What is the relationship between wasting and stunting?

Thursday, February 9, 2023

Hosted by the Nutrition subgroup
The relationship between wasting and stunting
The status quo

Is this justified? Is it effective?
## Wasting & Stunting Technical Interest Group (WaSt TIG)

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**Coordinators:** Tanya Khara & Natalie Sessions
Systematic Review

Aim: To systematically review current evidence on the relationship between wasting and stunting including:

- Physiological mechanisms behind the interaction
- Evidence on the relationship between wasting and stunting
- Mortality implications
- The burden of wasting and stunting, and concurrent wasting and stunting
- Programme and policy implications
- Research priorities
Methods

• Systematic review following PRISMA guidelines
• Registered with PROSPERO

   Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)COS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.

   A systematic review of the evidence of the relationship between wasting and stunting, including evidence on causes and effects, direct associations and physiological mechanisms
Results

45 studies included
Interconnecting physiological processes

- Loss of fat mass – linked with survival
- Loss of muscle mass
- Reduced stores of leptin
- Environmental factors
- Infectious disease and immune inflammatory response
- Concurrence is a transient state
The burden, aetiology and timing of wasting and stunting

• Cross sectional data fails to measure the onset, recovery and persistence of wasting

• New insight into timing of wasting and stunting through longitudinal data
  • peak incidence of wasting and stunting 0-3 months

• Common causes and determinants

• Inter-play between determinants
Evidence for the relationship between wasting and stunting

• Previously considered as independent indicators

• Bi-directional relationship
  
  • Wasting and stunting positively associated in 37/51 countries
  
  • Two-way dose response - Interaction value 1.57
  
  • Wasting treatment programme data also demonstrates relationship
Wasting leading to stunting

• Time lagged effect – wasting is followed by stunting
  • Wasting predictive of stunting
  • Persistent wasting from birth to six months strongly associated with incident stunting
• Body slows or halts linear growth until weight is gained and infection is treated
• Where linear growth occurs, characterised by
  • Less severe wasting/stunting, fewer co-morbidities

• population level data from Senegal - linear growth increased with improving health status (Garenne 2020).
Wasting leading to stunting

- the effect of episodes of wasting on linear growth is modified by age
  - wasting more detrimental to long term linear growth the later it happens
  - recovery of HAZ is more likely if wasting occurs early

- Seasonal evidence - wasting is associated with further wasting
Stunting leading to wasting

- Evidence also supports a direct relationship whereby stunting leads to wasting
  - physiological mechanisms less clear
Concurrent wasting and stunting

- 15.9 million children experience concurrent wasting and stunting (GNR 2018)

- FCAS disproportionately affected with higher rates stable contexts (Khara et al. 2018).

Image from: Khara T, Mwangome M, Ngari M, Dolan C. Children concurrently wasted and stunted: A metaanalysis of prevalence data of children 6–59 months from 84 countries. Matern Child Nutr. 2017;e12516
Concurrent wasting and stunting

• Population-level data
  • wasting, stunting and concurrent wasting and stunting all more prevalent in boys than girls
  • Concurrent wasting and stunting peaks between 12-30 months

• Treatment programme data
  • concurrent wasting and stunting are more prevalent in boys and younger children
  • despite higher overall admission in females, there were more males with concurrent wasting and stunting within the admitted group (Odei Obeng-Amoako, Wamani, et al. 2020).

Image from: Myatt, M., Khara, T., Schoenbuchner, S., Pietzsch, S., Dolan, C., Lelijveld, N. & Briend, A. 2018. Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries. Arch Public Health, 76, 28.
Mortality implications of concurrent wasting and stunting

- McDonald et al 2012 - First big analysis of mortality and multiple anthropometric deficits
  - meta-analysis of 10 cohort studies in 10 countries
  - Children with multiple anthropometric deficits - 12-fold elevated risk of mortality

- Analysis from 51 countries (Myatt et al 2018) later showed a child cannot be wasted and stunted and not underweight
  - mortality estimates calculated above, will also apply for concurrent wasting and stunting

- Wasting, stunting and concurrent wasting and stunting have a positive effect on mortality (Garenne – Senegal)
  - Combined effect of wasting and stunting explained 51% of the total mortality
  - Sex differences in mortality not significant

Image from: Myatt, M., Khara, T., Schoenbuchner, S., Pietzsch, S., Dolan, C., Lelijveld, N. & Briend, A. 2018. Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries. Arch Public Health, 76, 28.
Wasting treatment outcomes and stunting

- Some evidence of influence on treatment response, though inconsistent

- Niger (Isanaka) – response to SAM treatment independent of stunting
  - No difference in weight gain during or after treatment
  - No difference in mean time to recovery
  - Limited HAZ gain during rehabilitation – stunting increased on average (see graph)

- Uganda (Odei) SAM Rx - Lower recovery rates in stunted children
  - nearly half of admissions had WaSt
    - Lower recovery, higher non-response, longer LOS, BUT higher rate of weight gain

- Malawi (Stobough et al) – relapse following MAM Rx
  - children who experienced a negative change in HAZ where more likely to experience relapse to MAM or SAM

Wasting treatment outcomes and stunting

- Long term implications of SAM on stunting
  - Malawi - (Lelijveld et al) - Early weight deficits may have adverse effects on growth and body composition height attainment in the long-term
    - Case control study - 378 children followed up 1-7 years after SAM treatment
    - Some recovery in height, but still more severe stunting than controls
      - shorter leg length, similar sitting height – torso growth preserved, and limb growth compromised
Anthropometric indices and identification of risk

• Studies recognition of heightened mortality – prompts re-examination of how best to identify risk

• WAZ identifies high risk children (especially those both wasted and stunted) who are not being captured using MUAC or WHZ severe criteria

• MUAC and WAZ also found to identify high risk infants under six months.
Ongoing research priorities

• The strength of the evidence has come a long way in recent years but there is still a long way to go.

• Priority areas include:
  • Better understanding of the biological processes and causal pathways
  • Research around prevention
  • Operational/Implementation research
Implications for policies and programmes

• Consider overlapping vulnerabilities

• Develop common prevention strategies
  - Consider seasonality of undernutrition & childhood diseases

• Consider the adaptation of targeting towards the most at risk
  - including concurrently wasted and stunted children
    - Determine the appropriate intensity and duration of treatment for this group
Implications for policies and programmes

• Ensure younger children are prioritised for prevention

• Understand sex-specific data

• Better contextual casual analysis for both wasting and stunting

• Consider the knock-on effects of the problems of underestimating the actual burden of wasting
Implications for policies and programmes

• Explore policy cohesion between wasting and stunting policies

• Donors should continue to examine their financing arrangements- so that wasting and stunting can be simultaneously prevented in both humanitarian & development contexts
Conclusions

• Huge progress in understanding the relationship between wasting and stunting

• Wasting and stunting, driven by common factors, frequently occur in the same child, either at the same time or through their life course, with important interactions between them

• Need for a more integrated approach to prevention and treatment strategies that consider life cycle in order to interrupt this process.

“The notion that wasting and stunting are not separate issues and that they are affecting the same children and that children move in and out of these conditions and we are not doing them justice by just focusing on wasting and neglecting stunting.”

“So what? What do we do differently? How do we manage this problem and what are the priority areas for investment?”
Additional work within the WaSt TIG

Prevention related work

• Preventative actions for wasting and stunting should overlap
• Good health/healthy environment for women & young children is critical
• That mothers and the initial months after birth matter
• Improving the diets of children over six months is essential
Analysis to understand which anthropometric diagnostic criteria best discriminate higher from lower risk of death in children & the programme implications of this.

- Analysis has pointed to a combined case definition (WAZ <-3 and MUAC <115mm) is the best anthropometric measure for predicting deaths

- Operational questions remain before widespread adoption can be recommended

Additional work within the WaSt TIG
Additional work within the WaSt TIG

Bringing new evidence on undernutrition and mortality risk into practice

• This study aims to test whether WFA and MUAC can be effectively utilised in existing programmes to capture WaSt children and reach considerably more children at a high risk of death. It addresses the question:

• What intensity, duration of treatment, and discharge criteria are appropriate for children identified using the combinations of the indicators/thresholds identified (WFA < -3 or MUAC < 115mm)?
Thank you

For more information, visit: https://www.ennonline.net/ourwork/reviews/wastingstunting

Or email: Tanya Khara (tanya@ennonline.net) or Natalie Sessions (natalie@ennonline.net) for more information on the WaSt TIG
Connect with us

Engage with the **Nutrition subgroup co-chairs:**

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Subgroup information, recordings and presentations from previous meetings and webinars are available on the subgroup page and events page of the Child Health Task Force website: www.childhealthtaskforce.org/subgroups/nutrition & www.childhealthtaskforce.org/events

*The recording and presentations from this webinar will be available on these pages in a couple days*

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