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Efficacy of multiple-micronutrient fortified biscuits on micronutrient status and cognitive performance of adolescent girls in Ghana: A randomized control trial

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Introduction

- Food fortification is potentially a useful strategy to optimize adolescent girls' nutrition, improve their health and work capacity, and break intergenerational cycles of malnutrition and deprivation.
- However, limited knowledge of the efficacy and timing (regarding menarche) of such interventions, especially in resource-poor settings, delays progress.

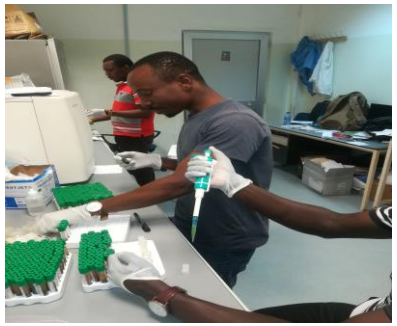
Objectives

To evaluate the effect of consuming multiple-micronutrient fortified biscuits (MMB) 5 days weekly compared to unfortified biscuits (UB) on micronutrient status, height, and cognitive performance of female adolescents (10-17 yrs.), and how the intervention effect relates to its timing before or after menarche

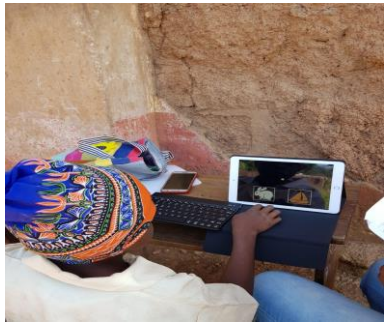
Methods

A 26-week double-blind, randomized placebo-controlled trial with base- and end-line measurement of: plasma biomarkers (primary outcomes), cognition and anthropometry (secondary outcomes)

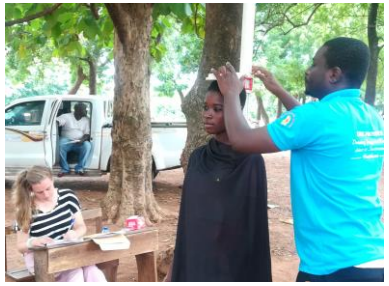
Biomarkers



Cognition (NIH-Toolbox)



Anthropometry



- Analysis was intention-to-treat, followed by per-protocol and subgroup analysis for baseline anaemic girls.
- SAS Proc Mixed was used

Results

- We found no effect of the intervention on hematologic biomarkers and retinol binding protein.
- Body iron stores (calculated) decreased in the MMB group post-intervention($P < 0.05$).
- No effect of intervention on iron and vitamin deficiencies.
- No effect on anthropometric indices and cognition.
- No effect modification of baseline menarche status observed. I
- In a sub-group analysis for anaemic girls, post-intervention working memory and mathematic scores for girls in the MMB group increased significantly ($P<0.05$).

Conclusion

In this group of rural Ghanaian adolescent girls, we found no evidence that MMB consumption improves micronutrient status, cognition, and anthropometric indices