

## Integrating Personalized Nutrition and Social Determinants of Health Can Improved Health Equity in Communities with Health Disparities: A Research Commentary

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Health disparities, defined as systematic, plausible, and avoidable health differences that adversely affect socially disadvantaged groups, with far-reaching implications for public health and societal well-being is today's growing challenge [1]. Recent advances in personalized nutrition and increased recognition of social determinants of health (SDOH) provide promising avenues to address and bridge these disparities. Addressing health disparities in the context of personalized nutrition and understanding SDOH is critical for reasons that include the reduction of disease prevalence, improved overall health, lower healthcare costs, and the promotion of health equity.

According to Zeevi, *et al.* 2015, personalized nutrition, which takes into account an individual's genetic makeup, lifestyle, and environment, can help mitigate the risk of chronic diseases like obesity, diabetes, and heart disease resulting in reduction of disease prevalence highlighted in their study, that personalized dietary advice based on personal gut microbiota could successfully modulate blood sugar levels, a key risk factor for diabetes and obesity [2]. In addition, personalized nutrition led to healthier eating habits, better dietary adherence, and improved health outcomes. Similarly, Celis-Morales, *et al.* 2017 showed that individuals who followed a diet tailored to their unique physiological and genetic profiles demonstrated significant improvements in health-related outcomes [3].

The World Health Organization (WHO) reported that social determinants of health can result in substantial cost savings in healthcare and that health inequalities due to social determinants led to vast health inequities and increased healthcare costs [4], suggesting that by addressing these factors, healthcare systems can lower costs and improve health outcomes. Addressing SDOH is vital for achieving health equity, and these determinants, including socio-economic status, education, neighborhood and physical environment, employment, and social support networks, have a significant impact on health outcomes. A report by the Robert Wood Johnson Foundation, 2020, emphasized the need for healthcare systems to address social determinants to promote health equity and reduce health disparities [5].

It is important to note that while integrating personalized nutrition and addressing SDOH can significantly contribute to bridging health disparities, they are not the sole solution. A multi-pronged approach that includes improved healthcare access, better education, and socio-economic reforms is also needed. As described earlier [2,3], personalized nutrition, an approach that tailors' dietary recommendations based on an individual's unique genetic, phenotypic, medical, and lifestyle factors, is showing promise in addressing health disparities [6]. Many chronic diseases, such as diabetes, heart disease, and obesity, are strongly influenced by diet, and these diseases are more prevalent in socially disadvantaged populations [7]. With its targeted approach, personalized nutrition can potentially reverse

these trends. For example, a personalized nutrition approach can consider genetic variants common in specific ethnic groups that affect nutrient metabolism. Variants like lactose intolerance in East Asian populations, or the higher prevalence of apolipoprotein E (APOE)  $\epsilon$ 4 allele (a risk factor for cardiovascular disease) in African populations, can be accounted for by making dietary recommendations that could prevent or reduce the impact of these genetic variants [8]. In addition, considering these unique genetic traits, personalized nutrition can provide more effective and efficient dietary guidelines, contributing to a reduction in health disparities [3]. Moreover, addressing the social determinants of health conditions in the environments in which people live, learn, work, play, worship, and age is also integral in tackling health disparities [9]. These determinants influence a wide range of health, functioning, and quality-of-life outcomes and risks. Factors like socioeconomic status, education, neighborhood and physical environment, employment, and social support networks, as well as access to health care, all play a significant role [10]. Research also demonstrates a direct correlation between SDOH and health outcomes. For instance, lower socioeconomic status is associated with higher mortality rates and poorer health outcomes [11]. Similarly, food insecurity, a social determinant, is linked to increased risk of chronic diseases [12].

Effective interventions are needed to tackle these factors such as policies that improve access to healthy food options in disadvantaged neighborhoods or initiatives that provide stable and affordable housing can have a profound impact on health outcomes [13]. Indeed, such policies can be as important as medical interventions in improving health and reducing disparities. By leveraging the potential of personalized nutrition and addressing the social determinants of health, it is possible to make strides toward reducing health disparities. However, it requires concerted effort from all stakeholders including policy makers, healthcare providers, and communities. A multifaceted approach, which combines genetic insights with a deep understanding of societal influences, will be critical to creating a healthier and more equitable future. The combination of personalized nutrition and interventions on the social determinants of health offers a potent strategy for addressing health disparities. It is therefore important that researchers and policy makers build a solid scientific and policy foundation in these areas to fully realize their potential. Both are interdependent and must be pursued collectively in order to reduce health disparities, improve overall health, and ensure health equity.

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