

Fortified Ultra-Processed Foods as an Intervention in Vulnerable Populations to Address Nutrient Deficiencies: A Mini Review

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ABSTRACT

This review aimed to examine review papers on effects of Ultra-Processed Foods (UPFs) on vulnerable groups, specifically malnourished children. While some studies showed negative health effects of UPFs, others showed that UPFs were beneficial. For example, fortified biscuits improved nutrient levels in primary school children and ready-to-use therapeutic foods helped malnourished children. Overall, it is crucial to balance the potential benefits and risks of UPFs. Therefore, policymakers should adopt a multifaceted approach that includes redefinition, reformulation, regulation, and education about the mindful consumption of UPFs.

Keywords: fortified biscuits, nutrient deficiencies, ready-to-use therapeutic food, ultra-processed food, vulnerable populations

INTRODUCTION

Based on the degree of food processing, the NOVA system classifies foods into four primary groups, one of which is ultra-processed foods (NOVA Group 4). This categorization does not provide any information about their nutritional composition. Ultra-Processed Foods (UPFs) are compositions of ingredients that are commonly produced through a sequence of industrial techniques and processes, hence the term ultra-processed. UPFs include carbonated soft drinks, pastries, candies, biscuits, cereals, fruit yogurts, infant formulas, and many other products (Food and Agriculture Organization (FAO) 2019). However, there is an ongoing debate about the definition of UPFs and the need to redefine them. Some studies suggest that UPFs may have detrimental effects on human health, while others suggest potential beneficial effects. Therefore, the aim of the present review was to evaluate the existing evidence on the benefits of fortified UPFs for vulnerable populations.

METHODS

A systematic approach was used to identify relevant review papers in multiple databases, including PubMed, Cochrane, ScienceDirect, and Google Scholar. Data extracted

were related to exposure to UPFs and health outcomes. Inclusion criteria were review papers that assessed the benefits or effects of UPFs, such as fortified biscuits or ready-to-use therapeutic foods, on vulnerable groups, including children at risk of malnutrition. This review aimed to provide insights into the potential consequences of UPF consumption on nutritional status and health outcomes. The significant findings were analyzed through a narrative review and the results included only the statistically significant associations of UPFs on health outcomes.

RESULTS AND DISCUSSION

Based on the search conducted for a number of review papers that reported on the consumption of UPFs and its association with health outcomes, there were three papers that met the inclusion criteria of this review (Table 1). A paper by Adams *et al.* (2017) showed that the regular consumption of fortified biscuits among primary school children resulted in significant improvements in their average levels of iron, folic acid, vitamin B12, retinol, and vitamin D. Furthermore, there was a significant reduction in the incidence of anemia and vitamin D deficiency. Similar findings have been reported in studies conducted on children under the age of five suffering from severe acute malnutrition

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Reviews found on effects of consumption of UPFs by malnourished children

Author (year)	Study design	Number of subjects/papers	Intervention	Outcome measured
Adams <i>et al.</i> 2017	Cohort pre-post with control group	351	Fortified biscuits	Iron level Folic acid level Vitamin B12 level Retinol level Vitamin D level
Schoones <i>et al.</i> 2019	Systematic review and meta analysis	15	Ready-to-Use Therapeutic Food (RUTF)	Recovery rates Weight gain
Rimbawan <i>et al.</i> 2022	Systematic review	31	Ready-to-Use Therapeutic Food (RUTF)	Recovery rates Weight gain Height gain Anemia status Albumin level Plasma amino acid level

who received Ready-to-Use Therapeutic Food (RUTF) interventions. The results showed a positive impact on recovery rate, weight gain, height gain, anemia status, and albumin amino acid levels (Rimbawan *et al.* 2022). Another paper comparing RUTF, which met the World Health Organization (WHO) recommendations for nutrient composition, with an alternative dietary approach. This paper suggested that RUTF is likely to enhance recovery and may contribute to an increased rate of weight gain (Schoones *et al.* 2019).

These findings indicate that UPFs can potentially have a positive effect on vulnerable populations, specifically malnourished children. The findings highlight that the effects of UPFs are not all negative, but depending on the specific formulation, the healthy eating habits of the consumers, and the frequency and total intake of the UPFs. Reformulation of UPFs is needed to promote healthier outcomes. This may include controlling sugar, fat, and sodium levels and proper use of food additives. In addition, it is important to ensure that the formulation of UPFs meets the nutritional needs of the target populations. With appropriate formulation and mindful consumption, UPFs are expected to provide health and nutritional benefits. However, it is crucial to continue to research and refine the formulation of UPFs to optimize their nutritional value and minimize potential health risks that may be associated with them.

CONCLUSION

UPFs (fortified biscuits and RUTF products) can provide a healthy dietary alternative for vulnerable populations. Overall, it is crucial to balance the potential benefits and risks of UPFs. Therefore, policy makers should adopt a multifaceted approach that includes redefinition, reformulation, regulation, and education on mindful consumption of UPFs.

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DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicts of interest to report.

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