





Increasing Mothers' Knowledge of Infant and Young Child Feeding through Booklets in Banggai Regency, Central Sulawesi Province, Indonesia

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Abstract

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BACKGROUND: Stunting is caused in part by feeding behavior in infants and young children. Knowledge is the most important factor in shaping one's attitude and behavior, particularly when it comes to infants and young children feeding.

AIM: This study aims to find out how the mothers' knowledge of infant and child feeding could be increased through booklets in Banggai Regency, Central Sulawesi Province, Indonesia.

METHODS: This study is a quasi-experimental non-randomized study with pre- and post-test only control design. Study was conducted in Jayabakti Village, Banggai Regency. Sample consisted of 40 mothers of children under five collected with purposive sampling method from October to December 2020. At the local Integrated Health Service Post, booklets were distributed once a month as part of the study intervention. Over the duration of the 3-month study period, booklets were distributed 3 times. The used booklets were the modified version of the WHO-developed *Infant and Young Child Feeding (IYCF) Counseling: An Integrated Course*. The mean difference was to compare the results of the pre- and post-tests on knowledge of IYCF. The hypothesis test was applied with a 95% confidence level of 0.05.

RESULTS: The respondents with ages ranging between 15 and 20 were 42.5%. Mothers graduated from senior high schools were 45%. Mothers that had three children were 55.0%. Family income was 586,000 rupiahs in average. After the booklets distribution for 3 months, there was an increase in the mothers' knowledge regarding IYCF. The older the mother's age, the better her knowledge ($p = 0.015$). Factors of children's age and mother's education did not have a significant effect.

CONCLUSION: Mother's knowledge regarding IYCF at Banggai Regency Central of Sulawesi is generally good. After using the booklets, their knowledge has increased. With time, the mother's knowledge expands. Formal education has no significant effect on infants and young children nutrition knowledge.

Introduction

Stunting, defined as height measurements below minus two standard deviations of the World Health Organization (WHO) growth reference median, reflects chronic exposure to a deficient environment and undernutrition [1]. Stunting in children under 5 years could lead to impaired physical development and have a long-term effect on cognitive development, educational performance and economic productivity in adulthood and on maternal reproductive outcomes. This linear growth deficit continues to deteriorate till the age of five due to sustained exposure to unpleasant environmentally modifiable factors related to feeding, infections, and psychosocial care. The continued decline in linear growth observed in the first 5 years of life may cause severe irreversible physical and neurocognitive damage that accompanies stunted growth and pose a major threat to human development [2]. In certain communities within countries, wasting can be 9 times higher in children

under the age of five, stunting 4 times higher, and overweight and obesity 3 times higher in children under the age of five. There is a clear link between infant and young child feeding (IYCF) habits and household factors. Breastfeeding is less common for children in wealthier households, urban areas, or with a more educated mother up to the age of 1 or 2 years. For children in the poorest households, however, rates of solid food introduction and minimum diet diversity are significantly lower [3]. A dynamic interplay of infant, maternal, household, environmental, and socioeconomic factors affecting nutritional intake influences optimal growth and development in early childhood [4]. Study showed that stunting prevalence has positive associations to mother with ≥ 2 children [5], family size [6], and living in medium and large family size [7], and multiple births [8]. At the household level, children from families with two or more children under the age of five were found to have a higher risk of stunting [9].

Globally, 20.5 millions of newborns (14.6%) have a low birth weight, with levels of progress well

below those required to achieve the 2025 target. Stunting still affects 149.0 millions (21.9%) of children under 5 years of age, and wasting affects 49.5 millions (7.3%) of children under 5 years of age; progress is far too slow to achieve any of those targets. Notably, Asia is home to more than half of the world's stunted children (81.7 million, 54.8%). We are also off course to meet the target for overweight in children, with 40.1 million (5.9%) children under 5 years of age being overweight [3]. The prevalence of child stunting in Indonesia has remained high over the past decade, and at the national level is approximately 37% [10].

Banggai District in Central Sulawesi Province is known to be one of the areas in the list of 100 priority districts/cities that must be intervened to overcome stunted children or stunting in 2018. Nevertheless, stunting cases are found throughout Central Sulawesi. The prevalence of infants under 5 years of age (toddlers) experiencing stunting due to malnutrition in Central Sulawesi until 2017 is still 30%. Jayabakti Village is the most populous village in Central Sulawesi with a population of around 6000 people/km², located in the Pagimana archipelago, Banggai Regency. Data for 2019 show that from the ten villages monitored, the Banggai District Health Office recorded 128 children under five who experienced stunting from all villages. Jayabakti Village has the highest prevalence of stunting, namely 53 people (41.4%). The Stewart Framework suggests IYCF are a direct factor in the causes of stunting [11]. Knowledge is the main aspect in attitude and behavior, especially in terms of IYCF. Prevention of stunting can be achieved with better knowledge of IYCF. Foods from animals are special foods for children. These foods should be eaten every day or as often as possible. To give more energy foods, families can give some extra foods between meals. These extra foods are often called snacks but should not be confused with sweets [12]. A child needs time to get accustomed to the new taste and texture of complementary foods. Give as much as the child will eat with active encouragement. A child needs to learn the skill of eating. Encourage families to start with 2–3 small spoonfuls of food twice a day [12].

Booklet distribution is one of the various educational methods that are usually used and can be applied to a special group, for example, couples of reproductive age. Providing information through writing is a common practice among couples of childbearing age, as is the case with the booklet method. This method utilizes the sense of sight by optimally reading pictorial writing [13]. The most effective media are booklets [14]. Other studies have also shown that the use of booklet in an effort to reduce the prevalence of stunting has been proven effective [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25]. In this case, parents are one of the factors that can control early stunting prevention.

This study aims to find out whether the mothers knowledge of infants and young children feeding could

be increased through booklets at Banggai Regency of Central of Sulawesi Province.

Methods

This study is a quasi-experimental non-randomized study with pre- and post-test only control design. The population of this study was the mothers who had children under 5 years of age residing in Jayabakti Village, Pagimana District, Banggai Regency. Study samples consisted of 40 mothers who were selected accidentally. The study was carried out for 3 months from October to December 2020. The protocol of this study had been approved by the Ethical Committee of Palu Health Polytechnic Ministry of Health (No. LB.01.01/KE/0019/VI/2020).

The intervention included providing booklets once in a month at the local Integrated Health Service Post. Booklets were distributed 3 times within the span of 3 months of the study period. The booklet used is a modified booklet from the IYCF Counseling: An Integrated Course that has been developed by the WHO [12]. Before distributing the booklets, the initial data were collected, and 3 month later the final data were collected again [13]. This method was applied to see the effect of booklet on mothers' knowledge of IYCF for preventing stunting in Central Sulawesi [21].

The mean difference was due to test the differences in pre-test and post-test results of mothers' knowledge regarding their infants and young children feeding using the paired t test. Statistical analysis for the relationship between characteristics of respondents and mothers' knowledge regarding IYCF used the Chi-square test. Hypothesis test was carried out with 95% confidence level $\alpha = 0.05$ using SPSS [21].

Results

Table 1 shows that respondents aged 15–20 years dominate the study sample (42.5%), while respondents aged 36–40 years represent only 5% of the total samples. The similar figure is observed for children's age. Children aged 1 year represent 62.5% and those aged 5 years represent only 2.5%. In general, majority of the mothers have completed high school (45%) and 5.0% of them have graduated from university. On average, each family has three children (55.0%). However, no family has only one child. The maximum number of children is 5. In general, the respondents' family income is <586,000 rupiah. There are only two families of the respondents who have an income of more than Rp. 586,000.

Table 1: Characteristics of respondents

Characteristic	n	%
Mother age (years)		
15–20	17	42.5
21–25	12	30.0
26–30	2	5.0
31–35	7	17.5
36–40	2	5.0
Child age (years)		
1	25	62.5
2	4	10.0
3	8	20.0
4	2	5.0
5	1	2.5
Mother education		
Elementary of School	10	25.0
Junior High School	10	25.0
Senior High School	18	45.0
Graduate	2	5.0
Number of children in family		
2	7	17.5
3	22	55.0
4	3	7.5
5	8	20.0
Income family in rupiah		
<586,000	38	95.0
≥586,000	2	5.0

Source: Primary Data, 2020

Table 2 shows that the mothers' knowledge of their infants and young children feeding before the intervention has a mean value of 8.88 points. After the distribution of booklet for three months, there was an increase in knowledge of 7.97 points.

Table 2: Comparison of mother knowledge of infant and young child feeding before and after booklets intervention

Statistic value	Before	After	p-value
N	40	40	0.000
Mean	8.88	16.85	
Mean difference (lower-upper)	8.87 (8.53–9.22)	16.85 (16.56–17.14)	

Source: Primary Data, 2020

Table 3 show that the respondents' knowledge regarding feeding is adjusted to the age and nutritional needs of the child. Children aged 1–3 years need

Table 3: Mothers' knowledge of infants and young children feeding after booklets intervention

S. No	Knowledge about infant and young child Feeding after Booklet Intervention	n	%
1	Feeding is adjusted to the age and nutritional needs of the child	40	100
2	Nutrients consist of carbohydrates, protein, fat, vitamins, mineral, and water	39	97.5
3	The body gets energy from types of nutrients, namely, carbohydrates, proteins and fats	39	97.5
4	Food materials that do not contain a lot of carbohydrates are agars and jelly	25	62.5
5	Children aged 1–3 years need 1000 kcal of calories/day	40	100
6	Nutritious and balanced food consisting of staple foods, side dishes, fruit, milk, and vitamins	40	100
7	Protein functions to replace damaged body tissue cells	40	100
8	Substances that can dissolve Vitamins A, D, E, and K are fat	40	100
9	Vegetables and fruits are sources of vitamins and minerals	36	90
10	Food ingredients that contain lots of carotene/pro vitamin A are papaya, pumpkin, and broccoli	36	90
11	Omega-3 essential fatty acids that are good for brain development in children are found in fish oil, nuts, and Vitamin B complex	39	97.5
12	Ideal body weight for 1-year-old children is 8 kg	40	100
13	Milk should be given to children under five twice a day	40	100
14	Boiling vegetables for too long will cause the loss of Vitamin B and Vitamin C	40	100
15	Yellow, red vegetables, and fruits contain lots of carotene	38	95
16	One way that can be attempted to reduce the loss of water-soluble vitamins during the food processing is to cook the ingredients intact and then sliced just before serving	39	97.5
17	Lack of Vitamin D in children can cause bone and tooth loss	7	17.5
18	Sources of iron can be found in the following food ingredients: Eggs, liver, and meat	40	100
19	Phosphorus is a mineral that plays a very important role in the growth of bones and teeth	7	17.5
20	Lack of protein in children for a long time will cause Marasmus disease	9	22.5

Source: Primary Data, 2020

1000 kcal of calories/day, nutritious and balanced food consisting of staple foods, side dishes, fruit, milk, and vitamins. Proteins play a role in replacing damaged body tissue cells. Substances that can dissolve Vitamins A, D, E, and K are fat. Ideal body weight for 1-year-old children is 8 kg. Milk should be given to children under five at least twice a day. Cooking vegetables for too long will cause the loss of Vitamin B and Vitamin C (respondent responses were very good or 100% true). Iron can be found in the following food ingredients: Eggs, liver, and meat. And then about nutrients consist of carbohydrates, protein, fat, vitamins, mineral, and water, the body gets energy from types of nutrients, namely, carbohydrates, proteins, and fats Omega-3 essential fatty acids that are good for brain development in children are found in fish oil, nuts, and Vitamin B complex. One way that can be attempted to reduce the loss of water-soluble vitamins during the food processing is to cook the ingredients intact and then sliced just before serving (respondent responses were 90–97.5% true). Yellow, red vegetables, and fruits contain lots of carotene. Vegetables and fruits are sources of vitamins and minerals. Food ingredients that contain lots of carotene/pro Vitamin A are papaya, pumpkin, and broccoli. However, food materials that do not contain a lot of carbohydrates are agar and jelly, lack of protein in children for a long time will cause Marasmus disease. Lack of Vitamin D in children can cause bone and tooth loss. Phosphorus is a mineral that plays a very important role in the growth of bones and teeth (respondent responses were 17.5%–62.5% true).

The respondent's knowledge about feeding is adjusted to the age and nutritional needs of the child. Children aged 1–3 years need 1000 kcal of calories/day. Milk should be given to children under five in 2 a day. Boiling vegetables for too long will cause the loss of Vitamin B and Vitamin C (respondent responses were very good or 100% true). Omega-3 essential fatty acids that are good for brain development in children are found in fish oil, nuts, and Vitamin B complex. One way that can be done to reduce the loss of water-soluble vitamins during the food processing is to cook the food materials intact and then sliced just before serving (respondent responses were 90–97.5% true). Lack of protein in children for a long time will cause Marasmus disease. Lack of Vitamin D in children can cause bone and tooth loss. Phosphorus is a mineral that plays an important role (respondent responses were 17.5–62.5% true).

After the intervention of giving the booklet for 3 months, there was an increase in the knowledge of the mother regarding IYCF. Mother's character which has a significant effect on knowledge is the mother's age factor. The higher the mother's age, the better her knowledge regarding infant and child feeding $p = 0.015 < 0.05$. Factors of children's age, mother's education, number of family members, and household income did

not have a significant effect on mother's knowledge of IYCF in Banggai, Central Sulawesi (Table 4).

Discussion

Child stunting reduction is the first of six goals in the global nutrition targets for 2025 and a key indicator in the second sustainable development goal of zero hunger [10]. Nutrition education is a component of health education programs, which are defined as a planned initiative in the health sector to improve the actions of people, households, organizations, and communities [26], [27].

The communication strategy contains the basic principles of prioritizing practical steps in its activities. This activity can be carried out through various media according to the existing situation and conditions. Effective activities will produce results, namely, the addition of knowledge and changes in behavior to the target. The use of booklets can increase attention, improve memory/retention of a message/information and to explain facts, procedures, and actions/skills. Retention is the process of remembering and forgetting something, to reach an area that is remembered so that it is sufficient, and then the material with a media book must be read over and over again in a not too long period of time [28].

In the current study, the characteristics of study respondents were focused on maternal age, maternal qualifications, the number of children in the family and household income per month in rupiah units. Respondents between the ages of 15 and 20 represent 42.5% of the sample, while those between the ages of 36 and 40 represent only 5%. Children as young as 1 year old represent 62.5% of the total, while children as young as 5 years old represent only 2.5% of the total. In general, mothers completed a formal study level (45%), with 5.0% of them graduated from university. Each family has three children on average (55.0%). No family, however, has just one child. The highest children number in one family is five. The respondent's family income is 586,000 rupiah on average. After the intervention of giving the booklet for 3 months, there was an increase in the knowledge of the mother regarding IYCF. The higher the mother's age, the better her knowledge. Factors of children's age and mother's education did not have a significant effect.

Booklet can have an instant effect so that one's knowledge can increase. In addition, factors that can affect a person's level of knowledge are education, age, culture, and economy. Education can affect the learning process so that the higher education a person gets, the easier it will be for that person to get information. Senior High School is the highest level of education for this study respondents. This period is the first step in determining

a person to choose and determine his life in the future. Age can affect a person's knowledge because the older the person, the more his perceptive power and mindset will develop, so that the knowledge he gets is getting better. On average, this study subjects were dominated by mothers aged 15–20 years where this period was a period of great curiosity so that it made the mother find out and it would have an impact on her knowledge using a trial and error system. The older a person is, the more mature a person will be to make good decisions in thinking and working. This is a collaboration resulting from experience and mental maturity so as to expand one's knowledge. Tradition (culture) affects knowledge because someone who has a good culture will have good knowledge, but if the social culture is not good then his knowledge will be less good. Family income affects the level of knowledge [20].

Early marriage among girls is a risk factor for early childhood growth and stunting. Study by Efevbera *et al.* shows that the odds of being off-track for development and being stunted are 25% and 29% higher, respectively, for children born to women who married before age 18 compared to those whose mothers married later. Geographic location and primary education, which were conceptualized as contextual factors, explained most of this relationship. Disparities in advanced maternal education and wealth explained child development and stunting, authors say. They conclude that there are intergenerational consequences of girl child marriage on her child's well-being. Study by Pangaribuan *et al.* show that there was a link between early marriage and underage pregnancy and childhood stunting. The study found that babies of early marriage parents were more vulnerable to growth and developmental disability. The study recommended that the adolescent health-care program and integrated child care surveillance be established to minimize the risk of occurrence [29], [30]. The reduction in infant stunting is still very limited to women and children under 2 years of age. The form of education provided to society needs to be more persuasive to increase action to solve practical problems and improve their health.

The respondent's knowledge about feeding is adjusted to the age and nutritional needs of the child. Children aged 1–3 years need 1000 kcal of calories/day. Milk should be given to children under five in 2 a day. Boiling vegetables for too long will cause the loss of Vitamin B and Vitamin C (respondent responses were very good or 100% true). Omega-3 essential fatty acids that are good for brain development in children are found in fish oil, nuts, and Vitamin B complex. One way that can be done to reduce the loss of water-soluble vitamins during the food processing is to cook the food materials intact and then sliced just before serving (respondent responses were 90–97.5% true). Lack of protein in children for a long time will cause Marasmus disease. Lack of Vitamin D in children can cause bone and tooth loss. Phosphorus is a mineral

that plays an important role (respondent responses were 17.5%–62.5% true).

Fishermen communities rely on their fish catches and have not utilized the coastal area to carry out other economic activities, so that fishing communities belong to groups of people who are left behind economically, socially, and culturally. In fishing families early marriages are often encountered. The findings of this study show that there were 42.5% of 15–20 years old mothers; this means that mothers who married at an early age in Jayabakti village were quite high. At an early age their knowledge is still very minimal. This study also shows that the good knowledge of mothers is those who have completed university education, although general high school and junior high school education also have good knowledge with a smaller percentage (100% vs. 70%).

Number of children in family, the socio-economic conditions and nutritional status of parents are the strongest factors correlated with anthropometric failure of children, according more than half of the respondents who have more than three children. The health and well-being of productive mothers in the household needs an understanding of their parental practices and nutritional status. As a consequence, education is required to modify actions to increase maternal and child welfare [5], [6], [7], [31]. Poverty alleviation, women's empowerment, and household feeding services can all be effective methods for reducing childhood malnutrition [32]. Improving modern contraceptive methods utilization to reduce family size is recommended [7]. A study by Utami *et al.* (2020) showed a significant correlation between family characteristics and nutritional parenting with the occurrence of stunting in children under five in South Jakarta.

Table 4: The relationship between characteristics of respondents and mothers' knowledge regarding infant and young child feeding

Characteristic	Booklet				p-value
	Good		Not good		
	n	%	n	%	
Mother age (years)					0.015*
15–20	15	88.2	2	11.8	
21–25	5	41.7	7	58.3	
26–30	1	50.0	1	50.0	
31–35	7	100.0	0	0	
36–40	2	100.0	0	0	
Child age (years)					0.395
1	21	84.0	4	16.0	
2	2	50.0	2	50.0	
3	5	62.5	3	37.5	
4	1	50.0	1	50.0	
5	1	100	0	0	
Mother education					0.799
Elementary of School	7	70.0	3	30.0	
Junior High School	7	70.0	3	30.0	
Senior High School	14	77.8	4	22.2	
Graduate	2	100	0	0	
Number of children in family					0.605
2	4	57.1	3	42.9	
3	18	81.8	4	18.2	
4	2	66.7	1	33.3	
5	6	75.0	2	25.0	
Income family in rupiah					0.402
<586,000	29	76.3	9	23.7	
≥586,000	1	50.0	1	50.0	

Source: Primary Data, 2020

Study by Utami *et al.* (2020) also showed that families whose incomes were below the regional minimum wage had a 6.625 times greater chance of observing stunting in children under five compared to families whose incomes were above the regional minimum wage with Wald value of 28.148. Socioeconomic factors, especially household income, are the factors that are most responsible for influencing the incidence of stunting in children under five. Multisector and integrated programs are needed to increase household income, knowledge, and family skills to reduce the incidence of stunting in children under two.

Since the younger the age of marriage means the more time to produce, early marriage has an effect on maternal health and the health of the baby later. Stunting has the potential to cause cognitive disorders, motor disorders, body growth problems, increased morbidity, and death in children. Several Indonesian studies have looked into health education, especially nutrition before pregnancy the level of awareness can be influenced by one's proximity to information sources. Information gathered from print media, social media, and health professionals, for example, has an effect on one's awareness. Someone who has access to a number of sources of information would have a greater idea of how to stop stunting [33], [34], [35], [36], [37], [38], [39]. The influence of mother's knowledge about exclusive breastfeeding shows that the influence of mother's knowledge increases through the presentation of interactive lectures using booklet media, while interactive lectures without book media show that maternal knowledge varies.

The role of the media in health promotion is critical, since the message conveyed by the media would be more interesting and understandable. According to Dale's, 20% of knowledge is remembered solely by listening. However, in this research, the experimental community received booklet, ensuring that the information was conveyed effectively [21].

Formal education is not a determinant of knowledge related to infant and child feeding. Increasing knowledge through booklets is an option for fishing community groups who are far from the city center. Counseling is an integral aspect of feeding a IYCF successfully. Improving child survival and fostering safe growth and development needs optimal IYCF [40]. Knowledge regarding long-term protein deficiency in children that can lead to Marasmus disease, the benefits of Vitamin D and Phosphorus for healthy bones and teeth still need to be well socialized using booklets.

Conclusion

Mother's knowledge regarding IYCF at Banggai Regency Central of Sulawesi is generally

good. Knowledge increases after booklets intervention. The mother's experience grows with age. Formal education is not a determinant of knowledge related to infant and child feeding. For fishing community groups based outside of the city center, growing awareness by booklets is an alternative. Long-term protein deficiency in infants, which can lead to Marasmus disease, is well-known. The value of Vitamin D and phosphorus for solid bones and teeth is also underappreciated.

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