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# IMPACT OF NUTRITIONAL EDUCATION ON MOTHER OF STUNTED CHILDREN AND ELDERLY DIABETES MELLITUS PATIENT IN EAST JAVA, INDONESIA

**Kartika Pibriyanti[1*], Qurotul Aini[1], Lulu' Luthfiya[1]**

*[1]Department of Nutritional Science, Faculty of Health Science, University of Darussalam Gontor, Indonesia*
*Corresponding author: dkartika.02@unida.gontor.ac.id*

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**ABSTRACT**
Stunting and diabetes mellitus (DM) are pressing public health issues in Indonesia. This study assessed the effectiveness of nutritional education interventions aimed at improving knowledge and dietary practices among mothers of stunted children and elderly patients with diabetes mellitus (DM). The study was conducted at Puskesmas (Community Health Center) Kendal, East Java, involving two respondents: a mother of a stunted child and an elderly DM patient. The intervention utilized educational materials (leaflets), a 10-day menu cycle, and tailored counseling. The results indicated significant improvements in knowledge (30% for the mother and 20% for the elderly patient) and dietary adherence in the elderly patient. However, limited dietary changes were observed in the stunted child due to food preferences. These findings underscore the critical role of ongoing educational programs in addressing malnutrition and DM management.

## 1. Introduction

Stunting and diabetes mellitus (DM) represent significant public health challenges in Indonesia, each contributing to the nation's dual burden of malnutrition. Stunting, defined as impaired growth and development in children due to chronic malnutrition, has shown persistently high prevalence rates. Data from the 2018 Indonesian Basic Health Survey indicated that 30.8% of children under five years were stunted, with a slight reduction to 27.67% in 2019 (Laksono et al., 2022). This condition not only hampers physical growth but also adversely affects cognitive development, educational attainment, and future economic productivity (Anonymous, 2015)

Concurrently, Indonesia faces a rising prevalence of DM, particularly among the elderly population. The increasing incidence of DM is closely linked to lifestyle factors, including poor dietary habits and physical inactivity. Effective management of DM necessitates comprehensive lifestyle modifications, with a strong emphasis on nutritional management. Medical Nutrition Therapy (MNT) has been demonstrated to significantly improve glycemic control, with studies showing reductions in HbA1c levels by approximately 1-2% following structured dietary interventions (Pastors et al., 2002)

The coexistence of undernutrition and overnutrition within the same communities, often referred to as the double burden of malnutrition, complicates public health interventions. Households may simultaneously experience cases of stunted children and overweight or obese adults, reflecting a complex interplay of socioeconomic, cultural, and environmental factors (Rachmah et al., 2021). Addressing this dual burden requires multifaceted strategies that encompass both ends of the malnutrition spectrum.

Nutritional education has emerged as a pivotal strategy in combating both stunting and DM. Educational interventions aimed at improving dietary knowledge and practices have been effective in various settings. For instance, patient-centered nutrition education has led to positive adjustments in eating behaviors among individuals with uncontrolled type 2 diabetes (Gebreyesus et al, 2024). Similarly, community-based nutrition education programs have shown promise in improving maternal knowledge and reducing the incidence of stunting among children (Andriani et al., 2023).

In East Java, the prevalence of both stunting and DM underscores the need for targeted interventions. This study focuses on assessing the impact of

nutritional education on two critical groups: mothers of stunted children and elderly patients with DM. By evaluating changes in knowledge and dietary practices following educational interventions, the research aims to contribute to the development of effective strategies for managing and preventing these conditions within the community.

In summary, the persistent prevalence of stunting and the rising incidence of DM in Indonesia highlight the urgent need for effective public health interventions. Nutritional education offers a promising avenue for addressing these challenges by empowering individuals with the knowledge and skills necessary to make healthier dietary choices, thereby improving health outcomes across the lifespan.

## 2. Materials and methods

### 2.1. *Study design*

This research utilized a pre-test and post-test design to evaluate the effectiveness of nutritional education interventions. The study was conducted in May 2024 at Puskesmas Kendal, East Java.

### 2.2. *Participants*

Two respondents participated: a mother of a stunted child (Mrs. K) aged 55 months and an elderly DM patient (Mr. L) aged 62 years. Both respondents were selected based on their nutritional challenges and willingness to participate. Respondents were chosen based on specific inclusion criteria, including stunted children under five and elderly individuals diagnosed with DM. Both participants were briefed about the study's objectives, and informed consent was obtained.

### 2.3 *Intervention programs*

#### 2.3.1. *For the mother of a stunted child*

Educational leaflets providing information about balanced nutrition and strategies for preventing stunting were distributed. A 10-day menu cycle featuring high-protein, balanced meals was designed and provided. Three days of dietary recall were conducted to monitor dietary adherence.

#### 2.3.2. *For the elderly patient DM*

Leaflets focusing on the "3 principles" of amount, type, and schedule were provided to guide meal planning. A 10-day menu cycle suitable for blood glucose control was introduced. Later, personalized counseling sessions were conducted to address specific dietary challenges.

### 2.4 *Data Collection*

Data were collected through the following methods:

a. Pre-test and Post-test Knowledge Assessments: Structured questionnaires were administered before and after the interventions to evaluate changes in nutritional knowledge.
b. Dietary Recall: A 3-day dietary recall was conducted for each participant to assess adherence to the recommended diet plans and identify any gaps in implementation.

### 2.5 *Data Analysis*

Descriptive statistics were used to analyze changes in knowledge scores and dietary practices. The data were presented in the form of percentages and mean scores to illustrate the effectiveness of the interventions.

## 3. Results and discussions

This study evaluated the impact of nutritional education on two distinct groups: mothers of stunted children and elderly patients with diabetes mellitus (DM) in East Java, Indonesia. The findings indicate that targeted educational interventions can enhance nutritional knowledge and, to some extent, influence dietary behaviors, though the degree of impact varies between groups.

### 3.1. *Impact on mothers of stunted children*

Following the guidance and support from the caregiver, it was found that the subject had eating issues characterized by a limited intake and a dislike of vegetables. Monitoring over three days revealed that the child consumed only animal-based and plant-based protein sources, with vegetables being excluded from the diet. This has contributed to child's nutritional status, which was classified as undernourished and stunted.

Stunting is closely associated with improper eating habits or inadequate food intake, which includes the wrong types, insufficient quantities, or poorly timed meals (Pujiati et al., 2021). Adequate and balanced nutrition is crucial for maintaining and improving the child's health, including their immune function, which is significantly influenced by their diet. Malnutrition leads to growth and development delays, with children being more susceptible to infections, potentially leading to stunting (Purwani & Mariyam, 2018).

**Table 1.** Observation result

**1. Mother of a Stunted Child**

| Category | Details |
|---|---|
| **Day/Date** | Friday, May 17, 2024 |
| **Personal Information** | **Child Age:** 55 months (4 years, 7 months)<br>**Gender:** Female<br>**Ethnicity:** Javanese<br>**Medical Diagnosis:** Stunting |
| **Anthropometry** | **Height:** 96.5 cm (below normal)<br>**Weight:** 12.8 kg (below normal)<br>**Height-for-age (TB/U):** -2SD (stunted) |
| **Dietary History** | **Pattern:** 3 meals daily<br>**Typical Intake:** Rice (1/2 ladle per meal), rarely vegetables, likes eggs (1/day), no food allergies |
| **Clinical Observations** | Mentally alert |
| **Diagnosis** | Malnutrition and stunted growth due to insufficient dietary diversity |

**2. Elderly Person with DM**

| Category | Details |
|---|---|
| **Day/Date** | Wednesday, May 22, 2024 |
| **Personal Information** | **Age:** 62 years<br>**Gender:** Male<br>**Ethnicity:** Javanese<br>**Medical Diagnosis:** Diabetes Mellitus (DM) |
| **Anthropometry** | **Height:** 155 cm<br>**Weight:** 42 kg<br>**BMI:** 17.4 kg/m² (underweight) |
| **Biochemical Data** | **Blood sugar (non-fasting):** 273 mg/dl (elevated, reference <140 mg/dl) |
| **Dietary History** | **Pattern:** 3 meals daily<br>**Typical Intake:** Rice (1 ladle per meal), vegetables (frequent, prefers soup with carrots), salted fish, eggs (1/day), no food allergies, does not limit food intake |
| **Clinical Observations** | Mentally alert |
| **Diagnosis** | Diabetes Mellitus with undernutrition |

Monitoring and evaluation were conducted in phases, starting with pre-test and post-test assessments. A questionnaire consisting of 20 items, divided into two sections—10 questions on maternal knowledge and 10 on child eating habits—was provided to the mother (Mrs. K). The questions were designed based on the educational material that would be presented to the respondent. The pre-test was administered before the intervention, and after the intervention, the respondent was asked to complete the post-test.

The pre-test results showed that An. K's mother answered 7 questions correctly regarding nutrition knowledge and 7 "yes" responses regarding the child's eating habits. The post-test results showed a complete improvement, with the mother answering all 10 nutrition questions correctly and 7 "yes" answers regarding the child's eating habits. While there was a

significant increase in the mother's knowledge, no improvement was observed in An. K's eating habits. This lack of improvement can be attributed to the child's difficulties in consuming vegetables and limited food intake.

The mother of the stunted child exhibited a 30% improvement in nutritional knowledge post-intervention. This aligns with previous research demonstrating that maternal education is crucial in improving children's nutritional status. For instance, a systematic review highlighted that mothers' nutritional knowledge significantly affects children's health outcomes, emphasizing the importance of educational programs in promoting optimal child growth and reducing stunting (Prasetyo et al., 2023).

Despite the increase in knowledge, the child's dietary intake showed minimal changes, primarily due to food preferences. This suggests that while knowledge acquisition is essential, translating it into practice may be hindered by factors such as children's taste preferences, cultural food practices (Abdelhafes et al., 2020), and household food availability. Effective nutritional interventions should therefore consider these factors, perhaps by incorporating strategies to modify food preferences or by providing practical solutions to overcome such barriers.

### 3.2. *Impact on elderly patients with diabetes mellitus*

Similar to the approach used with Mrs K, monitoring and evaluation for Mr. L involved pre-test and post-test assessments. A questionnaire with 20 questions focused on knowledge, where respondents selected "agree" or "disagree" answers, and 10 questions regarding eating habits, which had answers like "always," "often," "rarely," and "never." The pre-test was administered before the intervention, and the post-test was given after the intervention.

The pre-test results showed that Mr. L answered 16 questions correctly, and after the intervention, the post-test showed full improvement with 20 correct answers. This indicated an increase in knowledge about diabetes management . Moreover, monitoring Mr. L's dietary habits indicated positive changes following the intervention. One of the key indicators for diabetes management is controlling fasting blood glucose levels (Tayek, 2018). A healthful eating pattern, regular physical activity, and often pharmacotherapy are key components of diabetes management (Evert et al., 2013).

The pre-test and post-test results showed a significant improvement in Mr. L's knowledge, with a perfect score in the post-test. The intervention, which included leaflets about diabetes nutrition and balanced diet principles, contributed to a positive shift in his eating habits, showing the importance of knowledge in supporting dietary compliance.

The elderly DM patient demonstrated a 20% increase in nutritional knowledge and improved adherence to dietary recommendations post-intervention. This finding is consistent with studies indicating that nutritional education can lead to better dietary behaviors and glycemic control in diabetic patients. For example, lifestyle interventions, including dietary changes, have been shown to reverse diabetes-related complications, such as macular edema, by promoting healthier metabolism (Asif, 2014).

The patient's improved dietary adherence post-education underscores the effectiveness of personalized counseling and tailored meal plans in managing diabetes. However, sustaining these behavioral changes requires ongoing support and reinforcement, as dietary habits are deeply ingrained and influenced by various psychosocial factors.

### 3.3 *Comparative analysis and implications*

The differential outcomes between the two cases highlight the complexity of nutritional behavior change. In the case of the mother-child pair, increased knowledge did not directly translate into improved dietary practices for the child, suggesting that additional factors, such as behavioral interventions or environmental modifications, may be necessary. Conversely, the elderly patient's improved adherence indicates that individual motivation and the immediate health benefits of dietary changes can facilitate behavior modification.

These findings suggest that while nutritional education is a vital component of public health interventions, it should be part of a multifaceted approach that includes behavioral strategies, environmental support, and continuous engagement to effectively address malnutrition and chronic diseases.

### 3.4 *Limitations and future research*

This study's limitations include its small sample size and short duration, which may affect the generalizability of the findings. Future research should involve larger, more diverse populations and consider long-term follow-up to assess the sustainability of educational interventions. Additionally, exploring the integration of behavioral and environmental strategies alongside educational efforts could provide a more

comprehensive approach to improving nutritional outcomes.

In conclusion, nutritional education has a positive impact on enhancing knowledge and, to some extent, improving dietary behaviors among mothers of stunted children and elderly DM patients. However, to achieve substantial and sustained improvements in nutritional status and health outcomes, educational interventions should be complemented by strategies addressing behavioral, environmental, and systemic factors influencing dietary practices.

## 4. Conclusions

Nutritional education significantly improves knowledge and dietary practices, particularly among elderly DM patients. However, interventions targeting stunted children require more innovative approaches to overcome behavioral barriers. Sustained educational efforts and community engagement are critical for addressing these public health challenges.

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