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Yoghurt Supplementation Might Improve Gut Health and Support Growth in Malnourished Infants: A Pilot Randomised Controlled Trial in Dhaka's Slums

Introduction

Child undernutrition and stunting are persistent challenges globally, posing significant health risks and mortality among children (1). Despite significant progress, one in four children under five years still suffers from stunting in Bangladesh with higher rates in slum areas (2, 3). Improving gut health, particularly through fermented foods like yoghurt presents a financially viable intervention option in low- and middle-income countries (4, 5). Fermented foods contain beneficial bacteria that support gastrointestinal health (6), offering complex pathways to improved nutrition for young children.

Methods

We conducted a three-arm randomised controlled trial in five slum areas of Dhaka, Bangladesh in 2020. Eligible participants (N=162) included dyads of children aged 4–6 months deemed at risk of stunting (length-for-age z-score ≤ −1 SD and >−2 SD) and their mothers with ≤10 years of education. Using random and equal allocation of households to one of three groups, we provided monthly nutrition education sessions to mothers in one group, the same education plus daily yoghurt supplementation (50 g) to children in another, and usual care (control) to the remaining. The primary outcome measure was the change in mean length-for-age z-score (LAZ), with secondary outcomes including changes in minimum dietary diversity score (MDD) and three faecal inflammatory biomarkers alpha-1 antitrypsin (AAT), myeloperoxidase (MPO), and neopterin (NEO) before and after three months of yoghurt feeding. To manage missing data, we utilised multiple imputation methods. We employed linear mixed-effects models to evaluate changes between baseline and follow-up, supplemented by ANCOVA to assess treatment effects over time.

Results

Intention-to-treat analysis (N=162) and complete-case analysis (N=127) revealed no statistically significant differences in LAZ between the groups. However, the complete-case analysis suggested that following the intervention, children in the education plus yoghurt group improved LAZ by 0.20 SD (95% CI: -0.06, 0.47; *p*-0.13) while children in the education-only group showed an improvement by 0.13 SD (95% CI: -0.13, 0.39; *p*-0.32) compared to the control group. Additionally, children in the yoghurt plus group tend to be five times more likely (95% CI: 0.80, 31.80, *p*-0.09) to meet the MDD score compared to the control group. No significant differences in biomarker concentrations were observed between the yoghurt plus group and the control. Compared to the control group, the adjusted mean faecal NEO concentration decreased by 21% (NEO: RR 0.79, 95% CI: 0.60, 1.04 *p*-0.09), and AAT by 8% (AAT: RR 0.92, 95% CI: 0.69, 1.22, *p*-0.57); in contrast, the adjusted mean faecal MPO concentration increased by 14% (MPO: RR 1.14, 95% CI: 0.62, 2.09, *p*-0.67). Such changes were not evident in the education-only group.

Discussion

The three-month trial with a partial sample showed a more favorable growth trajectory among children in the yoghurt intervention group compared to the education-only or control groups. Additionally, there was a notable reduction in one inflammatory biomarker nearing statistical significance, but not the other two. However, due to the COVID-19 pandemic, endline measurements

at six months were not completed, impacting the interpretation of results. Fermented foods, like yoghurt, have shown diverse health benefits, meriting ongoing research in low-income settings.

References

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