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Use of Moringa Leaves to Meet Toddler Nutrition in The Prevention of Stunting

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Abstract: In 2017, 43.2% of children under five in Indonesia had an energy deficit and 28.5% had a mild deficit. For protein adequacy, 31.9% of toddlers experienced a protein deficit and 14.5% experienced a mild deficit. The high prevalence of stunting is a priority that must be resolved with local food sources that are abundant and high in nutritional content, namely moringa leaves. Moringa leaves have high nutritional content and are easily available in the surrounding environment, but are still very diverse in their utilization. The purpose of this study was to determine the factors associated with the utilization of moringa leaves by mothers of toddlers in preventing stunting in Sumber Rejo Village. This study is a quantitative study with a Cross Sectional design with a population and sample size of 120 respondents with total sampling technique and univariate and bivariate analysis tests using Chi Square. Respondents who had insufficient knowledge were 13.3%, respondents who had a negative attitude were 43.3%, respondents who did not have moringa availability were 23.3% and respondents who had a moringa consumption pattern were 11.7% and respondents who did not utilize moringa leaves were 40%. There is a relationship between knowledge (p-value 0.039), attitude (p-value 0.000), moringa availability (p-value 0.034) and moringa consumption patterns (p-value 0.000) with the utilization of moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village. It is hoped that health workers will conduct education or counseling for mothers of toddlers to increase the knowledge of mothers of toddlers about the use of moringa and it is hoped that mothers will improve moringa consumption patterns for toddlers and families with various variations of moringa preparations in order to increase the utilization of moringa as food intake for stunting prevention.

Keywords: Knowledge; attitude; Moringa availability; consumption pattern; Moringa utilization

Introduction

The World Health Organization (WHO) endorsed a comprehensive implementation plan on maternal, infant and young child nutrition that sets 6 global nutrition targets for 2025, one of which is a 40% reduction in the number of stunted children under five (WHO, 2014). By 2020, more than 45 million children in the world are acutely malnourished and as many as 149 million children are stunted. These conditions pose life-threatening risks that make them vulnerable to death, developmental delays, and disease (WHO, 2022).

Based on data from the Indonesian Nutrition Status Study (Segi) in 2021, stunting has the highest prevalence compared to other nutritional problems in Indonesia such as underweight and wasted. The prevalence of stunting in Indonesia was 24.4%, the prevalence of underweight was 17.0%, and the prevalence of wasted was 7.1%. Lampung Province is currently one of the provinces with acute nutrition problems (stunting <20% and wasted >5%). The prevalence of stunting in Lampung Province in 2021 was 18.5% (Segi, 2021).

West Tulang Bawang is one of the districts located in Lampung Province. Based on data (SSGI, 2021), the

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prevalence of stunting in West Tulang Bawang district in 2021 based on SSGI data is 22.7%. This shows that the prevalence of stunting in West Tulang Bawang Regency is higher than the prevalence of stunting in Lampung Province.

Stunting is a growth and development disorder experienced by children due to poor nutrition, repeated infections, and inadequate psychosocial stimulation. Children are said to be stunted if their height-for-age is more than 2 standard deviations (SD) below the WHO Child Growth Standards median (WHO, 2015).

The condition of a child's short body is often said to be hereditary or genetic from both parents, so many people just accept the condition without doing anything to prevent it. In fact, genetics is the least influential health determinant factor when compared to behavioral, environmental (social, economic, cultural, political), and health service factors. This means that stunting is a preventable health problem (P2PTM Kemenkes RI, 2018).

The cause of stunting is low nutritional intake in the first 1,000 days of life, which is from the fetus until the baby is two years old. In addition, poor sanitation facilities, lack of access to clean water, and lack of environmental hygiene also cause stunting. Poor hygiene conditions make the body have to fight extra against sources of disease, which inhibits the absorption of nutrients. Stunting can be prevented, among others, by fulfilling nutritional needs for pregnant women, exclusive breastfeeding for six months and then continued with complementary food (P2PTM Kemenkes RI, 2018).

Nutrient intake in toddlers is very important in supporting growth in accordance with their growth charts so that growth faltering does not occur, which can cause stunting. In 2017, 43.2% of children under five in Indonesia experienced an energy deficit and 28.5% experienced a mild deficit. For protein adequacy, 31.9% of under-fives experienced a protein deficit and 14.5% experienced a mild deficit. The percentage of women of childbearing age (WUS) at risk of pregnancy loss in Indonesia in 2017 was 10.7%, while the percentage of pregnant women at risk of pregnancy loss was 14.8%. The nutritional intake of WUS who are at risk of SEZ must also be improved so that they can have an ideal weight during pregnancy (Kemenkes RI, 2018).

Various government programs have been attempted to improve community nutrition in order to prevent stunting such as immunization, supplementary feeding (PMT) for pregnant women, PMT for toddlers, and monitoring the growth and development of toddlers at posyandu. In addition to the provision of PMT from the government, to meet nutritional needs, additional foods or drinks that are high in macronutrients and micronutrients can be used. The development of supplementary foods is prioritized based on locally available food ingredients, affordable prices, and contains sources of energy, protein, vitamins, and minerals (Hatijah et al., 2019). One potential alternative food source to meet the nutritional needs of pregnant women and toddlers is Moringa (Santi et al., 2020; Sukenti et al., 2020).

Moringa plants are found in many tropical and subtropical regions in the world including Indonesia. Moringa plants are easy to find and widely cultivated in various yards of local communities in Indonesia (Silalahi, 2020). Moringa can grow on all types of soil, is resistant to drought with a tolerance to drought for up to 6 months and is easy to breed and does not require intensive care. There are several nicknames for the Moringa tree, including The Miracle Tree, Tree For Life and Amazing Tree. The nickname arises because parts of the moringa tree ranging from leaves, fruit, seeds, flowers, skin, stems, to roots have extraordinary benefits (Isnan & Nurhaedah, 2017).

Fresh moringa leaves contain vitamin A, vitamin C, vitamin B6, calcium, potassium, iron, and protein, and have a high content of other nutrients compared to other food ingredients. Moringa leaves have a vitamin A content of 6.8 mg/100 g, higher than the vitamin A contained in carrots which is 1.8 mg/100 g. Moringa leaves also contain calcium of 440 mg/100 g. Moringa leaves also contain 440 mg/100 g of calcium, which is higher than the 6.49 mg/100 g of calcium contained in milk. Moringa leaves have a potassium content of 259 mg/100, which is greater than the potassium content in bananas, which is 88 mg/100. Moringa leaves also contain a fairly high protein of 6.7 g/100 g, compared to yogurt which has a protein content of 3.1 g/100 g. And the vitamin C content in moringa leaves is high at 220 mg/100 g, compared to 30 mg/100 g in oranges. Because of its high nutritional content, moringa leaves can be used to overcome malnutrition such as stunting (Katmawanti et al., 2021).

The high prevalence of stunting is a priority that must be resolved with local food sources that are abundant and high in nutrient content, namely moringa leaves. Moringa leaves have high nutritional content and are easily available in the surrounding environment, but there is still a lack of variety in their utilization (Sukenti et al., 2020). People usually use moringa leaves as a complement in daily cooking with simple processes such as boiling or sautéing as vegetables, not even a few who make moringa plants only as ornamental plants that grow on the terraces of houses or are used as animal feed (Isnan & Nurhaedah, 2017). Whereas moringa leaves can be processed into semi-finished materials, namely moringa powder, which can then be processed

into various variants of food and beverages such as moringa pudding, moringa ice cream, moringa tea, moringa sticks (Wadu et al., 2021), or cakes, nuggets, biscuits, crackers, sponge cake, serabi, brownies, and various other foods (Resia, 2022). According to (Simbolon, 2021), factors associated with moringa utilization are knowledge, attitude, moringa availability, and consumption patterns.

Maternal knowledge is an important factor in providing nutritious food to toddlers. With good knowledge, mothers know foods that contain nutritional values needed by toddlers. Ignorance about nutritious foods will result in nutritional problems in toddlers. Food consumed by toddlers will affect the level of growth and development, so mothers need to have good and sufficient knowledge to recognize nutritious foods that need to be given to infants or toddlers. Mothers with good knowledge can utilize Moringa as a food ingredient for consumption by their toddlers (Simbolon, 2021). The results of research conducted by (Hara & Nyoko, 2020b) in East Sumba Regency show that there is a relationship between knowledge and actions to utilize Moringa in East Sumba Regency. The results showed that the higher the knowledge, the better the action in utilizing Moringa.

The attitude of mothers of toddlers as a result of the knowledge gained can lead to understanding and belief in their needs as a mother of a toddler who must also be able to make efforts to prevent stunting in her toddler by utilizing moringa plants as food with high nutrition. The mother's attitude in utilizing Moringa as a food that can be managed and consumed by toddlers can prevent nutritional problems in toddlers such as stunting (Simbolon, 2021).

Household food availability is directly related to the incidence of stunting, families in households where food is not available tend to have toddlers who are classified as stunted, this is due to the lack of nutritional intake received both in terms of quantity and quality and does not meet the nutritional adequacy standards of stunted toddlers (Sihite et al., 2021). According to (Simbolon, 2021) with sufficient moringa availability in the surrounding environment can improve toddler nutrition and prevent stunting.

The wrong / bad diet results in a lack of nutrient intake. Food consumption patterns are very important because they are closely related to nutritional conditions, especially the quality and quantity of food consumed (Samuel et al., 2017). Regular consumption of moringa leaves given to children can avoid children experiencing malnutrition (Rikandi et al., 2022).

Sumber Rejo Village is one of the villages in Lambu Kibang District, West Tulang Bawang Regency. The number of toddlers in Sumber Rejo Village is 120 toddlers, with 15 of them suffering from stunting, so the prevalence of stunting in Sumber Rejo Village is 12.5%. This high prevalence of stunting has made Sumber Rejo Village the locus of stunting in Lambu Kibang Sub-district. Currently, Sumber Rejo Village has a regulation that every newly married couple is required to plant moringa in their house. Based on a literature search, research on the utilization of moringa in Sumber Rejo Village has never been conducted, thus encouraging researchers to conduct this study.

Method

This type of research is quantitative research with a cross sectional approach conducted to answer the questions of the study. This research was conducted in Sumber Rejo Village, Lambu Kibang District, West Tulang Bawang Regency. The time used by researchers to collect research data in January 2023. The sampling technique in this study used total sampling, which is a sampling technique in which all population units are taken as sample units (Roflin & Riana, 2022). In this study, the entire population was sampled, totaling 120 respondents. Data analysis included frequency distribution and bivariate analysis. Frequency distribution analysis was carried out to explain the percentage of maternal knowledge, maternal attitude, availability of moringa leaves and moringa leaf consumption patterns and utilization of moringa leaves. To find out the relationship between the dependent and independent variables (relationship between mother's knowledge, mother's attitude, availability of Moringa leaves and consumption patterns of Moringa leaves and utilization of Moringa leaves), bivariate analysis was performed using chi-square.

Results and Discussion

Analysis Univariate

Univariate analysis is a statistical analysis that only uses one variable. In this method, these variables are calculated and analyzed separately to produce a clearer picture regarding the variables of maternal knowledge, maternal attitudes, availability of Moringa leaves and consumption patterns of Moringa leaves and utilization of Moringa leaves.

Table 1. Knowledge distribution of mothers of toddlers

Knowledge	Frequency (n)	Percentage (%)
Less	16	13.3
Simply	75	62.5
Good	29	24.2
Total	120	100

Based on the table 1, it is known that out of 120 (100.0%) respondents, most of them have knowledge in the moderate category, namely 75 (62.5%) respondents, with a good category as many as 29 (24.2%), and a small proportion of respondents with a poor knowledge category, namely 16 (13.3%) respondents.

Table 2. Frequency Distribution of Maternal Attitude of Toddlers

Attitude	Frequency (n)	Persentase (%)
Negative	52	43.3
Positive	68	56.7
Total	120	100

Based on the table 2, it is known that out of 120 (100.0%) respondents, most of them have a positive attitude, namely 68 (56.7%) respondents, and a small proportion have a negative attitude, namely 52 (43.3%) respondents.

Table 3. Frequency Distribution of Moringa Availability

Moringa Availability	Frequency (n)	Persentase (%)
Yes	92	76.7
Not	28	23.3
Total	120	100

Based on the table 3, it is known that out of 120 (100.0%) respondents, most of them have moringa availability, namely 92 (76.7%) respondents, and a small proportion do not have moringa availability, namely 28 (23.3%).

Table 4. Frequency Distribution of Consumption Patterns

Consumption Pattern	Frequency (n)	Persentase (%)
Less	14	11.7
Simply	82	68.3
Good	24	20.0
Total	120	100

Based on table 4, it is known that out of 120 (100.0%) respondents, most of them have consumption patterns in the moderate category, namely 82 (68.3%) respondents, consumption patterns in the good category as many as 24 (20.0%), and a small proportion of respondents' consumption patterns in the poor category, namely 14 (11.7%) respondents.

Table 5. Frequency distribution of Moringa utilization

Utilization of Moringa	Frequency (n)	Percentage (%)
Not Helpful	48	40
Helpful	72	60
Total	120	100

Based on table 5, it is known that out of 197 (100.0%) respondents, most mothers of toddlers utilize moringa plants in preventing stunting, namely 72 (60%), and a small proportion of mothers of toddlers do not utilize moringa plants in preventing stunting, namely 48 (40%).

Analysis Bivariate

The results of the chi-square test (attached) show that there are no cells with an expected frequency value of 0 and no cells with an expected frequency value of less than 5, so it meets the requirements for the chi-square test (Norfai, 2022).

Table 6. Relationship between Knowledge and Moringa Utilization

Knowledge	Utilization of Moringa						*p-value*	OR
	Not Helpful		Helpful		Total			
	N	%	n	%	n	%		
Less	10	8.3	6	5.0	16	13.3		
Simply	31	25.8	44	36.7	75	62.5		
Good	7	5.8	33	18.3	29	24.2	0.039	2.28
Total	48	40.0	72	60	120	100		

Based on table 6, the p value is 0.039 (p<0.05), which means Ha is accepted and H0 is rejected. Thus it can be concluded that there is a relationship between knowledge and the use of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village. Based on table 6 also obtained an OR value of 2.28, meaning that respondents who have good knowledge tend to utilize Moringa in preventing stunting 2.28 times compared to respondents with less knowledge.

Based on the results obtained, most respondents had knowledge in the moderate category, namely many 75 (62.5%) respondents, with a good category as many as 29 (24.2%), and a small proportion of respondents with a poor knowledge category, namely 16 (13.3%)

respondents. The results also showed that there was a relationship between knowledge and the utilization of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village (p=0.039).

The results of this study are in line with research conducted by Hara & Nyoko, (2020) in Lewa and Pandawai Districts, East Sumba Regency showing that there is a relationship between knowledge and the utilization of moringa leaves. The results of this study are also in line with the results of research conducted by Koamesah et al., (2019) in Kupang City which shows the results that there is a significant relationship between the level of maternal knowledge and moringa utilization behavior. The results of this study are not in line with Dewi's research (2012) which states that people's knowledge is lacking on the utilization of moringa, people usually use moringa as a complement in daily cooking and not a few who make moringa only as an ornamental plant that is left attached to the terraces of the house.

Knowledge or cognitive is a very important domain for the formation of one's actions (overt behavior). Actions based on knowledge will last longer than actions that are not based on knowledge. This can be used as a foundation in improving the provision of education to the community about moringa where almost all parts of the moringa plant can be processed, including pods, leaves, flowers, and seeds. Moringa pods are usually cooked as a vegetable in India, even exported to various countries for Indian expatriates fresh or canned. In addition, it can also be processed for medical needs to supplements. The seeds can be roasted and eaten like nuts, processed into oil for cooking. In its current development, the leaves of the Moringa plant can be made into powder which is packed into capsules to be used as a health supplement, besides that it is also packaged in the form of ready-to-brew tea to improve body health. The community is also expected to be more active and thorough in seeking information from various media, so that they have high insight and understanding of moringa (Koamesah et al., 2019).

According to (Wahyuningsih & Darni, 2021), maternal knowledge is one of the factors that has a significant influence on the incidence of stunting. Efforts to improve stunting can be done by increasing knowledge so that it can improve feeding behavior in children. Stunting is difficult to treat when the child has entered the age of two. Therefore, to prevent stunting in children, mothers need to consume proper nutrition, especially during pregnancy until the child is born and 18 months old. Basically, child survival and health cannot be separated from maternal health. Low nutrient intake is influenced by parenting, one of which is inappropriate feeding behavior.

Based on univariate tests, most respondents had knowledge in the moderate category, namely many 75 (62.5%) respondents, with a good category as many as 29 (24.2%), and a small proportion of respondents with a poor knowledge category, namely 16 (13.3%) respondents. Based on these results, this sufficient level of knowledge can be influenced by several things, one of which is still the lack of information obtained by mothers of toddlers about the benefits contained in Moringa.

The results of this study indicate that there is a relationship between knowledge and utilization of Moringa. This means that, the higher the level of knowledge of the mother of toddlers, the mother of toddlers will utilize moringa plants in preventing stunting. Conversely, the lower the knowledge, the lower the action in utilizing Moringa. This can be used as a foundation in increasing the provision of information to the community about moringa where almost all parts of the moringa plant can be processed, including the most commonly processed leaves, flowers, and seeds. The community, especially mothers of toddlers, is also expected to be more active and thorough in seeking information from various existing media, so that they have high insight and understanding of moringa in preventing stunting.

Table 7. Relationship between Attitude and Moringa Utilization

Attitude	Utilization of Moringa						*p-value*	OR
	Not Helpful		Helpful		Total			
	n	%	n	%	n	%		
Negative	36	30.0	16	13.3	52	43.3	0.000	10.5
Positive	12	10.0	56	46.7	68	56.7		
Total	48	40.0	72	60	120	100		

The chi-square test results show that there are no cells with an expected frequency value of 0 and there are no cells with an expected frequency value of less than 5, so it meets the requirements for the chi-square test (Norfai, 2022). Based on table 7, the p value is 0.000 (p>0.05), which means that H0 is accepted and Ha is

rejected. Thus it can be concluded that there is a relationship between attitude and the use of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village. Based on table 4.15 also obtained an OR value of 10.5, meaning that respondents who have a positive attitude tend to utilize Moringa in preventing stunting 10.5 times compared to respondents with a negative attitude.

Based on the results obtained, most respondents had a positive attitude, namely 68 (56.7%) respondents, and a small proportion had a negative attitude, namely 52 (43.3%) respondents. The results also showed that there was a relationship between attitude and the utilization of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village (p=0.000).

The results of this study are in line with research conducted by Simbolon (2021) in Banfanu Village which shows that there is a relationship between attitude and moringa utilization. The results of research by Dhiu et al. (2022) conducted with a population of PKK mothers in Aesesa District, Nagekeo Regency showed a change in attitude in receiving counseling and implementing the use of moringa leaves as functional food because PKK mothers get information and apply the use of moringa leaves as functional food.According to (Nurina et al., 2019), a good attitude about the benefits of moringa leaves has a good influence on the selection and provision of nutritious food so that the nutritional status of the family is well maintained. The results of research conducted by Nurina show that most respondents have a good attitude that moringa leaves are nutritious plants that can be utilized as one of the food sources of family nutrition. Good parental attitudes make good behavior towards the use of moringa leaves as a source of nutritious food for the family.

The results of this study indicate that there is a relationship between attitude and moringa utilization. This means that, the more positive the attitude of the mother of toddlers, the mother of toddlers will utilize moringa plants in preventing stunting. Conversely, the more negative the attitude, the lower the action in the utilization of Moringa. A positive attitude in mothers of toddlers is due to the knowledge gained that can lead to understanding and belief in their needs as a mother of a toddler who must also be able to make efforts to prevent stunting in her toddler by utilizing moringa plants as food with high nutrition.

Table 8. Relationship between Moringa Availability and Moringa Utilization

Moringa Availability	Utilization of Moringa						*p-value*	OR
	Not Helpful		Helpful		Total			
	f	%	F	%	F	%		
No	16	13.3	12	10.0	28	23.3		
Yes	32	26.7	60	50.0	92	76.7	0.034	2,5
Total	48	40.0	72	60.0	120	100		

The chi-square test results show that there are no cells with an expected frequency value of 0 and no cells with an expected frequency value of less than 5, so that the chi-square test is eligible (Norfai, 2022). Based on table 4.16, the p value is 0.034 (p <0.05), which means Ha is accepted and H0 is rejected. Thus it can be concluded that there is a relationship between the availability and utilization of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village. Based on table 8, the OR value of 2.5 was also obtained, meaning that respondents with moringa availability tended to utilize moringa in preventing stunting 2.5 times compared to respondents who did not have moringa availability.

Based on the results obtained, most respondents have moringa availability, namely 92 (76.7%) respondents, and a small proportion do not have moringa availability, namely 28 (23.3%). The results also showed that there was a relationship between the availability of moringa and the utilization of moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village (p=0.034). The results of the study are in line with research conducted by Simbolon (2021) in Banfanu Village which shows that there is a relationship between the availability of moringa and the utilization of moringa leaves.

Food is one of the basic human needs. If these needs are not met, both in quantity and quality at the individual and household levels, it will interfere with the achievement of a healthy, active and sustainable quality of life, and later cause health and nutrition problems. Stunting can be caused by relatively low and inaccessible access to and affordability of food (Sihite et al., 2022). Food security in households supports the consumption levels of children under five, both energy and protein. Low consumption levels of under-fives can affect growth and development in under-fives, and in the long term can cause problems of growth failure such as wasting and stunting (Alamsyah et al., 2022).

The availability of moringa plants is quite abundant in Indonesia. Moringa plants are able to adapt well to tropical environments including in Indonesia, Moringa is widespread in Indonesia and is found in many villages and is widely planted as a living fence, planted on the

edge of fields and rice fields. The availability and utilization of moringa plants is one of the efforts to increase the optimal nutritional intake of toddlers and prevent toddlers with nutritional problems and improve toddlers with malnutrition disorders. The amount, type, availability, cooking and processing of food, distribution in the family, consumption patterns in the family are important factors in preventing toddlers with nutritional problems such as stunting (Simbolon, 2021).

The results of this study indicate that there is a relationship between moringa availability and moringa utilization. Moringa plants can develop very well in the Sumber Rejo Village area, maintenance of moringa plants is also not difficult and easy to cultivate independently by means of cuttings. Currently, Sumber Rejo Village has a regulation that every newly married couple is required to plant moringa in their house. This also causes sufficient availability of moringa in Sumber Rejo Village. The sufficient availability of moringa can be utilized as a food ingredient that can be processed into various types of food for consumption by children under five in improving the nutrition of children under five and preventing stunting.

Table 9. Relationship between consumption pattern and Moringa utilization

Consumption Pattern	Utilization of Moringa						*p-value*	OR
	Not Helpful		Helpful		Total			
	F	%	f	%	f	%		
Less	12	10.0	2	1.7	14	11.7	0.000	4.19
Simply	31	25.8	51	42.5	82	68.3		
Good	5	4.2	19	15.8	24	20		
Total	48	40.0	72	60.0	120	100		

The chi-square test results show that there are no cells with an expected frequency value of 0 and there are no cells with an expected frequency value of less than 5, so it meets the requirements for the chi-square test (Norfai, 2022). Based on table 9, the p value is 0.000 (p>0.05), which means that H0 is accepted and Ha is rejected. Thus it can be concluded that there is a relationship between consumption patterns and the use of Moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village. Based on table 9, the OR value of 4.19 was also obtained, meaning that respondents who have good consumption patterns tend to utilize Moringa in preventing stunting 4.19 times compared to respondents with poor consumption patterns.

Based on the results obtained, most respondents have consumption patterns in the moderate category, namely 82 (68.3%) respondents, consumption patterns in the good category as many as 24 (20.0%), and a small proportion of respondents' consumption patterns in the poor category, namely 14 (11.7%) respondents. The results also showed that there was a relationship between consumption patterns and the utilization of moringa by mothers of toddlers in preventing stunting in Sumber Rejo Village (p=0.034).

Consuming Moringa leaves is one alternative to overcome nutritional problems in Indonesia. Several studies have shown that the utilization of this local plant, which contains high nutrients, can increase haemoglobin levels. Various kinds of preparations and variations of Moringa leaf dishes can improve the health of mothers and children. Moringa leaves are effective in helping toddlers with stunting to get additional vitamins that are important for child growth and development (Alamsyah et al., 2022).

Tjandra (2013) in a study in Lut Tawar District, Central Aceh Regency reported that a diet with a poor category had a 6.01 times greater risk of causing stunting nutritional status compared to a diet with a sufficient category. According to Simbolon (2021), diet fulfillment is a factor that needs to be considered in maintaining the health of toddlers who are experiencing a period of growth and development. In preparing a food menu pattern, mothers need to pay attention to a balanced menu and a variety of dishes. The menu served includes a diversity of food ingredients, in this case also utilizing Moringa as a mandatory food ingredient that needs to be added to the family food menu every day, food with the appropriate number of portions to meet the nutritional needs of toddlers for the maintenance of body cells and the process of growth and development. Good food consumption patterns for children under five can improve their nutritional status.

Moringa plants are widely used to fight malnutrition among pregnant, lactating mothers and children under five. When consuming moringa every day can increase the nutritional intake of toddlers and families (Misrah et al, 2014). Food consumption patterns in children under five play an important role in the

process of growth and development of toddlers, because food contains a lot of nutritional value (Simbolon, 2021).

The results of this study indicate that there is a relationship between consumption patterns and moringa utilization. A good consumption pattern contains all nutrients in sufficient quantities according to needs. A good diet and a variety of dishes can ensure the fulfillment of nutritional adequacy so that a person's nutritional status will be better and strengthen the body's resistance to disease. A good moringa consumption pattern is highly recommended to improve the nutritional status of toddlers because moringa leaves have good nutritional content in preventing stunting. The majority of people in Sumber Rejo Village consume moringa leaves as clear vegetables even though moringa can be processed into semi-finished materials, namely moringa powder, which can then be processed into various variants of food and beverages such as moringa pudding, moringa ice cream, moringa tea, or cakes, nuggets, biscuits, crackers, sponge cake, serabi, brownies, and various other foods to improve moringa consumption patterns for toddlers and families. Regular consumption of moringa leaves given to children can avoid children experiencing stunting. Based on this, socialization to the community about the various benefits of moringa leaves is needed so that moringa consumption can be optimized.

Conclusion

Based on the results of the research and analysis that has been carried out, it can be concluded that there is a relationship between maternal knowledge, maternal attitudes, availability of moringa, consumption patterns and the use of moringa by mothers of toddlers to prevent stunting in Sumber Rejo Village. There is still a need to provide education or counseling to mothers of toddlers to increase the knowledge of mothers of toddlers about the use of moringa and it is hoped that mothers can improve moringa consumption patterns for toddlers and families with various variations of Moringa preparations. in order to increase the utilization of moringa as food intake for stunting prevention.

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Author Contributions
Zelda Nora Afriza role in this research is to compile the background and find problems that occur, design research methods, analyze, process and present data, discuss research results and findings. While the role of Nova Muhani, Nurhalian Sari is to provide input, direction and improvement in this research.

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Reference

Alamsyah, A. G., Sari, P. M., Hidayati, C., Pradhana, P., Lestari, Z., & Indra, A. P. (2022). Pemanfaatan Ekstra Daun Kelor (Moringacae Olievera) Sebagai Upaya Pencegahan Stunting Pada Balita Di Desa Cinta Rakyat Percut Sei Tuan. *Jurnal Program Studi PGMI*, *9*(4). Retrieved from https://jurnal.stitnualhikmah.ac.id/index.php/modeling/article/view/1251

Hara, M. K., & Nyoko, Y. O. (2020). Hubungan Pengetahuan Dan Budaya Dengan Tindakan Pemanfaatan Kelor Di Kabupaten Sumba Timur. *Jurnal Kesehatan Primer*, *5*(2), 60–69. Retrieved from https://jurnal.poltekeskupang.ac.id/index.php/jkp/article/view/508

Hatijah, N., Sari, M., & Nurwantari, A. (2019). Effect of Formulation of Jackfruit Seed Extract, Soybean Juice and Moringa Leaf Extract on the Amount of Lactic Acid Bacteria, Total Acid, and pH of Kalelo Yogurt as Probiotics & Supplementary Feeding for Stunting Prevention. *Aloha International Journal of Multidisciplinary Advancement (AIJMU)*, *1*(5), 114–117. Retrieved from https://journal.aloha.academy/index.php/aijmu/article/view/aijmu10103

Isnan, W., & Nurhaedah, M. (2017). Ragam Manfaat Tanaman Kelor (Moringa oleifera Lamk) Bagi Masyarakat. *Info Teknis EBONI*, *14*(1), 63–75. http://ejournal.forda-mof.org/ejournal-litbang/index.php/buleboni/article/view/5096

Katmawanti, S., Supriyadi, & Mariroh, F. (2021). Is instant porridge with a high calcium content based on Moringa oleifera as an alternative baby food to prevent stunting in Indonesia? *Journal of Public Health Research*, *10*(2), 353–357. https://doi.org/10.4081/jphr.2021.2233

Kemenkes RI. (2018). *Buletin Jendela Data dan Informasi Kesehatan: Situasi Balita Pendek di Indonesia*. Kementerian Kesehatan RI. Retrieved from https://www.kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatan-indonesia/profil-kesehatan-indonesia-2018.pdf

Koamesah, S. M. J., Rante, S. D. T., & Sasputra, I. N. (2019). Hubungan Pengetahuan Dan Persepsi Ibu Terhadap Perilaku Pemanfaatan Kelor Sebagai Menu Makanan Keluarga di Kota Kupang. *Cendana*

Medical Journal, *18*(3). https://ejurnal.undana.ac.id/index.php/CMJ/article/view/2640

Nurina, R. L., Woda, R. R., Lada, C. O., & Buntoro, I. F. (2019). Hubungan Pengetahuan dan Sikap Orang Tua Tentang Manfaat Daun Kelor Dengan Status Gizi Keluarga Pada Wilayah Lahan Kering Kepulauan Semiringkai. *Cendana Medical Journal*, *18*(3). Retrieved from https://ejurnal.undana.ac.id/index.php/CMJ/article/view/2670/1910

P2PTM Kemenkes RI. (2018). *Cegah Stunting dengan Perbaikan Pola Makan, Pola Asuh dan Sanitasi - Direktorat P2PTM*. Kementerian Kesehatan RI. Retrieved from https://p2ptm.kemkes.go.id/post/cegah-stunting-dengan-perbaikan-pola-makan-pola-asuh-dan-sanitasi.

Resia, E. (2022). *Daun Kelor, Segudang Manfaat Untuk Kesehatan dan Perekonomian*. Direktorat Hukum Dan Hubungan Masyarakat Kementerian Keuangan Republik Indonesia.

Rikandi, M., Lamona, A., & Sari, W. K. (2022). Pemanfaatan Daun Kelor Sebagai Upaya Pencegahan Kejadian Stunting Pada Anak Usia Pra Sekolah Di Tk 'Aisyiyah 6 Padang. *GEMASSIKA : Jurnal Pengabdian Kepada Masyarakat*, *6*(1), 47. https://doi.org/10.30787/gemassika.v6i1.781

Roflin, E., & Riana, F. (2022). *Statistika Dasar*. Penerbit NEM. Retrieved from https://stiealwashliyahsibolga.ac.id/jurnal/index.php/jesya/article/download/1066/623

Samuel, S., Subagio, H. W., & Suhartono, S. (2017). Perbedaan Pola Konsumsi Dan Asupan Zat Gizi Anak Stunting Dan Tidak Stunting Usia 12 – 23 Bulan. *Media Informasi*, *13*(1), 67–72. https://doi.org/10.37160/bmi.v13i1.84

Santi, M. W., Triwidiarto, C., Syahniar, T. M., Firgiyanto, R., & Andriani, M. (2020). Peningkatan Pengetahuan Kader Posyandu dalam Pembuatan PMT Berbahan Dasar Kelor sebagai Upaya Percepatan Pencegahan Stunting. *Dharma Raflesia : Jurnal Ilmiah Pengembangan Dan Penerapan IPTEKS*, *18*(2), 77–89. https://doi.org/10.33369/dr.v18i2.12056

Sihite, N. W., Nazarena, Y., Ariska, F., & Terati, T. (2021). Analisis Ketahanan Pangan dan Karakteristik Rumah Tangga dengan Kejadian Stunting. *Jurnal Kesehatan Manarang*, *7*, 59. https://doi.org/10.33490/jkm.v7ikhusus.550

Silalahi, M. (2020). Pemanfaatan Daun Kelor (Moringa oleifera Lam) sebagai Bahan Obat Tradisional dan Bahan Pangan. *Majalah Sainstekes*, *7*(2), 107–116. https://doi.org/10.33476/ms.v7i2.1703

Simbolon, M. (2021). Analisis Pemanfaatan Kelor Oleh Ibu Balita Dalam Mencegah Stunting Di Desa Banfanu Wilayah Kerja Puskesmas Noemuti Tahun 2019. *Jurnal Ilmiah Kebidanan, 1*(2), 77-89.

SEGI. (2021). *Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota Tahun 2021*. Jakarta: Kementerian Kesehatan Republik Indonesia.

Sukenti, K.-, Rosida, N. Y., & Rosalina, D. (2020). Produk Inovasi Es Krim Kelor (Moringa oleifera Lam.) sebagai Upaya Pencegahan Stunting Desa Jatisela, Kecamatan Gunung Sari, Lombok Barat. *Jurnal Pengabdian Magister Pendidikan IPA*, *3*(1). https://doi.org/10.29303/jpmpi.v3i1.392

Tjandra, E. A., & Tjandra, S. R. (2013). Hubungan antara komponen kognitif, komponen afektif dan komponen perilaku terhadap sikap konsumen memanfaatkan teknologi internet. *Jurnal Manajemen*, *17*(1), 42–52. Retrieved from https://ejurnal.mercubuana-yogya.ac.id/index.php/psikologi/article/view/1457

Wadu, J., Linda, A. M., Retang, E. U. K., & Saragih, E. C. (2021). Pemanfaatan Daun Kelor Sebagai Bahan Dasar Produk Olahan Makanan Di Kelurahan Kambaniru. *Jurnal Pengabdian Masyarakat Berkemajuan*, *4*(2), 87. https://doi.org/10.31764/jpmb.v4i2.4270

Wahyuningsih, R., & Darni, J. (2021). Edukasi Pada Ibu Balita Tentang Pemanfaatan Daun Kelor (Moringa Oleifera) Sebagai Kudapan Untuk Pencegahan Stunting. *Jurnal Pengabdian Masyarakat Sasambo*, *2*(2). Retrieved from http://jkp.poltekkes-mataram.ac.id/index.php/PKS/article/view/687

WHO. (2014). *Global Nutrition Target 2025 Stunting Policy Brief*. In World Health Organization. https://doi.org/10.7591/cornell/9781501758898.003.0006

WHO. (2015). *Stunting in A Nutshell*. WHO. Retrieved from https://www.who.int/news/item/19-11-2015-stunting-in-a-nutshell

WHO. (2022). *Staggering backsliding across women's, children's and adolescents' health revealed in new UN analysis*. WHO. Retrieved from https://www.who.int/news/item/18-10-2022-staggering-backsliding-across-women-s--children-s-and-adolescents--health-revealed-in-new-un-analysis