

Education and Training on Making Carrot Hard Candy and Dragon Fruit Soft Candy for Stunting Prevention

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Abstract

Stunting is a form of chronic malnutrition associated with prolonged nutritional deficiencies. One crucial way to meet the nutritional needs of young children is by consuming vegetables and fruits, which are primary sources of micronutrients. Vegetables and fruits are vital for the body as sources of vitamins, minerals, and fiber, essential for achieving a healthy diet according to balanced nutrition guidelines. Vitamins are particularly crucial for maintaining body health. Carrots (*Daucus carota* L) and dragon fruit (*Hylocereus* sp.) are highly nutritious vegetables and fruits, containing high levels of carotene, vitamin A, B, C, and various minerals. Providing education and training to individuals and community groups, especially those at risk, aims to enhance knowledge, foster healthy habits and behaviors, and ultimately prevent stunting in the community. This community service project consists of preparation, observation, and implementation stages. The project involved 30 participants from the community and the PKK women's group in Kerang Village, Takeran District, Magetan Regency, East Java Province. The results indicated high participant enthusiasm, as seen from their active engagement. The community learned about the benefits of carrot hard candy and dragon fruit soft candy and understood the process of making these nutritious candies. From a low level of understanding before the education, there was an increase in understanding, and the community's low skill level improved after the training.

Keywords: *Training; Making; Hard Carrot Candy; Soft Fruit Candy; Stunting Prevention*

Introduction

Stunting is a common health issue among children worldwide. In 2017, approximately 151 million children under five years old, or 22% of the global child population, were affected by stunting. More than half of these cases were in Asia (Hanien et al, 2019). Stunting is influenced by poor nutritional status starting from pregnancy and early childhood and frequent infections before or after birth, leading to higher risks of illness and death (Asriati et al, 2022). Stunting is characterized by chronic malnutrition, indicated by a lower height or length for age compared to normal standards. The lack of routine height or length measurements among young children often results in unnoticed stunting (Inoue et al, 2016). Consequently, stunting has become a primary focus in global nutrition improvement efforts through 2025 (Baker et al, 2019). Preventing stunting involves three key factors: good parenting practices, improved nutrition, and better

sanitation and access to clean water. Malnutrition, particularly severe malnutrition, is often caused by poverty, low socio-economic conditions, food scarcity, limited purchasing power, frequent illness, inadequate care and hygiene, and irregular eating habits among parents (Delisle, 2021). Parents, especially mothers, play a vital role in educating and developing the child's personality. They are responsible for ensuring that their children receive adequate nutrition to support healthy growth and development (Dixit et al, 2023).

High malnutrition rates within communities are often closely associated with unhealthy dietary patterns, particularly those that fail to adhere to the principles of balanced nutrition across various age groups (Efendy et al, 2023). This issue is especially critical among young children, whose nutritional needs are vital for proper growth and development. One of the most effective ways to meet these needs is through the regular consumption of vegetables and fruits, which serve as the primary sources of essential micronutrients (Januarti et al, 2020). These food items are indispensable for the body, providing vital vitamins, minerals, and fiber necessary to maintain a healthy diet in accordance with balanced nutrition guidelines (Suzihaque et al, 2017). The role of vegetables and fruits extends beyond mere sustenance, as they are packed with antioxidants that contribute to disease prevention (Khan et al, 2020). The consumption of these nutrient-rich foods can help ward off conditions such as coronary heart disease, diabetes, and certain types of cancer, making them a cornerstone of any healthy diet (Karomah et al, 2024).

Moreover, the quality of food consumed is a direct reflection of the nutrients it contains, which are crucial for meeting the body's needs. In contrast, food quantity refers to the amount of each nutrient present in the food consumed (Nuraini et al, 2021). For individuals to achieve optimal nutritional status, it is essential to strike a balance between both the quality and quantity of their diet (Lee et al, 202). This means not only ensuring that the diet is rich in necessary nutrients but also that the intake of these nutrients meets the body's requirements (Wakhungu et al, 2020). Failure to pay attention to either aspect can lead to nutritional imbalances, which may exacerbate the risk of malnutrition and related health issues (Marni et al, 2021). Therefore, promoting a diet that is both nutritionally balanced and adequate in quantity is fundamental to improving community health and preventing malnutrition (Klasse et al, 2019). Food quality reflects the nutrients needed by the body contained in food, while food quantity represents the amount of each nutrient in the food. Achieving optimal nutritional status requires attention to both the quality and quantity of food consumed (Apriliawan et al., 2022).

Vitamins are vital nutrients for maintaining body health. One way to obtain these vitamins is by consuming vegetables like carrots (*Daucus carota* L) and fruits like dragon fruit (*Hylocereus* sp.), which are rich in carotene, vitamin A, B, C, and various minerals (Yunitasari et al, 2022). Carrots have various benefits, being used not only as food but also in the production of medicines and cosmetic products (Martirosyan et al, 2022). Typically, carrots and dragon fruits are processed into food products like vegetables and juice. One innovative way to process these is by making them into hard candy and soft candy to

appeal to young children and encourage their consumption (MCDowell et al, 2022). Hard candy is a type of confectionery with a hard texture and clear appearance. It is usually made from sucrose and glucose syrup as the main ingredients, with additional components to enhance flavor and appearance (Mariati et al, 2022). Essentially, hard candy is a mixture of sugar, glucose syrup, invert sugar, water, flavoring, and coloring. Granulated sugar is the primary component used in making this candy (Martin et al, 2021). Soft meanwhile, candy is a type of confectionery with a soft texture made by adding hydrocolloid components like agar, gum, pectin, starch, carrageenan, gelatin, and similar ingredients (Poole et al, 2019). Soft candies containing active ingredients like curcumin are often designed to provide a localized effect in the mouth and throat, used to soothe sore throats or reduce cough symptoms (Mulyani et al, 2023).

Education and training for individuals and community groups, especially those at high risk, aim to enhance knowledge to foster healthy attitudes, habits, and behaviors. The primary goal is to prevent the occurrence of stunting (Nasrudin et al, 2024).

Method

This community service project involves educating and training the community on making Carrot Hard Candy (*Daucus carota* L) and Dragon Fruit Soft Candy (*Hylocereus* sp.) to prevent stunting and malnutrition. The method includes direct engagement in education through workshops, training, and distribution of informational leaflets to the community and the PKK women's group in Kerang Village, Takeran District, Magetan Regency, East Java Province.



Figure 1. Leaflet

The project proceeds in several stages:

- a. Preparation Stage: This includes organizing team tasks to maximize the delivery of adequate information and understanding to the participants. It involves gathering references for preparing the training materials, creating instruments such as leaflets and videos on making Carrot Hard Candy and Dragon Fruit Soft Candy, and preparing participant lists and necessary materials for the activities.
- b. Observation Stage: This involves consulting with the community about the prevalence of stunting and malnutrition in the Kerang Village area, conducted one week before the implementation stage, on February 14, 2024, with the main activities scheduled for February 24, 2024.
- c. Implementation Stage: This stage includes explaining stunting and malnutrition, providing training on making Carrot Hard Candy and Dragon Fruit Soft Candy, distributing leaflets, and sharing the products with the Kerang community.

The activities are conducted using the following methods:

- a. Lecture Method: Used to convey knowledge about stunting, its causes, symptoms, dangers, and prevention.
- b. Practical/Simulation Method: Involves hands-on training in making Carrot Hard Candy and Dragon Fruit Soft Candy to prevent stunting and malnutrition, along with the distribution of leaflets and products.
- c. Question and Answer Method: Provides feedback and gathers participant responses to the material presented during the activities.

Results and Discussion



Figure 2. Implementation of PKM with PKK women's group in Kerang Village

The community service activities were conducted smoothly with support from the local government and the Kerang Village community in Magetan. The activities were attended by 30 participants, including:

- a. Providing explanations about stunting and malnutrition
- b. Explaining the advantages of Carrot Hard Candy and Dragon Fruit Soft Candy products
- c. Conducting training on making Carrot Hard Candy and Dragon Fruit Soft Candy products
- d. Distributing leaflets to participants

- e. Distributing finished products to participants
- f. The activities were well-received, with participants showing high enthusiasm and actively engaging in the sessions.

Before and after conducting education and training, respondents were given a questionnaire regarding their level of knowledge related to the nutrients found in carrots and dragon fruit, to determine the extent of the surrounding community's understanding. The results obtained before the education and training were that the community had low understanding (63.3%), moderate (26.7%), and good (10%). After the training, the respondents' understanding improved to good (100%). (Figure 3)

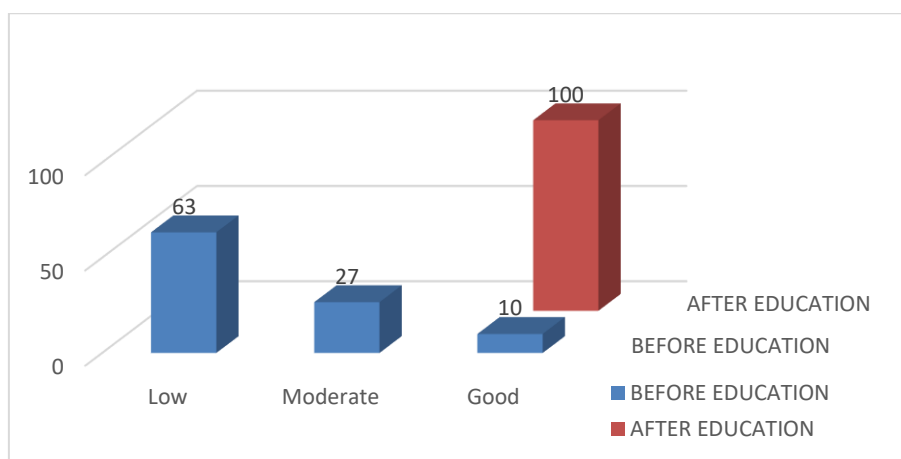


Figure 3. Percentage of Respondents' Knowledge Level

In this activity, the community's skills in making both soft and hard candy were also measured. The community was given a questionnaire with questions about how to make candy. The results obtained before education and training showed a low skill level (76.7%) and moderate (23.3%). After the activity, the community's skill level reached 100%. (Figure 4)

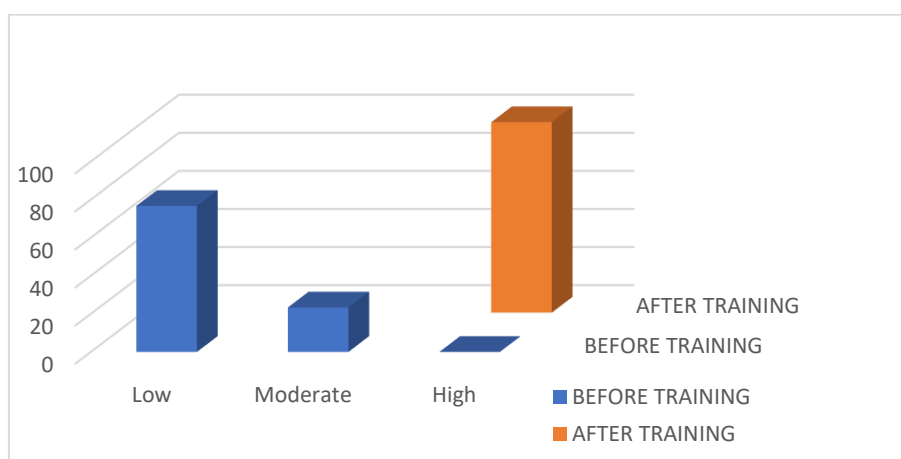


Figure 4. Percentage of Skills in Candy Making

Stunting, or the condition of a child being short in stature, is a state where infants (0-11 months) and toddlers (12-59 months) experience growth failure due to prolonged malnutrition, especially during the first 1,000 days of life. This condition causes children

to be shorter than their peers of the same age. The malnutrition begins while the baby is still in the womb and continues into the early stages of life after birth, although the symptoms of stunting typically become more apparent after the child is 2 years old (Astarani et al, 2020).

Stunting is a condition caused by chronic malnutrition and recurrent infections during the first 1,000 days of life (Nordiawati et al, 2024). The primary reason for this condition is a lack of community awareness about the importance of consuming a balanced and nutritious diet. Several factors contribute to stunting, including Insufficient understanding of health and nutrition before and during pregnancy, Not providing exclusive breastfeeding to infants, Inadequate introduction of appropriate complementary foods to breastfeeding, Limited access to clean water and proper sanitation facilities (Aramico et al, 2020). Stunting is a common nutritional problem driven by various risk factors and is considered a chronic nutritional issue, even though it can develop rapidly. The factors contributing to stunting are often linked to inequities in access to balanced nutrition and affordable healthcare services (Rohrs et al, 2021). Balanced nutrition is crucial for young children as a daily guide to support optimal growth and development. It includes meeting all the necessary nutritional needs, covering both macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins and minerals). Moreover, a lack of knowledge about stunting itself is also a significant risk factor (Siregar et al, 2022). Therefore, activities at Posyandu (integrated community health posts), which provide a combination of consultation tables and educational outreach, serve as key sources of information about stunting for mothers with children (Aprilia et al, 2024).

Education and training on the production of carrot hard candy and dragon fruit soft candy are conducted to prevent stunting, given the diverse and high nutritional content of carrots and dragon fruit. These foods are rich in essential nutrients such as carotene, vitamins A, B, C, and various minerals. Additionally, both hard candy and soft candy are highly favored by children. Therefore, it is hoped that this initiative will help the community in combating stunting.



Figure 5. Product of PKM Implementation

Conclusion

The conclusions drawn from the activities are as follows: (1) The community and PKK mothers in Kesa Kerang, Takeran District, Magetan Regency, East Java Province, demonstrated a very high level of enthusiasm. This was clearly evidenced by their active participation during the sessions, particularly in the way they eagerly asked questions and engaged in discussions, reflecting their genuine interest and curiosity, (2) The community has significantly improved their understanding of providing supplementary food for children, specifically through popular items such as soft candy and hard candy made from locally sourced vegetables and fruits. Prior to the educational sessions, their knowledge in this area was quite limited, but post-education, they have developed a solid understanding, (3) The community has also learned valuable techniques and recognized the benefits of producing carrot hard candy and dragon fruit soft candy. Initially, their skills in candy making ranged from low to moderate, but following the training, they have achieved a higher level of proficiency.

Acknowledgment

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