

# The Effect of Giving Mitekor (Moringa Leaf Noodles) On Overcoming Stunting in School Children in Medan Tuntungan District, Medan

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**Abstracts:** Stunting can be interpreted as delayed growth or failure to thrive in children due to chronic malnutrition so that children are shorter for their age. Malnutrition occurs when the baby is in the womb and in the early stages of life after birth. This research aims to determine the effect of giving mitekor and sticks made from Moringa leaves with anchovy flour on preventing stunting in school children in Medan Tuntungan sub-district, Medan City. This type of research used a quasi-experiment with one group with random sampling and the sample criteria were stunted school children from 2 schools, SDN 067246 and SDN 065015 with determination of anthropometric nutritional status-plus WHO-2007 to determine the TB/U Z-score value. The intervention given was giving 100 g/day of mites and sticks made from moringa flour and anchovy flour to see changes in body height. The intervention was given for 30 consecutive days and analyzing the mites and sticks content in the laboratory as well as to obtain intake. The food was recalled twice, not consecutively. The results of the study showed that there was an increase in nutritional intake before and after the intervention, this was due to the provision of 100 gr of noodles and sticks per day for 30 days, the average energy increased by 240.57 kcal, protein; 5.97 gr, carbohydrates; 42.64 gr, calcium 146.97, zinc; 0.5 mg, iron; 1.91 mg There was an increase in nutritional status based on the TB/U index before and after the intervention, where the short category before the intervention was given was 33 people (100%) and after the intervention it was 31 people (93.9%). Statistical results show that there is an effect of giving mitoros and sticks on preventing stunting in school children in Medan Tuntungan sub-district with  $P = 0.02$

**Keywords:** School Children, Intake, Mitekor, Stunting, Stick.

## 1. INTRODUCTION

One indicator for creating quality human resources is the fulfillment of goals and targets in the health sector, namely reducing the prevalence of stunting in Indonesia. Stunting is a condition of failure to grow in children due to chronic malnutrition so that children are shorter for their age. Malnutrition occurs when the baby is in the womb and in the early stages of life after birth, but only appears after the child is 2 years old [1]. The Indonesian Ministry of Health (2017) noted that stunting in school children aged 5 -12 years was 27.7% with a prevalence of stunting of 19.4% and very stunting of 8.3%. Based on the 2018 Riskeudas results, the national prevalence of stunting (shortness) for ages 5-12 years was 24%. Stunting in Indonesia since 2007-2018 is still a problem that requires more attention [2]. Based on the SSGI 2021 Medan City, the prevalence of stunted toddler height according to age is 19.9%.

According to Andriani and Wirjatmadi 2012, school age children are in the 6-12 year age group. The growth of children at school age begins to enter a phase of increasingly slow growth. The high incidence of stunting in Indonesia is influenced by several factors including low birth weight, maternal factors including maternal height, maternal education, maternal knowledge level, low-income families, number of toddlers in the house, parenting patterns and food diversity [3].

Anchovies and Moringa leaves are food ingredients that are high in protein, zinc and calcium which can be used to overcome stunting. Anchovy (*Stolephorus* sp.) is a type of fish that is produced in quite large quantities in the Indonesian seas. One type of anchovy that is known to the public is the jengki anchovy. 100 grams of dried jengki anchovies contain 68.7 grams of protein, 5.2 mg zinc and 1700 mg calcium [5].

Moringa leaves (*Moringa oleifera*) are a type of plant that is rich in nutrients. Moringa is known throughout the world as a nutritious plant and the World Health Organization has introduced moringa as an alternative food to overcome nutritional problems [6]. 100 grams of Moringa leaves contain 58.6 grams of protein, 5.2 mg zinc, 1650 grams of calcium. Anchovies and Moringa leaves are still very rarely used. To increase the benefits and nutritional value of anchovies and Moringa leaves, anchovies and Moringa leaves can be processed into flour. In this research, anchovy flour and Moringa leaf flour were used as food ingredients which will later be added to making noodles to increase the nutritional value of the noodles [7].

The results of a survey conducted at two schools, SDN 064026, Baru Kebun Bambu Subdistrict and SDN 067246, Tanjung Selamat Subdistrict, Medan Tuntungan District, found that 12 children from the two schools were randomly measured, 4 of the children whose height was measured using the Z score approach had the same height. shorter than other children. Based on this, it is very necessary to use techniques to reduce stunting in these two schools by empowering mothers and providing school children with microphones.

The problem formulation in this research is to see whether there is an influence of maternal empowerment and the provision of mitekor (moringa anchovy noodles) on preventing stunting in school children in Medan Tuntungan sub-district, Medan city?

## 2. RESEARCH DESIGN

### 2.1. Research Design

This type of research used a quasi-experiment with one group with random sampling and the sample criteria were stunted school children from 2 schools, SDN 067246 and SDN 065015 with determination of anthropometric nutritional status-plus WHO-2007 to determine the TB/U Z-score value.

### 2.2. Nutritional content of noodles and tekor sticks per 100 grams

**Table 1. Nutritional content of tekor noodles**

No	Nutrients	Nutritional Value
1	Energy	238.70 kcal
2	Proteins	8.32 gr
3	Carbohydrate	26.42 gr
4	Calsium	105.28 mg
5	Zink	1.46 mg
6	Iron	2.39 mg

**Table 2. Nutritional content of tekor stick**

No	Nutrients	Nutritional Value
1	Energy	588.22 kcal
2	Proteins	7 gr
3	Carbohydrate	45.69 gr
4	Calsium	131.17 mg
5	Zink	0.79 mg
6	Iron	1.72 g

## 3. DISCUSSION

### 3.1. Characteristics

Sample characteristics were obtained by fulfilling the inclusion criteria. Inclusion criteria: all school children at SDN 067246 and SDN 065015 aged 6-8 years. The largest sample age is the 6 year age group at 3%, the 7 year age group at 66.7% and the 8 year age group at 30.3%. The largest gender is male at 60.6%. The total sample was 33 school children.

### 3.2. Nutritional Status of School Children

Children's nutritional status is based on height and age or using the TB/U index with WHO-2007 anthropometry-plus software to determine the TB/U Z-score value. The division of nutritional status categories is based on the WHO cut-off, namely that a child is in the stunting category if the TB/U Z-score is  $< -2$  SD, and in the normal category if the Z-score is  $\geq -2$  SD. School age children in the research sample were categorized into stunting (a combination of very short and short) and normal.

Body height describes the growth of bones or skeleton. Under normal conditions, height increases with age, but is less sensitive to short-term nutritional deficiencies. The effect of lack of nutritional intake on height will only be visible over a long period of time. Thus, the TB/U index describes past nutritional status, so that low TB/U values (stunting) are used as an indicator of chronic malnutrition (Salimar et al., 2013)

Based on the TB/U index, stunting in school children before and after the intervention increased, where the stunting category before the intervention was given was 33 people (100%) and after the intervention it was 31 people (93.9%). The statistical results show that there is an influence of giving mitoros and sticks on preventing stunting in school children in Medan Tuntungan sub-district. In this study, it was found that the Z-score value  $< -2$  SD before the intervention was 33 school children and after the intervention it was reduced to 31 school children and the Z-score value  $\geq -2$  SD before the intervention was none or all samples were in the short or stunting category but after intervention there were 2 people in the normal category who had a Z-score of 1.99. The minimum value before intervention was 2.99, the maximum value was -2.02, the results showed that the data was normally distributed, then continued with statistical tests with  $P = 0.02$ .

The results of the study showed that the average height of school children before being given the intervention was 112.9 cm and after being given the intervention was 113.3 cm with a difference of 0.4 cm, meaning that the average increase in height of school children was 0.4 cm in one month. giving 100 grams of noodles and sticks per day for 30 days.

When compared with the height of children aged 7-9 years, it is 122-134 cm, so the average height deficiency for school children is 8.7 cm. This can happen because the nutritional intake of school children some time ago did not match the Nutritional Adequacy Rate (AKG) of school children or those aged 7-9 years.

### 3.3. Nutritional Intake

Nutritional Intake for school-aged children, the food provided must include staple foods (as a source of carbohydrates), side dishes (as a source of protein and fat), as well as vegetables and fruit (as a source of minerals and vitamins) and water in amounts adjusted to suit needs. child's age.

Nutritional problems arise due to various factors, such as the amount, type, frequency of food and the quality of food which depends on economic conditions, food practices, cultural traditions, knowledge and food allocation. Apart from that, the condition of a person's body also influences the ability to digest, absorb and utilize nutrition optimally. This ability can be hampered by infections and metabolic disorders (Almatsier, 2010).

Food consumption is the average amount of consumption per day that needs to be increased. Therefore, school children need nutrients that the body needs, such as carbohydrates, protein, fat, vitamins, minerals and water which function to carry out daily physical activities or as energy substances, for the process of growth and development in children, replacing damaged body tissue. damaged or as a building substance, as well as to regulate all body functions. In this study, there were 33 samples who had carried out a recall before and after giving tekor noodles.

**Table 3. Results of school children's nutritional intake**

No	Nutrients	Before intervention	Nutrients noodles tekor, stik	After intervention	Increased intake	AKG for school children 6-9 years per person/day	which must be fulfilled
1	Energy	1382.79 kcal	158,56 kcal	1623.36 kcal	240,57 kkal	1650 kcal	26,24 kcal
2	Proteins	27.27 gr	8.32 gr	207.36 gr	6,76 gr	40 gr	5.97 gr
3	Carbohydrate	200.12 gr	26.42 gr	34.03 gr	7,24	250 gr	42.64 gr
4	Calsium	527.21 mg	105.28 mg	853.03 mg	325,83 mg	1000 mg	146.97 mg
5	Zink	3.9 mg	1.46 mg	4.5 mg	0,6 mg	5 mg	0.5 mg
6	Iron	6.73 mg	2.39 mg	8.09 mg	1,36 mg	10 mg	1.91 mg

The results of the research to obtain nutritional intake using the food recall method, the table shows that there was an increase in nutritional intake before and after the intervention, this was due to the intervention or the provision of 100 grams of tekor noodles and sticks for 30 days, this is very helpful in meeting children's nutritional needs school. As for macronutrients, such as energy, it has increased by 240.57 kcal, but when compared with the nutritional adequacy figure for school children, it is still not suitable, and to fulfill it, 26.24 kcal is still needed. Also for micronutrients, such as iron, 1.91 mg is still needed to be suitable. with nutritional adequacy figures for school children. In this case, giving loose noodles and sticks is very good for meeting the nutritional needs of school children. Some of the things found in school children at Tuntungan Elementary School are that they often don't eat breakfast, eat low protein and vegetables, rarely consume fruit, don't bring lunch to school, snacks at school are junk food or ready-to-eat foods that are low in protein, iron, zinc, folic acid and calcium which are often consumed by school children, cause irregular eating patterns. Optimal nutritional consumption will support children to stay healthy. However, the fact is that there are still many elementary school children who experience nutritional problems.

Energy consumption is needed by children to support their physical activities, apart from that it also plays a role in the sustainability of the organ systems in the child's body. Meanwhile, protein consumption is needed to support the growth and development process in school children. Lack of energy, protein and mineral intake will cause children to become thin and short.

## CONCLUSION

- Based on the TB/U index, stunting in school children before and after the intervention increased, where the stunting category before the intervention was given was 33 people (100%) and after the intervention it was 31 people (93.9%).
- Average increase in energy intake; 26.24 kcal, protein; 5.97gr, carbohydrates; 42.64gr, calcium 146.97mg, zinc ; 0.5mg and iron; 1.9 mg.
- There is an effect of giving loose noodles on preventing stunting in school children (TB/U) with a P value of 0.002.
- There is an effect of giving tekor noodles on school children's nutritional intake (energy, protein, carbohydrates, calcium, zinc and iron) with a P value; 0,000

## REFERENCES

- Arfines, P. P., & Fitthia Dyah Puspitasari. (n.d.). Hubungan Stunting dengan Prestasi Belajar Anak Sekolah dasar di Daerah Kumuh, Kotamadya Jakarta Pusat. 45(1), 2017. doi:10.22435
- Nugrahani Astuti, D. R. (2021). Pengaruh penambahan tepung daun kelor (*moringa oliefera*) dan jumlah gula terhadap sifat organoleptik kue satu. *Jurnal Tata Boga*, 10(1), 157-165.
- N. N. Widyarningsih, K. Kusnandar, and S. Anantanyu, "Keragaman pangan, pola asuh makan dan kejadian stunting pada balita usia 24-59 bulan," *Jurnal Gizi Indonesia (The Indonesian Journal of Nutrition)*, vol. 7, no. 1, pp. 22-29, Dec. 2018
- Abidin et al. (2013, November). Sifat Fisik Mie Basah Berbahan Dasar Tepung Komposit Kentang. *Jurnal Agroindustri*, II, 57-64.
- Sutarno. 2018. Penetapan Kadar Protein Ikan Teri Kering (*Stolephorus sp*) yang Dijual di Pasar Tani Kemiling Bandar Lampung Dengan Metode Kjeldah. *Jurnal Analis Farmasi*. Vol 3 (4).
- Wilda Laila, D. (2018). Faktor determinan kejadian stunting pada anak sekolah dan pengaruhnya terhadap prestasi belajar di sdn 09 nanggalo kota padang tahun 2017. *Jurnal Kesehatan Perintis (Perintis's Health Journal)*, 5(1), 30-38.

- [7] Astawan. (2010, November). Mie basah merupakan mie mentah yang akan mengalami perebusan dengan air mendidih sebelum dipasarkan. *Jurnal Kompetensi Teknik Pertanian Lampung, Teknik* Vol. 11, 15-21.
- [8] Kholis N, H. F. (2010). Pengujian bioassay biskuit balita yang disuplementasi oleifera) pada model tikus malnutrisi. *Jurnal Teknologi Pertanian*, 144-151.
- [9] Lestari, Wanda, Sri Hartati Indah Rezeki, Dian Mayasari Siregar, and Saskiyanto Manggabarani. 2018. "Faktor Yang Berhubungan Dengan Kejadian Stunting Pada Anak Sekolah Dasar Negeri 014610 Sei Renggas Kecamatan Kisaran Barat Kabupaten Asahan." *Jurnal Dunia Gizi* 1(1): 59.
- [10]
- [11] Nanggalo, S D N, Kota Padang, Dezi Ilham, and Wilda Laila. 2018. "Faktor Determinan Kejadian Stunting Pada Anak Sekolah Dan Pengaruh Terhadap Prestasi Belajar Di Sekolah." 5: 30–38.
- [12] Unicef. (2013). *Improving child nutrition: The Achievable Imperative for Global Progres*. United Nations Publications Sales.
- [13] Almsier. (2016). *Prinsip Dasar Ilmu Gizi*, Jakarta: PT. Gramedia Pustaka .
- [14] Y, E. (2020). Faktor Determinan Kejadian Stunting pada Anak Sekolah dan Pengaruhnya Terhadap Prestasi Belajar. *Jurnal Ilmu Gizi Indonesia (JIGZI)*, 1(1), 59-70.
- [15] Gunawan, Gregorius, Jeanette I. Ch. Manoppo, and Rocky Wilar. 2018. "Hubungan Stunting Dengan Prestasi Belajar Anak Sekolah Dasar Di Kecamatan Tikala Manado." *e-CliniC* 6(2): 147–52.
- [16] Kemenkes. (2020). *Studi-Studi Status Gizi Balita Indonesia (SSGB) Tahun 2019 Dan Studi Determinan Status Gizi (SDGS) Pada Masa Pandemi Covid-19 Tahun 2020*. Jakarta: Badan Penelitian Dan Pengembangan Kesehatan.
- [17] Picauly. (2013). Analisis Determinan Dan Pengaruh Stunting Terhadap Prestasi Belajar Anak Sekolah Di Kupang Dan Sumba Timur, NTT. *Jurnal Gizi Dan Pangan*, 55-62.
- [18] Pusat Data Dan Informasi. (2018). *Situasi Balita Pendek (Stunting) Di Indonesia*. Buletin Jendela Data dan Informasi.
- [19] Reproduksi, *Jurnal Kesehatan*. 2020. "Unit Pelaksana Fungsional - Inovasi Penanggulangan Stunting Pusat Penelitian Dan Pengembangan Upaya Kesehatan Masyarakat Badan Penelitian Dan Pengembangan Kesehatan, Kementerian Kesehatan RI \*." 11(2): 163–77.

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