Building resilient food systems for public health.

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Introduction

Local food systems offer significant avenues to bolster food security and enhance public health outcomes. They achieve this by improving access to fresh produce, fostering stronger community ties, and increasing dietary diversity, ultimately yielding tangible benefits for vulnerable populations and promoting healthier eating habits [1].

However, significant challenges persist. Food insecurity, for example, is consistently linked with poor diet quality and chronic diseases, especially among adults in regions like Latin America and the Caribbean. Research reveals a strong association between food insecurity and lower dietary diversity, increased consumption of unhealthy foods, and a heightened risk of chronic conditions, highlighting a pressing need for targeted interventions [2].

To effectively address these intricate issues, precise measurement and innovative solutions are vital. Current dietary assessment methods in public health nutrition face persistent challenges regarding data accuracy and participant burden. Yet, innovative approaches, including mobile technology and biomarkers, offer promising opportunities to enhance the precision and practicality of dietary data collection, leading to more effective public health interventions [3].

Understanding and preserving traditional dietary practices also holds immense value. The nutritional composition of traditional foods in indigenous communities shows great potential for improving both food security and public health. Emphasizing the preservation of traditional dietary practices and knowledge, these foods can provide essential nutrients and build resilience against contemporary dietary challenges [4].

Broader global factors frequently disrupt food systems and public health. Climate change, for instance, significantly impacts food security and nutritional status worldwide. Changing weather patterns, resource scarcity, and agricultural disruptions worsen food insecurity, leading to malnutrition and adverse public health outcomes, particularly in vulnerable regions. This underscores the necessity for integrated, climate-resilient strategies [5].

A complex interplay exists where food insecurity can drive reliance on cheaper, ultra-processed options. This reliance, in turn, is associated with poorer dietary quality and elevated risks of non-communicable diseases, representing a critical public health challenge [6].

Digital technologies, such as mobile apps, remote sensing, and Artificial Intelligence (AI), are increasingly applied to enhance food security and nutrition surveillance systems. These tools can significantly improve data collection, analysis, and dissemination, enabling more timely and effective interventions for public health challenges, especially in low-resource settings [7].

This concept extends to urban environments, where community gardens actively contribute to public health. These initiatives not only improve food security by making fresh produce more accessible but also encourage healthy eating, boost mental well-being through social interaction and physical activity, and strengthen community resilience [8].

Furthermore, the existence of food deserts exacerbates diet-related health disparities. Interventions aimed at mitigating these impacts, such as farmers' markets, healthy food incentives, and policy changes, are crucial for improving access to nutritious food and reducing health inequities in underserved areas [9].

The COVID-19 pandemic also delivered a profound and widespread blow to global food security and nutritional status. Lockdowns, economic downturns, and supply chain disruptions severely exacerbated food insecurity, causing increased rates of malnutrition and posing substantial public health challenges globally, particularly for vulnerable populations [10].

Conclusion

Research consistently highlights the critical intersection of food security and public health, identifying both challenges and promising solutions. Local food systems and community gardens offer significant benefits by improving access to fresh produce, fostering community ties, and enhancing dietary diversity for vulnerable populations. Traditional foods in indigenous communities also play a vital role, providing essential nutrients and building resilience against modern dietary issues.

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Despite these positive avenues, widespread food insecurity remains a major concern, strongly linked to poor diet quality, increased consumption of unhealthy ultra-processed foods, and a higher risk of chronic diseases, particularly in regions like Latin America and the Caribbean. Global events like climate change and the COVID-19 pandemic have exacerbated these issues, causing agricultural disruptions, economic downturns, and supply chain failures that lead to widespread malnutrition and adverse health outcomes.

Addressing these complex challenges requires innovative approaches. Dietary assessment methods are evolving, with new technologies like mobile apps and biomarkers promising greater accuracy. Digital technologies, including Artificial Intelligence (AI) and remote sensing, are improving food security and nutrition surveillance, enabling more timely and effective interventions. Efforts to mitigate the impact of food deserts through farmers' markets, incentives, and policy changes are also crucial for reducing health disparities. The overall focus is on integrated, resilient strategies to ensure global food security and improve public health.

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