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Mid-Upper Arm Circumference (MUAC) Tapes:

A Simple Tool To Detect Child Wasting and Save Lives in Children Aged Between 6 Months and 5 Years Old

Key Messages

- One in 12 Indonesian children under five years is estimated to be wasted (too thin compared to their height/length). Wasted (moderate wasting and severe wasting) children are three times more likely to become stunted, with those with severe wasting having almost 12 times greater risk of dying than a healthy child.
- Detecting child wasting before children develop complications is essential in order to easily treat the condition.
- Simple colour-coded bands, known as mid-upper arm circumference (MUAC) tapes, can be easily used at both the community and health-facility level, and even within households, to detect wasting and refer children in need for wasting treatment.
- The World Health Organisation (WHO) and Ministry of Health (MoH) updated guidelines recommend that MUAC measurements be used as a screening tool to detect child wasting in the community, and at a health-facility level, as an independent criterion, in addition to weight-for-height and bilateral oedema (nutritional swelling), for admission to wasting treatment programmes.
- Global and local evidence has found that communities, including caregivers, can be easily trained and equipped with MUAC tapes to screen for wasting, detect child wasting early, and appropriately refer children at risk to health facilities when needed.
- Additionally, Integrated Health Outpost (Posyandu) and Early Childhood Development (ECD) center are also important platforms for early identification of wasted children and referral for timely treatment and nutritional care.

Introduction

In Indonesia, one in 12 children under five is wasted (i.e., too thin for their height/length), threatening their survival, growth, and development. This condition has the highest mortality rate among all forms of malnutrition, especially in its most severe form or when combined with stunting. Children with severe wasting are almost 12 times more likely to die than their healthy peers. Wasting is also inextricably linked to stunting: wasted children are three times more likely to become stunted than well-nourished children.

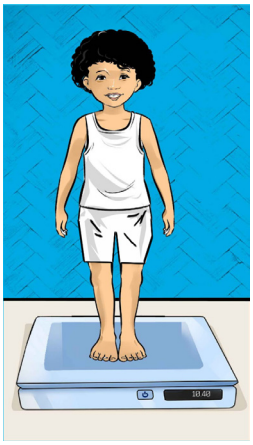
Thankfully, effective strategies to prevent wasting exist, and where prevention efforts fail, evidence-based treatment models have been developed. Global evidence has found that 85-90 per cent of severely wasted children aged 6-59 months can be successfully treated at home without requiring hospitalization, if identified early.

The Government of Indonesia is strongly committed to addressing child wasting, aiming to reduce the prevalence of wasting from 10 per cent to less than 7 per cent by 2024. Additionally, the 2021 Presidential Decree on child stunting set a target to provide treatment to 90 per cent of severely wasted children by 2024. Scaling-up wasting treatment interventions across the country is thus a priority.

Identifying children with wasting

It is essential to detect child wasting as early as possible, when it is easier to treat. To identify wasting, three different measures can be used independently:

1. **Weight-for-height/length:** Comparing a child's weight to his or her height/length is one of the main ways to determine if a child is wasted. If a child's weight is too low compared to his/her height, this is a sign that the child has insufficient energy intake and is wasted. WHO sets a definition of wasting as a child whose weight falls two standard deviations below their expected weight-for-height.



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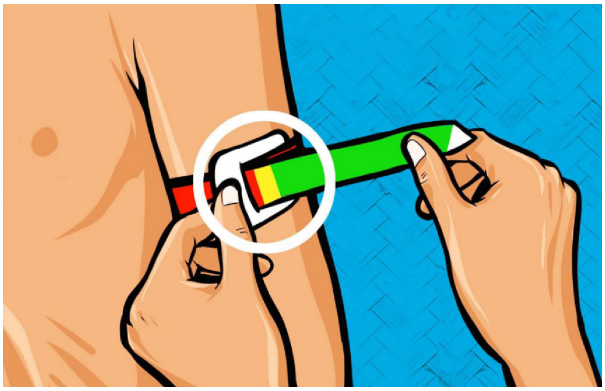
2. **Mid Upper Arm Circumference measurements (MUAC):** Another way of determining wasting is by measuring the circumference of a child's mid-upper arm using a colour-coded band. The MUAC between 115mm and 125mm identifies moderate acute malnutrition children while MUAC below 115mm determines severe acute malnutrition children.



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3. **Bilateral oedema:** A third sign of wasting is swelling in a child's feet and body. This can be assessed by pressing one's thumb on both feet for approximately three seconds. If an indentation remains, the child has oedema.

It is important to note that these three measures tend to identify different children and therefore all three are used to diagnose children with wasting.

Because of its ease of use, simplicity and scalability, MUAC tapes (together with oedema assessments) are often used at the community level rather than weight-for-height calculations, which require cumbersome equipment. MUAC has also been found to identify children at the highest risk of death from common childhood illnesses. Regular screening in the community has been shown to improve early diagnosis, while decreasing the risk of medical complications or death. Historically, MUAC screening at community level has been the primary responsibility of community health workers (CHWs) or community volunteers (CHVs). However, there is mounting evidence to suggest that families and caregivers can also play a significant role in carrying out MUAC screening in their own families.

The benefits of using MUAC tape

A number of benefits of using MUAC have been identified in both research and programming. These include:

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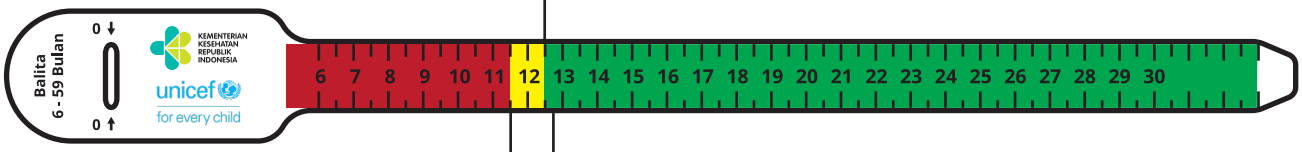
- It is a simple, easy-to-use method
- It is non-invasive
- It is inexpensive and easy to produce
- It requires minimum training
- It can easily be used even by those who are illiterate
- It identifies children with the greatest mortality risk
- It is better able to facilitate high programme coverage

Myatt, M., et al., 'A review of methods to detect cases of severely malnourished children in the community for their admission into community-based therapeutic care programmes', September 2006, https://pubmed.ncbi.nlm.nih.gov/17076211/.

MUAC cut offs

Yellow (Moderate Wasting)

If a child has an MUAC reading in the yellow zone, s/he is moderately wasted and should be provided with local supplementary food, counseling and regular monitoring to ensure they don't become severely wasted.



Red (Severe Wasting)

If a child has an MUAC reading in the red zone, s/he is severely wasted and requires treatment at the Pukesmas.

Green (No wasted)

If a child has an MUAC reading in the green zone, she/he is not wasted.

Using MUAC tape at the community level

Communities can play an essential role in identifying children with wasting as early as possible, and community platforms such as Posyandu are vital to monitor the growth of children, identify child wasting and appropriately refer children for wasting treatment. Since the updated guidelines on the prevention and treatment of severe child wasting by the MoH in 2019, the use of MUAC tapes have been institutionalized into routine Posyandu services to enable the early detection of child wasting. Importantly, in 2022, the MoH also integrated MUAC measurement documentation within the Maternal Child Health (MNCH) Book (the pink book).

Other platforms also offer unique opportunities for child wasting screening, such as Early Childhood Education (ECE/PAUD) centres. Similar to Posyandu, ECE centres are found in almost every village in Indonesia, and thus provide an opportune platform to support children beyond their educational needs - particularly given the importance of good nutrition for optimal learning.

Consequently, in 2022 UNICEF, the Ministries of Health and Education and related agencies began piloting a project to build the capacity of ECE teachers around child wasting, particularly how to identify and appropriately refer children with severe wasting in East Nusa Tenggara (NTT), Papua and South Sulawesi provinces.

The project aims to serve as a model for future interventions to prevent and treat child wasting. It will be closely monitored and evaluated, with a baseline and endline assessment planned to document any changes in teachers' knowledge, attitudes and practices in relation to child malnutrition.

Using MUAC tape at the household level

Since 2012, an approach where caregivers are trained to screen for wasting in their children, by measuring MUAC and assessing for oedema, has been rolled out in many different countries. This approach, often known as Family MUAC, recognizes that families are best placed to identify early signs of nutrition problems and reinforces their role in protecting and promoting their child's health. Involving families also enables them to develop a better understanding of wasting and to be more engaged in monitoring their children's nutrition status. In addition, frequent screenings also lead to the earlier detection of wasting, which, if acted upon in a timely manner, can decrease mortality and morbidity, reduce programme costs due to shorter treatment times, and lower the proportion of children requiring hospitalization. The approach also enables community health workers to have more time to perform other important health and nutrition tasks.

There is now a wealth of evidence on the effectiveness of this approach with studies consistently showing that caregivers are able to take MUAC measurements and identify wasting, as well as community health workers. As the colour-coded band can easily be used to identify children in the 'green' (not wasted), 'yellow' (moderately wasted) or 'red' zone (severely wasted), neither literacy or numeracy skills are required, and therefore all caregivers are able to use the approach.

Given the global evidence of the effectiveness of this approach, Family MUAC was piloted in NTT province in March 2020. The pilot found that

screening by caregivers was as good as screening conducted by community health volunteers. As a result, since 2021, UNICEF has supported the MoH to introduce Family MUAC in more than 20 districts across seven provinces in Indonesia.

"We can and must put families at the centre of efforts to diagnose malnutrition by giving them the means, knowledge and the power to use MUAC."

Using MUAC tape at the facility level

MUAC is also an important tool to be used at the facility level to detect and diagnose child wasting. It is, however, a relatively new tool, with many health workers preferring to use the more familiar weight-for-height measurements. Internationally agreed upon and WHO-recognized anthropometric definitions for severe wasting use both weight-for-height and MUAC indicators as independent criteria at the facility level, meaning that both measures should be used to classify severe wasting. Both indicators are recommended because the two criteria have low overlap, and identify different children in many contexts. In other words, most children with severe wasting present with either severely low weight-for-height or severely low MUAC, rather than both. WHO estimates that the two criteria only overlap in 40 per cent of cases, but this figure may be as low as 16.5 per cent. Given that taking both weight and height measurements is generally feasible at the health facility level (unlike in most community settings), it is advised that both measures, together with oedema assessments, should be used.

Moreover, the use of both indicators is recommended as the use of different anthropometric criterion at different points of contact - i.e., the use of MUAC for screening at the community level, but the use of weight-for-height at the health facility level can lead to confusion and children being rejected when referred.

MUAC and the National Nutrition Information System

In 2021, the recording and reporting of MUAC screening indicators and data on the treatment of severely wasted children was included in the national nutrition information system (e-ppgbm and Pelita Kesmas). This enables the collection of screening and treatment data through the upgraded system to ensure strong monitoring and evaluation of child wasting interventions.

Next steps in promoting the use of MUAC throughout Indonesia

When efforts to prevent malnutrition fall short, early detection and treatment of children with wasting and other life-threatening forms of malnutrition are critical to save their lives, and put them on the path to healthy growth and development. Tools like MUAC tapes are essential in this regard. To further promote the use of MUAC tapes across Indonesia, UNICEF recommends to:

- Ensure the availability of MUAC tapes in all Posyandu and ECE centres across the country and where feasible, as many households as possible to facilitate the early identification of child wasting.
- Continue to integrate regular child wasting screening activities within Posyandu and ECE centres for early detection and timely referral and treatment if needed;
- Continue to scale up the Family MUAC approach and ECE-led child wasting screening across the country.
- Strengthen the capacity of community health volunteers, community leaders and caregivers in relation to MUAC measurements;
- Continue to scale up the use of both MUAC and weight-for-height measurements at the facility level as per the MoH guidelines; and
- Strengthen the reporting and recording of child wasting screening and treatment data, including MUAC measurements, within the e-ppgbm and Pelita Kesmas, the national nutrition information system.

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Editor: David Challanger

Layout: Andy Ruay

Contact Details: Blandina Rosalina Bait | Nutrition Specialist | bbait@unicef.org

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United Nations Children's Fund (UNICEF)
World Trade Center 2, 22nd Floor,
Jl. Jend. Sudirman Kav. 31,
Jakarta, 12920, Indonesia.
Tel: +62 21 5091 6100
Email: jakarta@unicef.org
Website: www.unicef.or.id

Ministry of Health
Directorate General of Public Health
Directorate of Nutrition and Mother and Child Health
Adhyatma Building, 7th Floor
Jl. HR Rasuna Said Block X.5 Lot 4-9 Kuningan,
Jakarta, 12950, Indonesia.
Tel: +62 021 5221227
Website: https://gizikia.kemkes.go.id/