South African Journal of Clinical Nutrition 2021; 34(4):161–162
https://doi.org/10.1080/16070658.2021.1951951

SAJCN
ISSN 1607-0658 EISSN 2221-1268

LETTER TO THE EDITOR

Increasing resilience to the SARS-CoV-2 virus and other health threats in food-insecure communities

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The health of the majority of South Africa's population is seriously threatened by hunger and micronutrient deficiency, with impaired immune response a real threat, which the current SARSCoV-2 virus pandemic has highlighted. Traditional household food-processing techniques can, amongst other advantages, increase nutrient bioavailability in affordable staple foods and hence provide a way, in part, to alleviate malnutrition for food-insecure communities. In this way, immune defence and pathogen resilience of the food insecure could be enhanced so that they can better survive both COVID-19 and future threats.

Keywords: COVID-19, economic shocks, food insecurity, food security, health shocks, indigenous knowledge systems, malnutrition, micronutrient deficiencies, nutrient bioavailability, nutritional bioavailability, pathogen resilience, SARS-CoV-2

Sir

Fifty per cent of South Africa's population before COVID-19 was food insecure, or at risk of it.[1] Since lockdown, food insecurity has significantly worsened and, probably, zinc and other micronutrient deficiencies too.

Micronutrient deficiency in developing countries occurs largely because of lower bioavailability of micronutrients in plant-based food (PBF) staples (e.g. pulses and wholegrains), in comparison with micronutrient bioavailability in meat, fish and chicken foodstuffs (MFCFs). This is due to the presence of anti-nutritional factors (ANFs) in plants, such as phytate, enzyme inhibitors and lectins, and particularly so for staples such as pulses and wholegrains. Such ANFs bind nutrients in insoluble complexes, reducing their bioavailability significantly.[2–8]

Although ANFs are associated with adverse effects such as impaired nutrient bioavailability, gastrointestinal discomfort, increased intestinal permeability and toxicity at high levels,[4–6] they also serve protective functions, including:

- assisting immune activation for overcoming bacterial, viral and fungal pathogens;
- antioxidant action;
- protection from cell and DNA damage;
- benefittng glucose and lipid metabolism.[6]

PBF staples are well supplied with nutrients, yet their impaired bioavailability seemingly limits their usefulness for developing countries.[2–6] Ways to moderate ANFs' adverse effects, yet reap their benefits, pose a dilemma that challenges developing countries today. However, it could be said that before industrialisation and modern global marketing practices displaced traditional foods and food cultures,[7,9] this was not so.[7,10] The literature reveals that techniques have long been used in traditional food cultures that were useful in increasing nutrient bioavailability by reducing ANF levels in staple foods to optimal amounts.[3,4,7,8]

Some of the useful techniques used included soaking, boiling and fermenting.[3–8] These methods reduced ANF levels and enhanced bioavailability via various mechanisms: leaching of ANFs into soak water, which is discarded before cooking;[3,5] breakdown of insoluble mineral–ANF complexes via passive or simple diffusion; activation of endogenous and microbial enzymes[3–7] even within the first hour of soaking;[4] on longer soaking, further enzyme activity and beneficial spontaneous natural mixed microbial fermentation, with the corresponding drop in pH, increased nutrient bioavailability and food safety;[3–5,7,8] deactivation of all heat-labile ANFs (e.g. lectins and enzyme inhibitors) after 10 minutes of rapid boiling.[5]

These household food-processing techniques are still an intrinsic part of the food culture among indigenous communities in Africa and the developing world. For instance, traditional fermented porridges and beverages in Africa are often preferred for their characteristic taste, texture and colour, and constitute a staple in these traditional diets.[7,8] Further, these methods have been found to be economically and socially feasible and sustainable.[3,4,7,8] As a result, within these communities, such foods and beverages are popular with both the wealthy and the food insecure.[7]

As these practices are manageable for most, irrespective of household socioeconomic status, they could, in part, alleviate malnutrition in food-insecure households via liberating crucial nutrients for immune function, such as zinc[7] and copper. Since there has been much food distribution to alleviate hunger amongst the food insecure since COVID-19, this opportunity should be used to raise awareness of the value to health of these household practices and to facilitate their reclamation in populations where they are no longer used, specifically in food-insecure communities, so that micronutrient deficiencies may be alleviated.[3,4,7,8]

Both authors contributed to the writing and proofreading of the manuscript.

In indigenous communities, it is particularly the women who carry the knowledge that these practices confer digestibility, variety, improved cooking qualities, pleasant flavours, textures and consistencies, and protection from spoilage.[7] Understanding all these benefits makes community uptake by food-insecure households more likely. Thus, co-opting community volunteers/mobilisers,[11] who, where possible, are women who are cognisant of these indigenous knowledge systems (IKS), while also, at all stages of any development/implementation of strategies, involving the mothers/primary caregivers within the food-insecure communities,[4,7] could transfer the relevant IKS to food-insecure households.[7] Guidelines for such purposes should be formulated and terminology should be adjusted: 'pulses' is not a widely understood concept and should be replaced with the phrase 'dried peas, beans and lentils' and appropriate examples of wholegrains should also be given (e.g. stampkoring, pearl barley, samp, Maltabella, brown rice).

COVID-19 is not expected to be our last national or global crisis. The above strategies could promote healthier, more resilient communities so that not only can the current COVID-19 threat be better weathered, but also any other future economic or health shocks.

Disclosure statement – No potential conflict of interest was reported by the author(s).

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Received: 21-04-2021 Accepted: 1-06-2021