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Abstract

Weight Gain among Children with Severe Malnutrition in Therapeutic Feeding Programmes: A Systematic Review and Meta-Analysis †

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Abstract: Background: Although 45 million children under five are wasted, the optimal rate of weight gain during treatment for severe malnutrition is unknown. Historically, inpatient treatment programmes focused on rapid weight gain (WG), with the rationale that this would optimise outcomes. However, recent evidence suggests that too rapid WG might be associated with higher cardiometabolic risk. Our objectives are as follows: describe WG in different programme types (e.g., inpatient, outpatient); explore any association between WG, average length of stay, and mortality/recovery; describe heterogeneity in WG reporting. Methods: For this systematic review and meta-analysis, we searched three databases: Embase (1947–2023), Global Health (1910–2023), and Medline (1946–2023), running the final search on 2nd May 2023. Papers were included if they reported average WG of children aged 6–59 months with severe malnutrition undergoing treatment. Non-English language and grey literature were excluded, except Emergency Nutrition Network Field Exchange articles. Summary data were extracted, and quality appraisal was done using a NICE Quality Appraisal Checklist. We conducted meta-analysis to describe pooled mean WG by programme type. We conducted meta-regression to investigate potential associations of WG with length of stay and programme outcomes. This study is registered with PROSPERO (CRD42023266472). Results: Our search yielded 3001 papers. We reviewed 307 full texts, identifying 127 eligible papers. Of these, 105 papers, with over 240,000 participants in total, reported WG as grams per kilogram per unit time and were eligible for meta-analysis. Mean rate of WG was 9.1 g/kg/d (95%CI 7.9, 10.3) across 19 inpatient programmes, and 3.9 g/kg/d (95%CI 3.5, 4.3) across 58 outpatient programmes. Faster WG was associated with shorter length of stay ($p < 0.001$), but this was moderated by programme type. There was no association between WG and mortality/recovery in unadjusted analyses. There was high heterogeneity between studies. Lastly, 17% of papers did not report WG as grams per kilogram per unit time. Conclusions: Slower WG can be expected in outpatient programmes, compared to

inpatient programmes. However, this is not an immediate cause for concern because we found no important association between WG and mortality. It may even be beneficial considering long-term cardiometabolic risk.

Keywords: severe malnutrition; weight gain; therapeutic feeding programmes; child health; growth; nutrition; catch-up growth

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