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The Impact of Community-Based Nutrition-Sensitive Aquaculture on Maternal Haemoglobin and Stunting in the Barotse Floodplain

A Systematic Review and Meta-Analysis

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ABSTRACT

{ "background": "Nutrition-sensitive aquaculture is posited as a sustainable strategy to combat micronutrient deficiencies and undernutrition in vulnerable populations. The Barotse Floodplain presents a unique agro-ecological context where such interventions have been implemented, yet their aggregated efficacy on maternal health outcomes remains systematically unassessed.", "purpose and objectives": "This meta-analysis aimed to quantify the effect of a community-based nutrition-sensitive aquaculture programme on haemoglobin concentration and stunting prevalence among pregnant women in the Barotse Floodplain region.", "methodology": "A systematic review identified relevant studies from electronic databases and grey literature. Random-effects meta-analysis was performed on eligible randomised and quasi-experimental studies. The primary model for continuous outcomes was $Yi = \mu + thetai + epsiloni$, where $thetai \sim N(0,\tau^2)$ represents study-specific effects and ε_i the within-study error. Heterogeneity was assessed using the I^2 statistic, and publication bias was evaluated via funnel plots and Egger's test.", "findings": "Pooled analysis of four studies ($n = 1{,}242$ *participants) showed a significant increase in maternal haemoglobin concentra* : 4.8 g/L, 95% CI: 1.2 to 8.4 g/L). The reduction in stunting prevalence was not statistically significant (risk ratio: 0.89, 95% CI: 0.75 to 1.06). High heterogeneity (I^2 = 78%) was observed for haemoglobin outcomes.", "conclusion": "The intervention had a statistically significant, positive effect on improving maternal haemoglobin levels, but evidence for reducing stunting prevalence was inconclusive within the studied timeframe.", "recommendations": "Future programmes should integrate robust dietary counselling and address non-dietary determinants of stunting. Implementation research is needed to understand the contextual factors driving heterogeneous impacts.", "key words": "aquaculture, haemoglobin, stunting, maternal nutrition,

Keywords: *nutrition-sensitive aquaculture, maternal haemoglobin, stunting, Zambia, systematic review, meta-analysis, community-based intervention*

Article Highlights

- Meta-analysis of four studies (n=1,242) shows significant haemoglobin improvement.
- High heterogeneity (I^2=78%) suggests variable intervention impacts across contexts.
- No statistically significant reduction in stunting prevalence was found.
- Findings underscore the need for integrated, multi-faceted

Methodological Note

Random-effects meta-analysis accounted for study-specific variations ($\theta_i \sim N(0, \tau^2)$), with heterogeneity assessed via I^2 statistic and publication bias evaluated.

This review quantifies the specific health impacts of a community-led aquaculture model in a unique floodplain ecosystem.

nutrition programmes.	