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CHILDHOOD TUBERCULOSIS AND NUTRITION: OPPORTUNITIES FOR INTEGRATED PROGRAMMING

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Introduction

An estimated 1 million children worldwide are infected with tuberculosis (TB) each year, representing about 11 percent of all TB cases.[1] Community platforms, maternal, newborn and child health, and nutrition programs play an integral role in ensuring TB in children is identified and treated early, however all too often children with TB remain undiagnosed, uncounted, and untreated. National TB guidelines commonly refer to growth faltering and weight loss as significant signs for diagnosing TB in children. Good nutrition is promoted as an essential element of TB treatment and weight gain is used to monitor children's progress during treatment. However, nutrition programs implemented through primary health care (PHC); MNCH, and nutrition services provide limited references to screening malnourished children for TB. This brief is intended to inform National TB Programs (NTPs), nutrition programs, and providers how to capitalize on existing nutrition programs to identify children with TB. It highlights key interventions aimed at addressing malnutrition, and key questions nutrition programs should ask in order to operationalize the identification of children with potential TB.

ABOUT ASH

African Strategies for Health (ASH) is a five-year project funded by the U.S. Agency for International Development's (USAID) Bureau for Africa and implemented by Management Sciences for Health. ASH works to improve the health status of populations across Africa through identifying and advocating for best practices, enhancing technical capacity, and engaging African regional institutions to address health issues in a sustainable manner. ASH provides information on trends and developments on the continent to USAID and other development partners to enhance decision-making regarding investments in health.

Malnutrition[2]

Each year, malnutrition contributes to an estimated 3 million deaths in children under five years of age globally.[3] Undernourished children are especially susceptible to developing infections which may become particularly extensive and serious, including TB and HIV. Malnutrition is a strong risk factor for progression from TB infection to disease, and is estimated to contribute to 26 percent of incident TB globally.[4] However, little research has been done on systematic screening for TB in malnourished children and there is limited data on the prevalence of TB in malnourished children. A study in India

showed that 2 percent of children treated for severe acute malnutrition and evaluated for TB at a nutritional rehabilitation center were confirmed to have TB.[5] More data exists for HIV; a study in Malawi showed that 34 percent of children admitted for severe malnutrition were found to also be HIV positive.[6] Because people living with HIV are more likely than others to become sick with TB, it is likely that TB may be a significant problem in severely malnourished children in areas where HIV prevalence is high. This association between TB, HIV, and malnutrition suggests that screening for TB at service delivery points for malnutrition may be an effective case-finding strategy to expand the number of children diagnosed with TB.[7]

Malnutrition has different manifestations.[8] When screening malnourished children, the highest yield of diagnoses is likely to be obtained from children presenting with wasting classified as either moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). Programs that address MAM and SAM are well-structured with clear guidelines and appropriate systems and have been implemented at scale in many countries.[9] This simplifies the process of incorporating TB screening activities into nutrition programs and facilities rigorous application of screening required to identify TB in children.

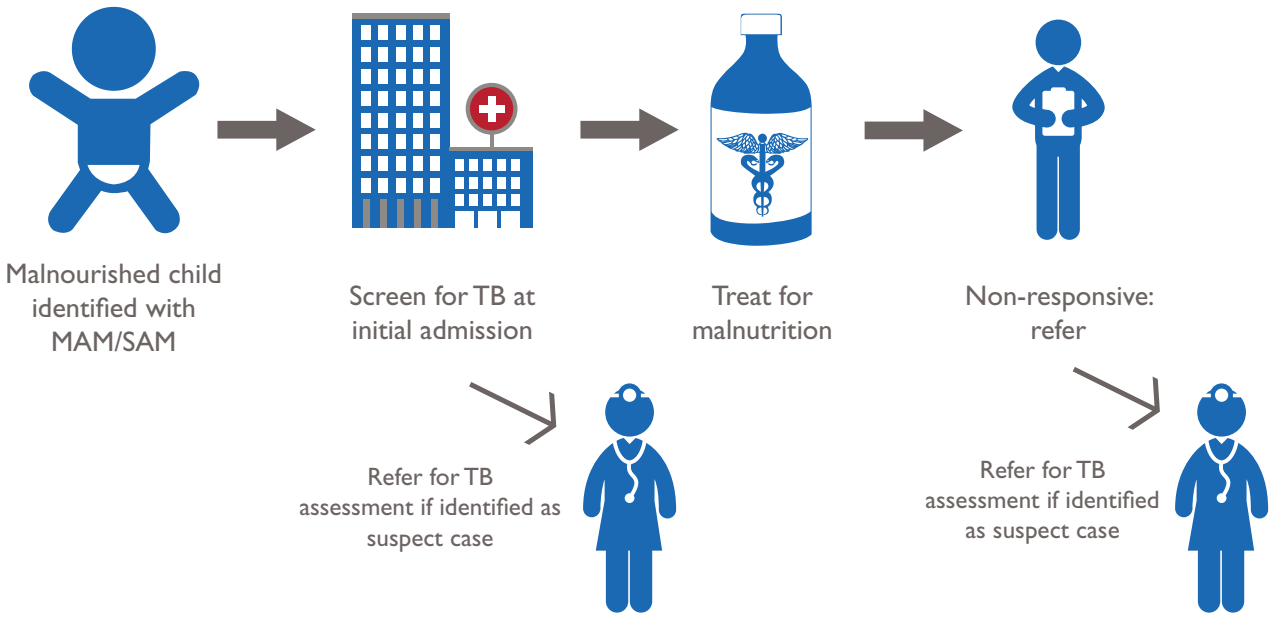
Implementation of Nutrition Programs: Structure and Operationalization

Nutrition programs that target malnourished children rely on community- and facility-level interventions. Health workers (HWs) involved in nutrition programming include community volunteers, community HWs (CHWs), nutrition workers, and clinicians. Children are screened using simple tools such as mid-upper arm circumference (MUAC) tapes or height and weight measuring equipment. Screening may be community-based (e.g., house-to-house visits or through EPI and growth monitoring outreach services) or facility-based.

Children identified with MAM or SAM are assessed for their nutritional and health status which in turn determines the appropriate intervention, following the application of treatment guidelines and algorithms. Children with MAM are enrolled into a supplementary feeding program and are mostly managed on an ambulatory basis. Children with SAM, depending on the clinical assessment, may receive ambulatory or initial institutional treatment followed by ambulatory treatment. Ambulatory treatment is typically supported by volunteers and CHWs with backstopping from PHC facilities. The child's period of rehabilitation may last for several weeks to a few months, thereby creating an extended period of contact between the child and the health system. TB programs can leverage this extended period of contact to confirm the presence of TB in the child as well as identify and trace family members who may also have been exposed to TB.

As with treatment of childhood TB, effective treatment of children with malnutrition hinges on systematic and thorough application of treatment protocols. National guidelines, which include specific measures and algorithms, allow HWs, volunteers, and CHWs to successfully identify, treat, and monitor malnourished children. Guidelines for clinical assessment of

Figure 1. Continuum of care for malnourished children: Opportunities for the detection of TB cases



Benefits of Integrating TB Activities into Nutrition Programs

TB Programs

- **Increased detection of potential cases of TB**
  Active routine screening for TB in children identified with MAM or SAM can result in increased detection of childhood TB cases.
- **Increased identification of other child contacts at home and index TB cases**
  NTPs can leverage the extended period of contact between the health sector and the malnourished child to thoroughly assess both the child identified as a possible TB case and its family members who may be infected or exposed.
- **Improved engagement of community nutrition networks by TB programs**
  Nutrition programs routinely engage with community networks which have the potential to support basic community-level screenings for TB cases and subsequent reporting to NTPs

Nutrition Programs

- **Strengthened quality of care provided through nutrition programs**
  A close linkage between TB and nutrition programs enables the provision of better care to children with TB whose initial contact with the health system occurs through the nutrition program. Identification of a disease like TB, and provision of proper care, can expedite appropriate treatment of malnutrition.
- **Improved efficiency of service delivery**
  Referral of malnourished children for assessment for TB and HIV can prevent reliance on costly, long-term provision of ready-to-use therapeutic food (RUTF).

How to Integrate TB Activities into Nutrition Programs

- Develop the capacity of HWs involved in the management of MAM and SAM to apply existing TB screening tools for assessing and monitoring malnourished children.
- Encourage a routine practice of maintaining a "high index of suspicion" for potential cases of childhood TB.
- Ensure that TB activities contained within nutrition guidelines as well as the nutrition management process are appropriate.
  Specific guidance is required on aspects such as sequencing of treatment and initial responsibility for treatment. Existing guidance suggests that the nutritional status of the child be stabilized prior to initiating TB treatment since TB medicines such as Rifampicin-INH are particularly toxic in the malnourished child. Malnourished children are best managed in nutrition wards when initiating treatment rather than in TB wards due to the high level of specialized skills and adherence to treatment protocols required for the effective management of children receiving treatment for severe malnutrition.
- Clearly define the referral process for children identified with possible TB.
  Standard operating procedures should clearly outline the steps to be taken by nutrition workers when referring a child for TB treatment. Processes and steps should also be outlined for reverse referrals when children are identified as severely malnourished at TB or HIV treatment points.
- Include mechanisms that enable monitoring and evaluation, quality assurance, and supervision of TB activities integrated into nutrition service delivery.
  An example of an indicator for assessing quality and appropriateness from Zimbabwe:[10]
  - Causes of readmission are investigated.
    Some reasons for high numbers of readmissions may be chronic health problems (e.g., HIV/AIDS, TB), poor health environment, disease outbreaks, poor overall food security and lack of general ration, or poor care practices).

Photo by Rudi Thetard

pediatric SAM refer specifically to TB and HIV. In some instances, the guidelines recommend HIV testing during the child's initial admission to nutrition programs. HWs are also trained to explore underlying causes of malnutrition such as HIV or TB when children do not satisfactorily respond to treatment.

Conclusion

Screening children with malnutrition for TB can be an effective mechanism to increase accurate identification of TB in children. Implementation of a referral mechanism to confirm or exclude TB as a cause of malnutrition can optimize service delivery for children with MAM and SAM. Quality of care is enhanced when contributing factors related to malnutrition are detected and effectively managed. NTPs and nutrition programs must collaborate to catalyze sustainable integration of TB activities into malnutrition programming. Malnourished children are likely to be best served when nutrition programs can refer children for TB assessment while, correspondingly, malnourished children identified through TB programs can benefit from the nutritional support provided by nutrition programs. ■

This summary brief was prepared by Dr. Rudi Thetard (ASH) with inputs from Stephanie Rotolo, JoAnn Paradis, and Alison Corbacio (all ASH) and Catherine Lijinsky (USAID/AFR).

ENDNOTES

1. World Health Organization. Global TB Report 2015.
2. Malnutrition refers to deficiencies, excesses, or imbalances in intake of energy, protein, and/or other nutrients. Contrary to common usage, the term 'malnutrition' correctly includes both under-nutrition and over-nutrition. In this brief, the term malnutrition refers specifically to undernutrition. http://www.who.int/nutrition/media_page/backgrounders_4_en.pdf
3. http://data.unicef.org/nutrition/malnutrition.html
4. Bhat PG, Kumar AMV, Naik B, Satyanarayana S, KG D, Nair SA, et al. (2013) Intensified Tuberculosis Case Finding among Malnourished Children in Nutritional Rehabilitation Centres of Karnataka, India: Missed Opportunities. PLoS ONE 8(12): e84255. doi:10.1371/journal.pone.0084255
5. Ibid.
6. Thurstans S, Kerac M, Maleta K, Banda T, Nesbitt A. HIV prevalence in Severely Malnourished Children admitted to Nutrition Rehabilitation Units in Malawi: Geographical & Seasonal variations a Cross-sectional study. BMC Pediatrics. 2008; 8.
7. Nutrition service delivery points specific to nutrition are often referred to as nutrition rehabilitation units (NRU) or Outpatient Therapeutic Points (OTP).
8. Acute malnutrition (wasting [thinness] or nutritional edema); Chronic malnutrition Stunting (shortness, poor cognitive development); Acute and or Chronic malnutrition (underweight). http://www.unicef.org/nutrition/training/2.3/2.html
9. Guidelines produced by Action Against Hunger provide an excellent overview for the management of acute malnutrition including guidance on screening, diagnosis, and treatment initiation, as well as the relationship between TB, HIV, and SAM. International guidelines for the integrated management of severe acute malnutrition: in- and out-patient treatment. http://www.actionagainsthunger.org/sites/default/files/publications/2011-12_ACF_Guidelines__annexes_for_the_Integrated_Management_of_SAM_EN.pdf
10. Government of Zimbabwe. Guidelines for Management of Acute Malnutrition through Community-based Therapeutic Care (CTC). First Edition, 2008. https://www.humanitarianresponse.info/system/files/documents/files/Guidelines%20for%20Management%20of%20Acute%20Malnutrition%20through%20Community-based%20Therapeutic%20Care%20(CTC).pdf

Additional information can be obtained from:
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