

# Consequences of famine and malnourishment on kidney health

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Adequate nutrition is essential for kidney health; however, attempts to improve nutrition and food security have been hindered in recent years by man-made and natural disasters. Approaches to eradicate famine, improve nutritional status and reduce food insecurity are needed to reduce inequities and maintain kidney health in the face of adverse circumstances.

Adequate nutrition is a prerequisite for health. Accordingly, eliminating hunger is the second of seventeen sustainable development goals formally adopted by UN member states. Specifically, the ‘zero hunger’ sustainable development goal aims to end hunger, achieve food security, improve nutrition and promote sustainable agriculture by 2030. However, man-made and natural disasters have cruelly interfered with progress towards these goals. The effects of armed conflict, COVID-19, climate change and growing inequalities have converged to undermine food security worldwide, to the extent that an estimated 1 in 10 people worldwide now suffer from hunger and nearly 1 in 3 lack regular access to adequate food<sup>1</sup>.

Disasters cannot always be prevented, and in times of disaster generally, vulnerable individuals suffer most. There is no doubt that patients with kidney disease are among the vulnerable individuals. The theme for World Kidney Day 2023 – ‘preparing for the unexpected, supporting the vulnerable’ – is therefore both appropriate and timely. The dependency of patients with kidney disease on the continuity and accessibility of dedicated health-care services stands out as an acute threat in times of emergency. However, this threat should not overshadow the more gradual and less obvious consequences of disruption, such as the effects of food security and the availability of adequate nutrition on health status. Throughout human history, these entities have emerged in the slipstream of disaster and add another dimension of misery, with adverse consequences in the short and long term. Despite the fact that the world is producing more food than ever, current events are no exception – as demonstrated by the extent of worldwide hunger and by reports of COVID-19-elicited increases in food insecurity in patient populations. Therefore, nutrition deserves consideration in the call to action for World Kidney Day 2023.

Famine, malnourishment and food insecurity can affect kidney health, and the health and wellbeing of patients with kidney disease, in various ways. In the context of famine when survival is at stake, kidney health may not be an acute consideration. However, exposure to famine during vulnerable periods can have consequences for future generations. Follow-up studies of individuals who lived through the Dutch

famine (1944–1945) and China’s Great Famine (1959–1961) show that the offspring of individuals who are exposed to famine during pregnancy have an increased risk of cardiometabolic disease and albuminuria, and reduced estimated glomerular filtration rate<sup>2,3</sup>. Hence, famine paves the way for the health issues of the next generation, and eliminating famine not only saves the lives of those directly affected but is also a prerequisite for the health of future generations.

## “Famine, malnourishment and food insecurity can affect kidney health”

Malnourishment can occur when food is available but does not meet the body’s needs. Hence, diet quality rather than quantity is the main concern in this context. Malnourishment is a well-established feature of chronic kidney disease (CKD), especially in advanced stages, and is a key determinant of clinical outcomes and patient wellbeing. It is intricately linked to the complex metabolic derangements associated with the loss of kidney function, and requires dedicated consideration and management, which should be included in policy measures that aim to support continuity of care during emergency situations. In addition to malnourishment arising as a consequence of CKD, emerging evidence indicates that signs of malnourishment can also precede and predict the development of CKD<sup>4</sup> – highlighting its relevance as a prevention target for public health programmes. The recognition of malnutrition as a risk factor for noncommunicable diseases such as CKD coincides with increasing awareness that obesity – which has long been recognized as a target for preventive health programmes – is not the antithesis of malnourishment. Rather, obesity and malnourishment reflect a connected nutritional issue – namely, poor diet quality, which is often driven by poverty and often coexists with diet-related noncommunicable diseases across the life course of vulnerable populations<sup>5</sup>. Hence, obesity and malnourishment are part of the same nutritional issue and should be approached in an integrated way rather than separately. Those involved in caring for patients with kidney disease who have obesity and are malnourished will recognize both the challenge and the clinical relevance of this connection.

The notion that obesity and its complications do not merely reflect an abundance of food, but often accompany hidden nutritional deficiencies – the so-called ‘hidden hunger’ – suggests that pleas for health policies that prioritize preventive measures, while entirely appropriate, could further benefit by elaborating on the importance of proper nutrition in primary and secondary disease prevention. Adequate nutritional status is a key requirement for adequate physical, mental and immune function, thus enabling resilience against a variety of possible unexpected events. The strong commitment of the nephrology field to the management of malnourishment might be an asset that could be further reinforced through joint efforts with

stakeholders involved in the prevention of other noncommunicable diseases (such as cardiovascular disease and diabetes).

Food insecurity, defined as the limited or uncertain availability of nutritionally adequate and safe foods, is increasingly recognized as a relevant risk factor for noncommunicable diseases, including CKD, diabetes, cardiovascular disease and obesity<sup>6</sup>. It is closely intertwined with inequity issues, poverty and diet quality. The adverse effect of social disruptions (including loss of income and soaring food prices) as a consequence of the COVID-19 pandemic on food security, particularly in low- and middle-income countries and in vulnerable groups such as patients with CKD, is staggering<sup>7</sup>. The health consequences of this rising food insecurity are not yet clear. Nevertheless, current data along with considerations of justice warrant an emphasis on safeguarding food security as a guiding principle in preparing for the unexpected. It is encouraging that, within the nephrology community, initiatives to reinforce food security for patients are already underway – both through advocacy measures that aim to change government policy and through practical initiatives that directly benefit the patient (for example, by providing food to patients in need and their families)<sup>8</sup>. Awareness among nephrologists is vital, and the two-question ‘Hunger Vital Sign Screen’ can help to identify households who are at risk of food insecurity<sup>9</sup>.

## “Pursuit of the ‘zero hunger’ sustainable development goal is more needed than ever”

With the approach of World Kidney Day 2023, it is also relevant to consider whether there is more we can do as a nephrology community. Considering the resilience of individual patients – defined as the ability to recover from or adjust to misfortune – may be helpful in the context of clinical care and is within immediate reach of health-care professionals. However, it is more crucial than ever that collective action is taken to combat inequities as a major driver of disease and suffering, rather than relying on the capacity of individuals to cope. The safeguarding of nutritional status is one useful strategy with which to

promote resilience. Improving health and food literacy could be another promising strategy to strengthen the ability of patients and citizens to overcome difficult circumstances while minimizing damage to health and wellbeing. Data support links between health literacy, dietary habits and the onset and complications of CKD<sup>10</sup>. Reinforcing health literacy will hopefully strengthen the resilience of affected individuals when faced with an acute disaster; however, it also has the potential to curb the consequences of the slowly unfolding disaster driven by the abundance of unhealthy, nonsustainable foods. Pursuit of the ‘zero hunger’ sustainable development goal is more needed than ever, and is appropriately emphasized by the theme for World Kidney Day 2023.

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### References

1. United Nations Department of Economic and Social Affairs. End hunger, achieve food security and improved nutrition and promote sustainable agriculture. [sdgs.un.org, https://sdgs.un.org/goals/goal2](https://sdgs.un.org/goals/goal2) (accessed 1 January 2023).
2. Painter, R. C. et al. Microalbuminuria in adults after prenatal exposure to the Dutch famine. *J. Am. Soc. Nephrol.* **16**, 189–194 (2005).
3. Wang, N. et al. Exposure to famine in early life and chronic kidney diseases in adulthood. *Nutr. Diabetes* **8**, 4 (2018).
4. Lu, Y. et al. Malnutrition risk and kidney function and decline in community-dwelling older adults. *J. Ren. Nutr.* **32**, 560–568 (2022).
5. The Lancet. A future direction for tackling malnutrition. *Lancet* **395**, 2 (2019).
6. Te Vasquez, J., Feng, S. N., Orr, C. J. & Berkowitz, S. A. Food insecurity and cardiometabolic conditions: a review of recent research. *Curr. Nutr. Rep.* **10**, 243–254 (2021).
7. Vargas-Vazquez, C., Gonzalez-Ortiz, A., Betran-Vila, M. & Espinosa-Cuevas, A. Impact of SARS-COV-2 pandemic on food security in patients with chronic kidney disease. *J. Ren. Nutr.* <https://doi.org/10.1053/j.jrn.2022.07.004> (2022).
8. Mokiao, R. & Hingorani, S. Food insecurity and kidney disease: symptoms of structural racism. *Clin. J. Am. Soc. Nephrol.* **16**, 1903–1905 (2021).
9. Children’s Healthwatch. The hunger vital sign. [childrenshealthwatch.org, https://childrenshealthwatch.org/publicpolicy/hunger-vital-sign/](https://childrenshealthwatch.org/publicpolicy/hunger-vital-sign/) (accessed 1 January 2023).
10. Gurgel do Amaral, M. S., Reijneveld, S. A., Geboers, B., Navis, G. J. & de Winter, A. F. Low health literacy is associated with the onset of CKD during the life course. *J. Am. Soc. Nephrol.* **32**, 1436–1443 (2021).

### Competing interests

The author declares no competing interests.