (Barnett et al., 2016). In terms of regulations, the Indonesian government has issued rules by establishing Minister of Health Regulation

Number 25 of 2014 concerning Child Health Efforts, which explains that one of the health services for babies, toddlers, and preschool children must be monitoring growth (nutritional status) including weighing every month, measuring height every 3 months, and head circumference measurements according to schedule at essential health services. This growth monitoring process is often only used as a routine for mothers, cadres, and health workers, and there is no nutritional education or understanding regarding nutritional status that can support optimal child growth in mothers. Apart from that, it is often found that the recording of growth data in the Maternal and Child Health book is incomplete, so the mother does not have complete knowledge regarding the child's growth.

The FFBK application used in this research is a website-based application that can be accessed via a laptop, smartphone, or tablet. This application has a menu called Child Health Profile; the menu makes it easy for respondents to find out and monitor the baby's nutritional status by entering the baby's age, gender, weight, and body length. It will automatically display the nutritional status based on anthropometric standards for assessing nutritional status Weight/Age, Length/Age, and Weight/Length according to the baby's age and gender so that the mother can provide the proper nutritional intake to the baby and can improve the baby's nutritional status, which is poor, deficient or excessive. This significant increase in nutritional status was due to increased insight and understanding of respondents regarding nutritional status and providing appropriate nutritional intake to babies.

The research was conducted for only 4 weeks according to the nutritional status indicator theory (Z-score) Weight/Age which states that weight is a parameter that provides an overview of body mass which is very sensitive to changes, such as the provision of interventions that change behavior in fulfilling nutrition so that the impact of The provision of intervention can be seen within a minimum period of 4 weeks (Atmojo et al., 2020).

3. Effect of the Food For Baby & Kids (FFBK) Application on Nutritional Status

The results of the analysis using the Paired Sample t -Test, as outlined in Table 3, show that the p-value of nutritional status is 0.002 ($p < \alpha = 0.05$), which means that the FFBK application has a significant effect on the nutritional status of respondents in Donomulyo Village, Kulon Progo. The results of this study are in accordance with research (Røed et al., 2019), where this study provides evidence of the effectiveness of an e-health intervention targeted at improving children's nutritional status and improving parents' eating habits for children in Brazil. Other research results also state that e-Health is an effective method or strategy for providing counseling regarding infant feeding practices in order to reduce the incidence of anemia and stunting in infants and improve the nutritional status of infants in China (Zhang et al., 2016).

E-health is a tool that can be used as a guide for parents in providing food to children with the aim of developing eating habits, developing tastes for types of food, developing the ability to choose food for health, and educating behavior to eat well and correctly according to each culture so that the child's

nutritional status is good (Castro et al., 2017). E-health is an effective and efficient health service method used as a means of information for patients and health workers in monitoring, evaluating, consulting, and interacting without having to meet face to face (Guerra-Reyes et al., 2016). Currently, in Indonesia, many initiatives related to the use of e-health, both personal, mobile, and web-based, are being developed. Web-based applications tend to be easier and faster to develop, very easy to access, use a programming language that is run and carried out on one server only, and have the convenience of distributing information to users where it is enough to provide updates on the server. Each user will get information is provided right away and anywhere, and is very flexible, where you can adjust the appearance and performance on the device used, such as a laptop, smartphone, tablet, or computer (Nakamura et al., 2017). Some of the main benefits of using e-Health in the health sector include education, remote data collection, remote monitoring, training and communication for health workers, tracking cases and outbreaks, and supporting diagnosis and treatment. The broad reach and capabilities of web-based e-health enable researchers in the health field to use it to develop and deliver interactive and comprehensive health programs so that correct patient health behavior can be achieved and also reduce unwanted symptoms (Castro et al., 2017).

The significant influence of the FFBK application on nutritional status is because respondents use the FFBK application optimally and implement the knowledge gained in daily life by increasing insight, understanding, and awareness of the importance of providing complementary foods for breast milk appropriately and also encouraging monitoring of nutritional status in children positive behavioral changes occur in mothers so that they care more about their children's health and dietary conditions.

CONCLUSION

Based on the research results, it can be concluded that there is a significant increase in the average nutritional status (Z-score) of Weight/Age in babies aged 6-12 months before and after using the FFBK application. The FFBK application has a significant influence on the nutritional status of babies aged 6-12 months.

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