



## **SEVERE MALNUTRITION WITH GROSS MOTOR DEVELOPMENTAL DELAY IN A 21-MONTH-OLD GIRL: A FAMILY MEDICINE CASE REPORT**

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### **Abstract**

*Severe wasting also called severe acute malnutrition (SAM), represents one of the most life-threatening forms of malnutrition affecting vulnerable children worldwide, with 13.6 million children under five globally. Indonesia's wasting prevalence (10.2%) exceeds Southeast Asia's 8.9% average, with severe wasting at 5.3%. Survivors face profound developmental delays, with neurobiological changes including reduced synapses and delayed myelination that persist despite nutritional recovery. This case report aims to describe the comprehensive management of a toddler with SAM and gross motor developmental delay using a family medicine approach. We made four home visits every week from July to August 2025 in the Cikupa Community Health Centre area. The patient is given a comprehensive management plan, such as patient-centered interventions that involve a family and community approach. After weekly home visits for one month, the patient's weight and height increased. Although the patient's development remained at a score of 6, significant gross motor development was gradually occurring. This case exemplifies family medicine's transformative power in managing SAM with developmental delay through comprehensive management.*

**Keywords:** Severe Wasting, Severe Acute Malnutrition, Developmental Delay, Family Medicine Approach, Toddler

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## INTRODUCTION

Severe wasting represents one of the most acute and life-threatening forms of malnutrition affecting vulnerable children worldwide. It is also referred to as severe acute malnutrition (SAM) (UNICEF, 2022). Defined as weight-for-height z-score below  $-3$  SD or mid-upper arm circumference  $<115$  mm, affects 13.6 million children under five globally, carrying 11 times higher mortality risk than well-nourished peers (UNICEF, 2022; Dipasquale et al., 2020). Unlike chronic stunting, severe wasting reflects acute energy deprivation from poverty, infections, and food insecurity, manifesting as marasmus (extreme tissue wasting) or kwashiorkor (edematous malnutrition) (Titi-Lartey, 2023). Survivors face profound developmental delays, with neurobiological changes including reduced synapses and delayed myelination that persist despite nutritional recovery (Kirolos et al., 2022).

Asia bears about three-quarters of the global severe wasting burden, while Africa accounts for 22% (PAHO/WHO, 2022). In Cambodia, wasting showed stronger associations with fine motor ( $HR <0.75$ ) and cognitive delays than stunting (Van Beekum et al., 2022). Ethiopia reported wasted children had 3.7-fold higher developmental delay risk (Wondemagegn et al., 2022). In India found 75% motor, 75% language, and 63% cognitive delays in SAM cases (Khandelwal et al., 2020). Malawi documented 80% gross motor delay, worse in kwashiorkor (van den Heuvel et al., 2017).

Indonesia's wasting prevalence (10.2%) exceeds Southeast Asia's 8.9% average, with severe wasting at 5.3% affecting  $\sim 1.2$  million children (Global Nutrition Report, 2024; Deswinta & Prasetyo, 2024). Fifteen of 17 eastern provinces exceed national rates; Papua shows 6.3% SAM malnutrition under age two (Jasper et al., 2022). All severe cases exhibited delays across motor, language, and social domains, kwashiorkor worse than marasmus (Papotot et al., 2021). Poverty and poor sanitation drive prevalence; clean water and breastfeeding protect (Deswinta & Prasetyo, 2024).

Severe wasting disrupts fine motor and cognitive domains more than gross motor, via micronutrient deficits impairing synaptogenesis and myelination (Van Beekum et al., 2022; Bhat et al., 2023). First 1,000 days represent a critical window; deficits often irreversible post-age 3-4

(Dipasquale et al., 2020). Indonesian studies confirm universal domain delays in severe cases (Papotot et al., 2021). Long-term, survivors show lower school achievement and productivity (Kirolos et al., 2024). East Nusa Tenggara trials found nutrition plus psychosocial stimulation superior to nutrition alone (Shagti et al., 2025). WHO guidelines emphasize MUAC screening, ready-to-use therapeutic foods, and integrated support (WHO, 2023). Prevention through social protection remains essential (Kirolos et al., 2022). This study aims to report the management of a toddler with SAM and gross motor developmental delay using a family medicine approach through serial home visits in the Cikupa Community Health Centre area.

## METHOD

This is a single-patient case report using a family medicine framework. We made four home visits every week from July to August 2025 in the Cikupa Community Health Centre area. In order to evaluate the patient's social interactions with his family and genetic disease history, our family medicine method entails generating a genogram. Additionally, we use the mandala of health to take into account a number of interconnected elements that may affect a patient's health, including biology, individual behaviour, the psychosocial environment, and the physical environment. We also use the APGAR and SCREEM scores to evaluate the physiological and pathological functions of the family. Five factors, such as personal, clinical, internal, external, and functional, are used to create a comprehensive diagnostic. Additionally, we offered patient education and interventions, such as growth and development monitoring through the use of a pre-development screening questionnaire (KPSP) and measurements of body weight and length at every visit. To increase treatment success, family-approached interventions are also required. These include education on the patient's disease, management strategies, dietary habits, and family support and aid.

## CASE REPORT

A mother brought her 21-month-old daughter to the Cikupa Community Health Center complaining of difficulty gaining weight for the past 5 months. The patient's mother stated that the child looked smaller than neighboring children of

the same age. The complaint was accompanied by the child not being able to stand independently or walk. The patient's mother stated that her child had difficulty when given family meals with a variety of side dishes. The patient preferred chocolate, snacks, and biscuits to meat, fruit, and vegetables. When the mother tried to force the patient to eat foods she didn't like, the patient tended to vomit them. Complaints of a persistent cough, swelling of the body, fever, and night sweats were denied. Bowel and urinary tract infections were within normal limits. The patient then underwent a Mantoux test on the volar part of her left arm and was advised to return two days later. Two days after the Mantoux test, the result was negative.

The patient and family denied any history of allergies, asthma, and tuberculosis. A history of similar complaints was also denied in the family. The patient is the second of two siblings born vaginally with a birth weight and length of 2800 grams and 48 cm, respectively. The patient cried loudly and spontaneously, and there were no complications during delivery. The patient's basic immunizations appeared incomplete, as they only reached 2 months of age. It was known that during pregnancy, ANC visits were routine and regular, but the patient's mother suffered from anemia and was given iron supplementation tablets.

The patient's nutritional history revealed that she was exclusively breastfed for the first six months of life. Breastfeeding was continued until the patient was 16 months old, supplemented with complementary foods. The patient's appetite decreased before and after the symptoms began. The patient's mother always provided food such as one medium-sized boiled potato, bread, a fried egg, and biscuits twice a day. However, the food was always left unfinished, with about half to three-quarters of the portion remaining. The patient also consumed formula milk five times a day, at a dose of two spoons of powdered milk in 90 ml of water. The patient had a habit of playing with neighboring children of the same age and rarely washed her hands after playing outside.

The patient lives with his parents, older sister, and maternal grandparents. The single-story house occupied by the patient and his family measures 6x12 square meters. There are three bedrooms, two kitchens, a toilet, a multi-purpose room, a storage room, and a front and back yard. The backyard is typically used by the patient's mother to process waste by burning it. The wastewater management system channels used water through a gutter in the backyard. The water source for domestic needs

uses a satellite pump, while for drinking, refillable gallons are used. The patient's bathroom appears quite clean, but the ventilation is inadequate. The total incidental and permanent ventilation in the patient's house are 32.5% and 4.8%, respectively. Access to the patient's house is quite difficult because it is located in a narrow alley and can only be passed by two-wheeled vehicles. The patient's house is at the end of the alley, and next to the patient's house is a large project underway.

The family's income comes from the patient's father and grandfather. The patient's father works as a casual laborer, while the patient's grandfather works as a laborer in a steel factory. The physiological family function obtained a total APGAR score of 8, reflecting good family function. Meanwhile, the pathological family function using SCREEM showed the patient's family's economic status as lower-middle class.

On physical examination, the patient was found to be in a state of *compos mentis* consciousness. Vital signs were within normal limits. The patient's weight and length were 6.5 kg and 73 cm, respectively. The upper arm circumference was 10 cm. The patient's nutritional status was classified as severely malnourished with very short stature (*z* score < -3 for weight/length, length for age, and weight for age). The patient's development was assessed using the developmental pre-screening questionnaire (KPSP), resulting in a total score of 6, indicating developmental impairment, particularly in gross motor development. Based on the KPSP for children aged 18-23 months, the patient was unable to stand without holding on for 30 seconds and therefore could not walk without staggering.

Physical examinations revealed anemic conjunctivae in both eyes. Pulmonary examination and peripheral perfusion were within normal limits. There was no edema in the patient's extremities or trunk. Laboratory results revealed hypochromic microcytic anemia (Hb = 10 g/dL).

The patient's comprehensive diagnosis, based on the history and examination, is as follows (Table 1):

**Table 1. Patient Holistic Diagnosis**

<b>Aspect I (Personal)</b>	It has been difficult to gain weight since 5 months ago, and the child is not yet able to stand independently and walk.
<b>Aspect II (Clinical)</b>	Primary diagnosis: Severe wasting/SAM Additional diagnoses: Gross

	developmental delay, anemia	
<b>Aspect III (Internal)</b>	<ul style="list-style-type: none"> <li>- The patient is a child who makes himself vulnerable to any disease.</li> <li>- Lack of understanding and knowledge regarding the condition experienced by the patient.</li> <li>- Incomplete basic immunization.</li> <li>- The patient is difficult to feed and does not always finish the food given.</li> <li>- Patients prefer chocolate, snacks, and biscuits over meat, vegetables, and fruit.</li> <li>- The patient did not wash his hands after playing outside the house.</li> </ul>	<ul style="list-style-type: none"> <li>- Explain to patients to avoid consuming chocolate and snacks.</li> <li>- Explain to the patient to finish the food eaten gradually in small portions but frequently.</li> <li>- Refer the patient to a pediatrician for further treatment.</li> </ul>
<b>Aspect IV (External)</b>	<ul style="list-style-type: none"> <li>- Lack of knowledge and understanding of parents regarding the condition experienced by the patient.</li> <li>- Lack of knowledge and understanding of parents regarding the importance of complete basic immunization for patients.</li> <li>- Lack of implementation of clean and healthy living among patients and their families.</li> <li>- Lower middle class family economic status.</li> <li>- Inadequate permanent ventilation in the patient's home.</li> <li>- Inadequate household waste management by burning.</li> <li>- Lack of variety in the daily menu consumed by patients every day.</li> <li>- The patient lives in an alley near a factory project and is densely populated.</li> </ul>	<ul style="list-style-type: none"> <li>- Explain the condition experienced by the patient.</li> <li>- Explaining the significance of family and parental support for the patient's healing.</li> <li>- Educating patients about the importance of complete immunizations.</li> <li>- Educate parents to give patients small but frequent meals high in calories, protein, and iron to prevent food waste.</li> <li>- Educate parents to provide a variety of foods that are well-tolerated by patients.</li> <li>- Educating parents of patients to manage household waste without burning it in the backyard.</li> <li>- Train the patient to walk little by little with company and supervision.</li> <li>- Educating the patient's family to adopt clean and healthy living behaviors.</li> <li>- Explain to the patient's parents about the importance of monitoring the patient's growth and development regularly at the nearest community health center or integrated health post.</li> </ul>
<b>Aspect V (Functional)</b>	Cannot be assessed yet	

The patient is given a comprehensive management plan. Patient-centered interventions involve a family and community approach (Table 2).

**Table 2. Comprehensive Management Strategy**  
**Comprehensive Management Strategy of the Patient**

Patient centered intervention	<ul style="list-style-type: none"> <li>- Giving the patient F100 milk for her malnutrition.</li> <li>- Patients are given iron supplements in the form of syrup.</li> <li>- Educate patients to adopt clean and healthy living behavior by washing their hands regularly after playing outside the house.</li> <li>- Educate patients to consume</li> </ul>
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<b>Family approach intervention</b>	<ul style="list-style-type: none"> <li>- Educate parents to give patients small but frequent meals high in calories, protein, and iron to prevent food waste.</li> <li>- Educate parents to provide a variety of foods that are well-tolerated by patients.</li> <li>- Educating parents of patients to manage household waste without burning it in the backyard.</li> <li>- Train the patient to walk little by little with company and supervision.</li> <li>- Educating the patient's family to adopt clean and healthy living behaviors.</li> <li>- Explain to the patient's parents about the importance of monitoring the patient's growth and development regularly at the nearest community health center or integrated health post.</li> </ul>
<b>Community approach intervention</b>	<ul style="list-style-type: none"> <li>- Collaborate with RT and cadres to conduct home visits to patients due to limited family finances.</li> </ul>

## DISCUSSION

This case exemplifies the family medicine principle that individual patient pathology cannot be separated from family systems and contexts. SAM in this 21-month-old girl, manifested as severe wasting (weight-for-height z-score  $<-3$  SD, mid-upper arm circumference 10 cm) with gross motor developmental delay, required a comprehensive family-centered approach rather than isolated medical intervention (Titi-Lartey, 2023; Dipasquale et al., 2020). The developmental delay— inability to stand independently or walk at 18–23 months—reflects neurobiological damage

occurring during the critical 1,000-day window when undernutrition causes irreversible alterations in synaptic development and myelination (Khandelwal et al., 2020). Family medicine demands understanding that the child's malnutrition emerges from modifiable family and environmental factors: inadequate household food security, maternal knowledge gaps regarding complementary feeding, poor sanitation, incomplete immunization, and economic constraint (Dipasquale et al., 2020).

The comprehensive diagnostic approach using genogram, mandala of health, APGAR, and SCREEM assessments enabled identification of underlying family systems context. The genogram revealed family composition and identified maternal anemia during pregnancy as a risk factor; the mandala of health simultaneously considered biological (anemia, incomplete immunization), behavioral (poor feeding practices, inadequate hygiene), psychosocial (maternal knowledge gaps), and environmental factors (inadequate ventilation, open waste burning, alley residence) (Family Assessment Tools, 2024). The APGAR score of 8 indicated adequate family function despite economic hardship, suggesting family dynamics could support interventions; SCREEM assessment identified lower-middle class socioeconomic status as a fundamental constraint (Family Assessment Tools, 2024). This holistic diagnostic framework transcended narrow medical categorization and instead mapped the complete ecological context: a child experiencing concurrent nutritional, infectious, developmental, and environmental health threats emerging from modifiable family-level and household-level factors amenable to intervention (Wondemagegn et al., 2022).

Home-based management through weekly visits addressed the fundamental barrier of treatment accessibility. Despite evidence that community-based management of SAM produces equivalent outcomes to facility-based care, only 10% of children with SAM globally receive treatment, primarily because transportation costs, time loss from economic activity, and care burden constitute insurmountable barriers for impoverished families (Woeltje et al., 2021; Isanaka et al., 2020). Home visits enabled direct environmental assessment (discovering inadequate ventilation, open waste burning, poor water management) and real-time identification of modifiable household risks (Family Assessment Tools, 2024). Collaboration with community

health volunteers leveraged existing social capital, transforming limited government resources through community-embedded care delivery (Isanaka et al., 2020). Research demonstrates that with minimal training (<30 minutes), caregivers can reliably implement at-home surveillance including mid-upper arm circumference measurement and clinical danger sign recognition, suggesting that home-based models shift appropriate responsibility for routine monitoring from overburdened health systems to empowered caregivers (Isanaka et al., 2020).

Family-centered nutritional and developmental interventions addressed both biological and psychosocial dimensions of severe wasting. F-100 therapeutic milk prescription (100 kcal/100 ml with balanced micronutrients) provides the biological foundation for metabolic repair and catch-up growth; however, treatment success depends entirely upon family capacity to implement therapy consistently despite economic constraints (WHO, 2023). Feeding education emphasizing small, frequent meals, gradual introduction to nutrient-dense child-preferred foods, and respectful acknowledgment of food aversion reflects contemporary understanding that food acceptance involves complex caregiver-child interactions, not merely caloric provision (WHO, 2023). Evidence demonstrates that caregiver knowledge, self-efficacy, and confidence constitute independent determinants of treatment adherence—factors entirely modifiable through family education addressing disease understanding, management strategies, and parental support importance (Isanaka et al., 2020; Azwar et al., 2024).

Emerging research demonstrates that combining nutritional rehabilitation with psychosocial stimulation produces superior developmental outcomes compared to nutrition alone; while formal stimulation therapy was not explicitly arranged, educational emphasis on environmental engagement (playing with siblings, regular monitoring) recognized that developmental recovery requires environmental activation beyond caloric repletion (Azwar et al., 2024; Humanity & Inclusion, 2021).

After weekly home visits for one month, the patient's weight and height increased. Although the patient's development remained at a score of 6, significant gross motor development was gradually occurring.

## CONCLUSION

This case exemplifies family medicine's transformative power in managing SAM with developmental delay through comprehensive home-based care, integrating F-100 therapeutic milk, KPSP monitoring, and family education on feeding, hygiene, and stimulation during weekly visits at Cikupa Community Health Centre. Ultimately, this approach not only promotes catch-up growth and neurodevelopmental recovery in the critical first 1,000 days but shifts from reactive treatment to preventive systemic change, affirming every child's right to thrive through empowered families and equitable health systems.

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