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Influence of eating concept on eating behavior and stunting in Indonesian Madurese ethnic group

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Abstract

Background and objectives: Stunting is a serious public health problem in Indonesia. Madura Island, which is inhabited by the Madurese ethnicity, had a very high stunting prevalence. The cultural factors of stunting mainly focus on food, food taboos, and early complementary feeding or prelacteal feeding practices. Therefore, this study aims to analyze the eating concept and its association with child feeding practices and stunting among the Madurese ethnic group in Indonesia.

Methods: This qualitative study was conducted in Sampang District, Madura Island, East Java, Indonesia. A total of 61 informants participated in this study (25 informants of in-depth interviews, 26 informants of FGDs, and 10 families in observations). Data collection consists of culture, values, and beliefs in child feeding practices that influence children's nutritional status. The analysis used was content analysis by emphasizing the meanings, themes, and concepts of eating and stunting.

Results and conclusions: Stunting was considered a normal condition rather than a nutritional problem. The concept of eating is "eating rice." Eating without other dishes is acceptable as long as there is rice on the plate. This concept affects inappropriate complementary food feeding practices and malnutrition among children under five. Overall, the study contributed to the improvement of the stunting reduction program by addressing how Madurese thought about eating and stunting.

Keywords: Eating concept, Feeding practice, Food culture, Madurese, Rice, Stunting

Introduction

Stunting is a major public health issue in many developing countries. Ambitious Sustainable Development Goals (SDGs) call for zero stunting by 2030. By 2025, the World Health Assembly target aims for a 40% reduction of stunted children under five compared to the baseline 2013 [1]. Globally, the rate of stunting has decreased in the last 20 years. However, the progress has been uneven across regional and countries. In 2019, 21.3% of children under five worldwide were stunted [2]. South Asia, Southeast Asia, and sub-Sahara Africa have the highest level of stunting prevalence [2].

Indonesia is strongly committed to achieving the SDG targets. Stunting prevalence has decreased by 6.4% in the last 5 years, from 37.2% (2013) to 30.8% (2018) [3]. However, it was still classified as a very high prevalence [4]. Stunting prevalence in East Java Province (32.8%) was higher than national average (30.8%) [3]. Madura Island is divided into four districts and had an unacceptably high stunting prevalence (three districts > 40% and one district > 30%) [5]. The Sampang District had the highest prevalence of stunting (47.9%) on East Java and Madura

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Island. Therefore, it has become a priority district for stunting reduction in Indonesia [5].

Stunting reduction is being driven by improvement in the basic, underlying, and immediate causes. In many countries, stunting can be effectively reduced by improving parental education, household socioeconomic status, sanitation, access to health services, family planning, and good feeding practices (breastfeeding and appropriate complementary feeding) [2, 6].

Indonesia is culturally diverse with more than 1300 distinct ethnic groups [7]. Madurese is Indonesia's fifth largest ethnic group after Javanese, Sundanese, Bataknese, and other Sulawesi's tribes [7]. Cultural values and geographical condition are closely linked to food and dietary practices. Many areas in Madura Island have a low soil fertility and dry. Therefore, it is suitable for maize cultivation [8] but unfavorable for vegetable production. This is one of the reasons why maize has become such an essential crop for the Madurese, whether for human consumption, livestock feed, or ritual activities [9]. Corn rice is the second staple food after rice. On the other hand, the Madurese consume small amounts of vegetables [10]. Children under five often consume corn rice regardless their household food insecurity status. These corn rice usually consumed with eggs, fish, tempeh, tofu or vegetables [10].

Culture defines what people should or should not eat and how food should be prepared, where, when, and with whom it should be eaten [11]. The cultural factors of stunting, especially those associated with beliefs and food taboos among pregnant, post-partum women, and breastfeeding have been studied [12–14]. Some of the food taboos were animal food (dairy, meat, fish, seafood, and liver), plant food (sweet potato, yam, avocado, kale, fried rice, durian, jackfruit, pineapple, eggplant, sugar cane, chili, banana inflorescence) which beliefs can endanger pregnancy [12, 13]. Post-partum mothers can only eat rice, grilled fish, and soup [14]. Some mothers believe that colostrum is dangerous for their babies. While, others believe that leafy vegetables, fish, and eggs could make their children less susceptible to disease [13].

However, limited studies have examined the concept of eating and stunting in certain ethnic groups and its connection with children's feeding practices. Therefore, the purpose of this study is to investigate how the Madurese culture, children's eating habits, and stunting are connected.

Methods

Study area

This research has been conducted for 30 months (February 2019–August 2021) in Sampang District, which is located on Madura Island, East Java, Indonesia (Fig. 1). Sampang District has one separate island named Pulau Mandangin or Goat Island. Sampang District is divided into 14 subdistricts, covering 186 villages [15]. In 2020, Sampang District had the highest poverty rate (22.78%) and lowest education level in East Java Province, Indonesia [16, 17]. The average of length of school was 6.19 years or equal to graduate from elementary school [17]. The school participation rate decreases as the level of education increases [15].

This research was conducted in agricultural and coastal areas. Gunung Maddah village represents the agricultural area, and Pulau Mandangin village represents the coastal area. Gunung Maddah Village is located at 4.80 m above sea level in the western part of the Sampang subdistrict. Gunung Maddah Village is the largest and highest area in Sampang District and covers an area of 8.6 km^2 [15]. Based in-depth interviews, the majority of Gunung Maddah villagers are farmers or farm laborers and non-farming laborers. The most widely cultivated plants were rice, corn, and mung beans. However, most families were small-scale farmers, so their harvest was only sufficient for consumption.

Pulau Mandangin village is a small island in the Sampang subdistrict with an area of 1.65 km^2 and a diameter of 3 km. Pulau Mandangin village has the highest population density in Sampang District. The total population in 2020 reached 19,798 people with a population density of 11,979 people per km^2 or 12 people per m^2 [15]. The island is divided into three hamlets. Pulau Mandangin village can be accessed by boat within 1.5–2 h of journey time from Tanglok Port in the Sampang subdistrict. Based in-depth interviews, most of Pulau Mandangin villagers are fishermen.

Key informant

Information is gathered through by in-depth interviews, focus group discussions (FGDs), and observations. In total, 61 informants participated in this study (25 informants of in-depth interviews, 26 informants of FGDs, and 10 families in observations). The in-depth interviews were conducted with 10 mothers, 10 family members (7 husbands and 3 mothers-in-law), and the cadre, village midwife, and community figure (5 informants). Meanwhile, the FGDs were conducted in two groups, divided into the family group (grandmother, mother-in-law, and neighbors) and cadre/health personnel groups (cadre and village midwife). The observation was conducted on 10 families with stunted (5 families) and non-stunted (5 families). The observation used a checklist and was conducted for 1–2 days in each family.

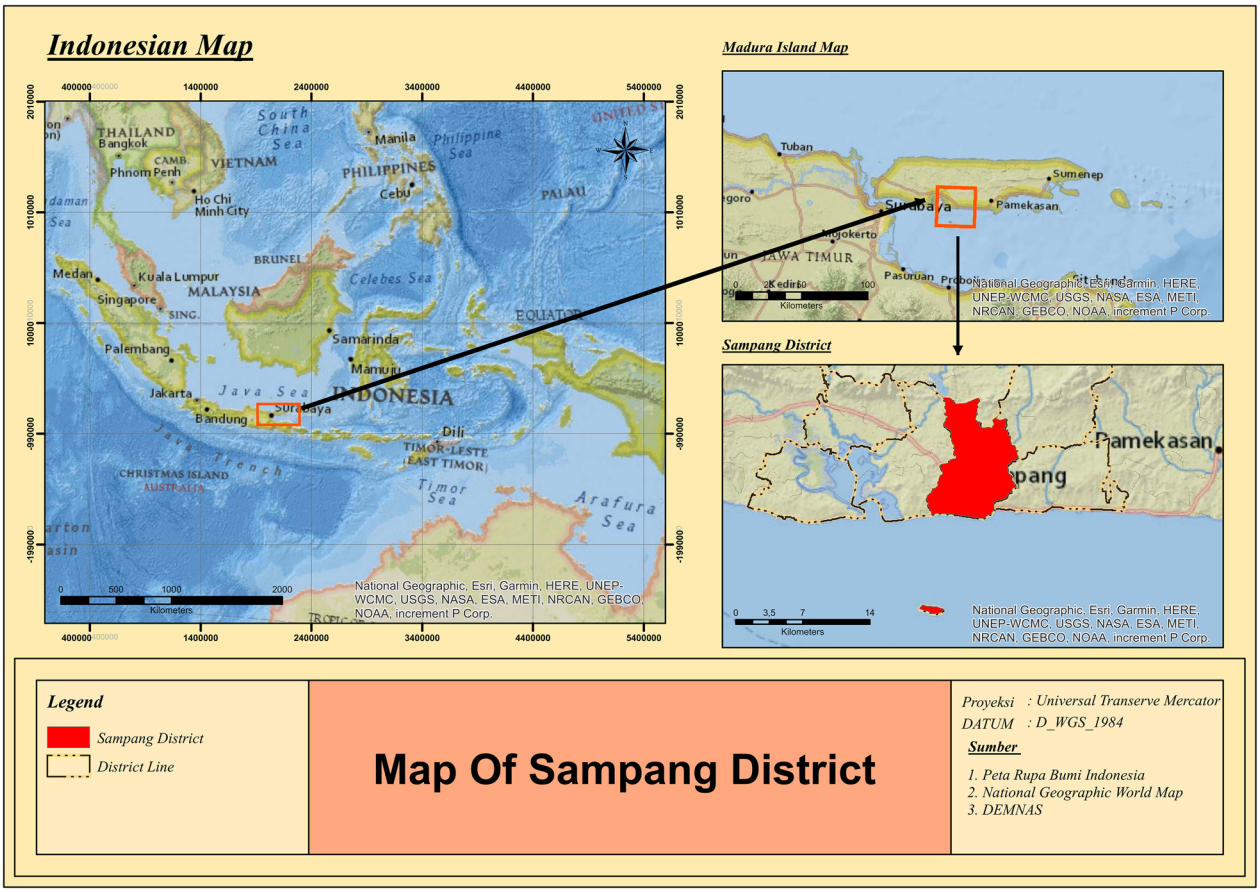


Fig. 1 Sampang district map

Data management and analysis

The qualitative data were collected through images, notes, and recordings. The interviews and FGDs were conducted in the Madurese and Indonesian languages. The transcripts of the collected data were processed and categorized. Data triangulation was performed on the qualitative data collected related to culture, values, and beliefs in child feeding practices that influence children's nutritional status.

A manual for data collection was developed to facilitate data collection. The manual consists of procedures for FGDs, a guideline for in-depth interviews and FGDs, and an observation checklist. Through in-depth interviews, values and beliefs toward stunting and eating, as well as food habits, were gathered. FGDs were conducted to collect information regarding childcare and eating habits. Meanwhile, the observations were performed to observe the children's feeding practices. The observational checklist consists of children main dish, side dish, and snacks. Researchers and enumerators lived among the community in the study location to get an accurate picture of the situation at the research site.

Content analysis was used to emphasize the meanings, themes, and concepts of eating and stunting. The gathered data were then classified, organized, and irrelevant data were deleted so that a final conclusion and verification could be reached. Trustworthiness consisting of credibility, dependability, and confirmability was evaluated through data triangulation. Source and method triangulation were carried out in this study. Data were collected from various informants such as mothers, fathers, grandmothers/in-law, health staff, cadre, and community figures through FGDs, in-depth interviews, and observations.

Results

Stunting concept

Informants (parents) did not have clear indications to determine whether their children were short or tall. Indicators of their children's height were obtained by comparing them to their peers. Children were considered to have a short stature if they were shorter than their peers, and vice versa.

"He's short (my son is short), he has a tall friend…it's okay, he'll be tall when he grows up, he'll be tall after circumcision, now he's still small" (Informant 36).

"I see his friends are short… my son is taller… I gave him vegetables, nutritious food, and took him to the Posyandu (Integrated Health Post) so my son would not be not short… In this neighborhood, a lot of children ate (given by their mother) sugar water ma'am…" (Informant 40).

Most Madurese thought that stunting was caused by genetic factors. For example, if the parents are short, the children will also be short. In addition, many parents thought stunting was not a health problem. Children with short stature are normal, and it is not something to be concerned about. As long as children wanted to eat, could do physical activities well, and were not fuzzy, then it meant that the children were fine and healthy. On the contrary, when the children could not do the normal activities, they would sense that something was wrong with them. People have different perceptions regarding stunting and being underweight. Underweight (severe and moderate) was considered a malnutrition problem. Meanwhile, stunting was not a nutrition problem. The parents will be ashamed (disgraced) when their children are diagnosed with malnutrition because they will be considered incompetent in caring for them.

In general, stunting was not a health concern for them. Parents were more focused on the health of the children's eyes and physical and spiritual condition. Some informants said they did not know about stunting. Most of them thought that stunting was heredity.

"A short baby, I think it is a matter of genetic. The proof is my child. Even though he is short, he is agile and has become a smart boy in his class" (Informant 35).

'What is stunting? Is it inheritance or what caused it? I've been told that stunting is not an inheritance factor, but what I see is that when the father is tall, then the children are tall. However, when the father is short (just like my neighbors), then the whole family will be short too, because their mom is short too" (Informant 33).

" Yes, it was destiny. From the God, who destined the children is short. His father is a short man, his mother is a short woman, and his grandfather is a short man. What can you do." (informant 33).

People's knowledge of stunting was limited only to knowing the term, and most of them thought it was not a big problem because they thought stunting was hereditary and could not be changed. People also believed that stunting was their destiny. It was a dogma that had to be accepted and was unable to be changed. However, some residents were curious about stunting and asked what stunting was and how to prevent it (after hearing about the stunting issue). On the other hand, the active *Posyandu* cadres had more exposure to stunting information from the health workers (especially midwives) than housewives.

"The midwife used to give us information about stunting several times at the Posyandu, I also wondered whether my child was a stunted baby or not. The midwife also gave lessons on nutrition for stunted children." (Informant 31)

Several informants mentioned that their children were taller than their parents at the same age. Some informants stated that their children consumed more milk, so they were taller than their parents. People believed that short children usually had special advantages, such as high intelligence and agility.

""Well, I hope, even though my son is short, he can be as clever as Mister Habibi (former Indonesian President) and Mister Mahfud MD (Madurese who became Indonesian minister), because usually short people have a clever and ingenious mind." (Informant 35)

Eating concept

The concept of eating, according to the Madurese, is "eating rice." Therefore, the most important thing is to eat rice. The Madurese respondents considered if someone is not yet consuming rice, then that person is said to have not yet eaten. Eat without other dishes is fine as long as there is rice on the plate. Observations discovered that many stunting children (mainly under 1 year old) were only given rice and soup compared to normal children who eat various food. Many children consumed rice with soup only (without the vegetables, meat, fish, or noodles) such as fish stock, vegetable soup, meatball soup, instant noodles soup, and *soto* soup. The stunting children's diets were less diverse than normal children.

"For people in here, the most important food is rice Miss..., just eat rice with no fish is okay, as long there is rice. For children are given soup or stock, just like that, to make the rice be swallowed quickly. Soto soup, Sarimi (instant noodles) soup, meatball soup. Sarimi soup be the most type of soup added to rice which eaten almost everyday." (Informant 13)

Child feeding practices

In general, children's consumption consists of staple foods and animal and or plant protein foods. Rice, corn rice, and noodles were the most commonly consumed staple foods. Meanwhile, saltwater fish, freshwater fish, and eggs were the most popular animal foods. Fried tempeh or fried tofu were popular plant protein sources. These animal and plant protein sources foods are widely available in the nearest food stalls or mobile vegetables vendors with affordable prices, and children consumed it daily.

Children under five had low consumption of vegetables and fruit. Most children only ate vegetable soup to make it easier for them to swallow food. The vegetables provided consisted solely of water/soup and no actual vegetables. The noodle soup was also preferred and consumed by children younger than 1 year.

The complementary foods often given to children under 1 year were mashed foods such as baby porridge, rice porridge, rice flour porridge, rice cake, and smooth or mashed papayas or bananas. The porridge was then added with soup, fish stock, vegetable soup, or plain water (if there was no soup or stock) to make the children easily swallow the food (Fig. 2). Some children over 1 year old were still given mashed rice with stock, soup, or water. Observation of non-stunting children showed that their parents added milk to their children's porridge.

Children (above 1 year old) who ate solid food were given family food and snacks. The snack consumption habit was relatively high in order to make children calm and not fuzzy.

Children over 2 years old were eating family food and snacks. Figure 3 shows that children ate white rice, corn rice (a mix of white rice and finely ground corn), or noodles as carbohydrate food sources. Fried fish, eggs, and fried foods (tempeh, tofu, or corn fritters) were mostly consumed as animal and plant protein food sources. Moringa leaves and vegetable soup were the most

(a) Rice porridge with fish

(b) Rice cake with fish stock

(C) Rice porridge with water

Fig. 2 Food consumption of children under 1 year old

(a) Corn rice, moringa leaves soup, and fried tofu

(b) Corn rice and fried fish

(c) Corn rice and corn fritters

(d) Rice and fried tempeh

(e) Noodles

Fig. 3 Food consumption of children above 1 year old

common vegetables consumed by children under five (Fig. 4).

According to children's nutritional status, many stunted children (particularly those under 1 year old) were fed only rice and soup or fish stock. In contrast, non-stunting children ate rice with other dishes such as fried fish, fried tempeh or tofu, and vegetable soup.

Snacks that were consumed by children were meatballs (*pentol*), nuggets and sausages, fried food, puffed and extruded snacks, jelly, bread, biscuits, chips, and

(a) Moringa leaves soup (b) Vegetable soup (carrot and cabbage)

Fig. 4 Vegetables consumed by children under five

others that were widely available around the house (Fig. 5). Observation revealed that many parents were not limiting or restricting their children's snacks.

The snack expenditure for children varied, ranging from IDR 5000–15,000 a day (equal to USD 0.34–1.11). The pocket money and snacks for children in the coastal area were higher and more varied than those in the agricultural areas. The observation showed that children 2–5 years old had been given sugar-sweetened beverages and soft or carbonated drinks.

Meatballs (*pentol)* were a very popular snack among toddlers and their mothers. Almost every day, toddlers consume meatballs (*pentol)* for IDR 5000–10,000 (equal to USD 0.34–0.67). Meatballs in the agricultural area were made from tapioca flour, wheat flour, and spices and then boiled. Finally, it was served with chili sauce or sweet soy sauce. Meanwhile, the meatball dough in the coastal area was enriched with fish or shrimp. There were abundant meatball sellers (mobile vendors and food stalls) in both regions, making it easy for children or their mothers to buy these snacks daily.

Some mothers assumed healthy food was expensive (beef, chicken, milk, apples, and pears), so they could not consume it daily. Meanwhile, the observation showed that they could easily access vegetables and fruits that grew around their house such as moringa leaves, corn, mung beans, sugar-apple, and mango. Corn and mung beans are the most widely cultivated plants besides rice in Gunung Maddah Village. The Moringa trees grew around their house, and their leaves could be harvested at any time. There were also sugar-apple "*srikaya*" (*Annona squamosa*) and mango trees in the surroundings. The locals did not know that the vegetables and fruits around their houses were healthy food.

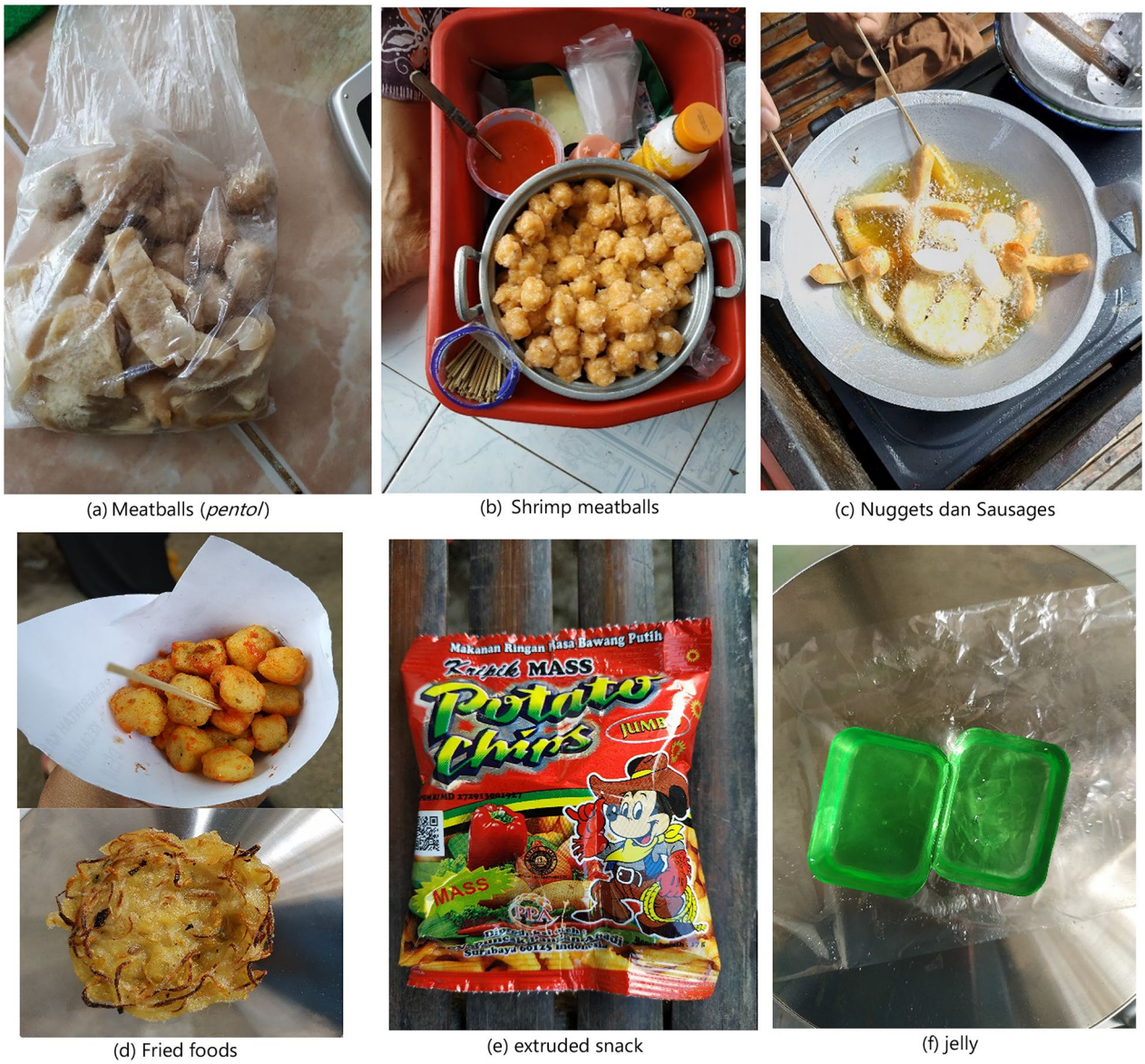
" Where does the money come from to buy fish, vegetables, and milk? Fruits are seasonal. If it's in season, we eat fruit; otherwise, we don't eat it" (Informant 31)

People often neglect sufficient and diverse food consumption (balanced nutrition). Instead, most people think they should eat modestly, but it is crucial to have a good house. They care more about their social status and their assets, especially having a magnificent and wonderful house. Having a decent and big house is an essential thing for people. Most houses in the agricultural and coastal areas were permanent houses with bricks and walls.

" Yes, people think it does not matter what you eat, as long as they can eat something, not the results of their work that is eaten continuously, so the results of their work cannot be seen if the house is not made of stone (permanent house with brick and walls) and not luxurious. The family will be ashamed. " (informant 31)

Discussion

This study revealed how cultural factors influence eating habits and the nutritional status of children. The concept of stunting and eating that developed in the Madurese ethnicity could be a reason for the high stunting problem on Madura Island, Indonesia. In 2018, stunting prevalence in Madura Island ranges from 34.4 to 47.9% (Sampang, Bangkalan, and Pamekasan Districts > 40% and Sumenep District > 30%) [5]. Stunting was not considered a nutritional or health problem because they saw no physical or intellectual problems in short children.



(a) Meatballs (*pentol*) (b) Shrimp meatballs (c) Nuggets dan Sausages

(d) Fried foods (e) extruded snack (f) jelly

Fig. 5 Popular snack consumed by children under five

Therefore, parents gave no special attention to their stunted children.

Most informants believed that stunting was a genetic or hereditary problem and could not be altered. However, some of them assert that their children were able to grow taller because they consumed more milk than their parents at the same age. These perspectives suggest that the majority of informants were unaware of stunting issues. Consequently, to address the stunting problem among the Madurese, more awareness and knowledge about stunting, its determinants, and its consequences for children are required.

People who are aware, interested, and motivated are more receptive to action-facilitating information and skills. Therefore, the first critical step in behavior change is that individuals must be aware that they need to change and have the benefits of doing so [11]. Indonesia has a national campaign and behavioral-change communication program, which is included in The National Strategy to Accelerate Stunting Reduction 2018–2024 [18]. This campaign aims to increase public awareness and behavior change to reduce stunting. Two strategies to achieve this goal are by doing a consistent and ongoing behavior-change campaign for the general

public and interpersonal communication within context (formulated with a specific message appropriate to the needs and social–cultural contexts of target groups, based on facts, with measurable impacts, and complete with guidelines and implementation tools) since 2018. A program that supports interpersonal communication is the GERMAS (Healthy Living Community Movement) program.

Based on Presidential Instruction Number 1/2017 on the Healthy Living Community Movement, The Ministry of Health is responsible for increasing literacy regarding balanced nutrition, exclusive breastfeeding, and physical activity. In addition, exclusive breastfeeding, appropriate complementary feeding education, and local food consumption became important nutrition education topics for increasing children's nutritional intake. However, improving complementary feeding practices have less attention than breastfeeding support [19].

The eating concept that was held by the Madurese influenced children's eating habits, which in turn affected their nutritional status. As a result of this condition, many children consume inappropriate complementary foods. Their consumption was dominated by carbohydrates and low in protein, fat, vitamins, and minerals, and stunted children's diets were less diverse than normal children's diets.

Corn is an integral part of the Madurese ethnic identity. Corn rice has been provided as a staple food since early childhood, particularly in agricultural areas. Stunted children consume more corn rice than rice. Nevertheless, it happens due to the diversity of food consumed, not the staple foods. Many stunted children consume corn rice with one or two other foods (tofu, tempeh, fish, or moringa leaves soup) and have low milk intake. Meanwhile, non-stunted children consume more diverse food by adding milk to their daily diets. These findings indicate that corn rice, as a Madurese ethnic food, should be combined with other food groups, especially animal food that is widely accessible, to reduce the risk of stunting in children.

Milk is a nutritious food and contributes significantly to children's nutritional needs. Milk price ranges from IDR 3000–6000 per box (115–250 ml). Meanwhile, children's snack expenditure was IDR 5000–15,000 a day. Substituting snacks with milk can contribute to children's nutritional intake. In addition, consuming vegetables with corn rice and adding fruits to their daily diets are also recommended to increase children's vitamin and mineral intake.

Macro- and micronutrients are required for children's normal growth. Protein and amino acids are recognized as the main nutrients involved in linear growth. The linear growth was also supported by micronutrients such as zinc, calcium, iron, iodine, vitamin A, and vitamin D [20]. Studies in many countries discovered that children with varied diets were less likely to be stunted than those with limited diets [21, 22].

Cultural norms, beliefs, values, and attitudes can influence individuals' behavior. Therefore, sociocultural influences parent decisions on child care and feeding practices [23]. The misconception of dietary culture can trigger unhealthy eating behavior. Changing people's conception and understanding of healthy food can lead people to establish the correct concept and develop healthy eating habits [19]. Therefore, this study encourages authorized organizations and all parties to raise awareness of appropriate feeding practices and balanced nutrition for children and prevent the harmful effects of erroneous conceptions and beliefs that will lead to malnutrition.

Geographical factors also contributed to the low intake of fruits and vegetables. Most of the vegetables and fruits were imported from other regions. The Sampang Bureau of Statistics revealed that vegetables produced in the area were shallot, chili, and tomato. Meanwhile, mango, papaya, banana, snake fruit, and durian were among the fruits that were cultivated in the region [15].

Snacks that were widely consumed by Madurese children were energy-dense foods such as fried food, extruded food, and meatballs. A study in developed countries also discovered that young children's snacks were heavily reliant on energy-dense foods and beverages [24]. In addition, snacks contribute a considerable amount of energy and nutrients for children [24, 25]. Parents need to pay more attention to their children's snack habits. Increasing nutrient-dense snacks is recommended for Madurese children.

The notion that healthy food is expensive food was also embedded in the Madurese community. They were unaware that the vegetables and fruits grown around their houses were nutritious and beneficial to the children's growth and development. Consequently, a deeper understanding of the nutritional value of local foods is required. Local foods, particularly those grown in the neighborhood, should be more promoted to enhance children's dietary intake.

The Ministry of Health and Ministry of Agriculture encourages the community to consume local food to increase their nutritional intake and household food security. Indonesia is implementing the Acceleration of Food Consumption Diversification Program and the Sustainable Food-Reserved Garden. Diversification of food consumption is a viable strategy to increase the availability of diverse food based on potential local resources (local food). Increasing local food consumption is carried out by nutrition education and increasing its added value. Meanwhile, increasing food

availability and food access was conducted by Sustainable Food-Reserved Garden. This program utilizes a home garden to provide vegetables, fruits, and animal food to meet the family's nutritional needs. However, both programs are administered by the Ministry of Agriculture and primarily target farmers. Mothers with children under five are ineligible for the Sustainable Food-Reserved Garden program.

On the other hand, the Ministry of Health encourages local food consumption to improve children's nutritional intake. In 2021, nutrition education to increase the intake of pregnant women and children under five through local food provision was already done in 420 villages, 70 health centers, 7 districts, 7 provinces. Therefore, a tailored awareness campaign and nutritional education suitable to the local social–cultural context should be emphasized to accelerate the stunting reduction in Madura Island.

Conclusion

The concepts of stunting and eating that were held by the Madurese influenced their children's eating habits and nutritional status. The belief that it is acceptable to eat without other dishes as long as there is rice on the plate led to inappropriate complementary feeding practices among children under five. Consequently, their nutritional status could be compromised. On the other hand, stunting was considered a normal condition and not a nutritional problem. Thus, overcoming the stunting problem will be challenging.

This study revealed that reducing stunting among the Madurese ethnicity needs to increase their awareness of the significance of stunting and its impact on children's growth and development. It is important to change their eating concepts, particularly for children under five. Children need a balanced diet; therefore, rice had to be served with animal protein, plant protein, and vegetables. Fruits can be a snack and can be consumed between meals. Vegetables and fruits in the neighborhood can be healthy, nutritious, and affordable food for their children.

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Author contributions
RD wrote the original draft. RDR performed the data analysis. RD and RDR conceived and designed the analysis and collected data. AK and HR were involved in review and editing the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials
The data supporting the findings of this study are available from the corresponding author (RD), upon reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was given by the Committee of Ethical Approval in the Faculty of Nursing Universitas Airlangga No. 1901-KEPK on February 5, 2020. Informed consent was given to and signed by the participants before the data collection.

Competing interests
The authors declare no conflict of interest.

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