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Opinions

Mediterranean diet or genome-based nutrition diets in Latin America's clinical practice guidelines for managing chronic liver diseases?

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Obesity, type 2 diabetes, atherosclerosis, and nonalcoholic fatty liver disease (NAFLD) comprising hepatic steatosis and nonalcoholic steatohepatitis (NASH), contribute heavily to the global disease burden. Thus, an ongoing challenge for the Medical and Nutrition associations or societies is to extend appropriate recommendations through clinical practice guidelines (CPGs) to prevent and manage these diseases. CPGs provide a consensual standard of care algorithm for patients' treatment. Indeed, most CPGs are clear regarding medication and nutrition to prevent chronic diseases' onset and progression. Nonetheless, it is notorious that general dietary recommendations (and even some drugs) may not be entirely useful due to genetic and sociocultural factors prevailing among the target population. The adage "one diet does not fit all" is more quickly said than done because commonly different CPGs still recommend the Mediterranean diet (MedDiet) as the golden standard, regardless of whether it suits their own culture.

Annals of Hepatology has strongly stressed the need for regional CPGs and to disclose any divergence with other world guidelines [1,2]. It is noteworthy that the latest Latin America's (LA) CPGs are moving forward in making recommendations based on the populations' characteristics and highlighting knowledge gaps that need to be filled by local evidence-based research. Unfortunately, in terms of nutritional intervention, the ALEH's CPGs for the management of NAFLD published recently failed to convey the message of recommending regional foods to restore health among these populations. This situation is evident in the section on dietary management, where, in fact, the advice was limited to the use of the MedDiet [3].

The undoubted protective and therapeutic effects of the MedDiet on various pathologies such as cardiovascular and neurodegenerative diseases, cancer, type 2 diabetes, and metabolic syndrome have been widely studied and documented. It has recently been suggested for the effective management of NAFLD [4,5]. For this reason, the MedDiet has been considered a model of both a healthy and sustainable diet [6]. However, it may not be feasible for nations outside the Mediterranean food-chain/culture region to follow this dietary pattern. Also, proclaiming the MedDiet as an international recommendation contrasts with the agreed definition of a sustainable diet, which states that it should be culturally acceptable, accessible, economically fair, and affordable besides being nutritionally adequate, safe, and healthy; while optimizing natural and human resources [6]. Indeed, one of the main challenges for successful nutritional therapy is compliance, mostly in the long term, with specific recommendations, which has been noted to improve when food preferences, availability, and traditions are considered in the context of individuals [7]. Furthermore, these factors may, in turn, be strongly influenced by the genetic and historical background of the individual's population of origin. For example, some studies have shown that differences in preferring or refusing foods with peculiar tastes (e.g., bitter-, sweet- and umami-tasting foods) can be explained by genetic variations involved in taste perception, which may have evolved in each population concerning the traditional consumption of such food [8,9].

Recently, the genetic basis of the adherence to the MedDiet and the favorable effects of some of its staple foods, such as the abundant amount of virgin olive oil and the reduced risk of cardiovascular disease, have been studied in Mediterranean peo-

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ple [10–12]. It would then be logical that other nations perform research to ascertain whether their local traditional diet suits them better based on that particular population's genetics. This information should also be considered in developing evidence-based CPGs and policies [1,2,13]. In this regard, the ESC Guidelines on diabetes, pre-diabetes, and cardiovascular diseases developed in collaboration with the EASD are examples of evidence-based guidelines. These guidelines have drawn up their dietary recommendations by considering at least the clinical trials results in Mediterranean populations, evidencing the impact of the MedDiet on these metabolic diseases [14]. Likewise, the EASL-EASD-EASO CPGs for the management of NAFLD have advised the MedDiet as the diet of choice for its treatment, although not referencing any of the various clinical studies conducted in Mediterranean populations [15]. Nonetheless, it is widely noted that most Mediterranean countries proudly acknowledge the nutritional quality of their MedDiet, value it as a sociocultural heritage, and strongly encourage its consumption among their people.

However, we still argue why several CPGs consider that the universal trend of eating a westernized diet, which roots the nutrition transition and chronic disease incidence, be reversed by recommending a MedDiet on a global scale? This habitual practice is precisely the challenge that arises in the current era of personalized medicine and nutrition. Based on evolutionary medicine research principles, this new field recognizes the role of genetics and the historical background of each population [16,17]. For this reason, a recent population-based framework to renew the International Classification of Diseases (ICD) considering the differences in genetic and environmental factors that predispose people to disease has been proposed. Recommendations will be tailored to adjust prognostic and diagnostic algorithms accordingly by population with an impact on CPGs. In this sense, the authors have for long alleged that obesity and other comorbidities be managed with regional nutritional interventions because, although the emergence of such health issues is multifactorial, the recent changes in the traditional dietary patterns and lifestyle have contributed decisively [18,19]. Therefore, it is pertinent to further study populations' evolutionary history to identify the adaptive alleles/haplotypes involved, which today might result as maladaptive or protective and influence differential disease risk due to changes in their environmental/cultural conditions. For example, a recent study revealed that some East-Asian populations' genomic adaptations to their traditional rice-based diet today mitigate the risk of obesity and diabetes entailed by westernizing their diets [20]. Although genes play a protective role in this case, a rice-based diet, rather than a MedDiet, would be preferred for a nutritional strategy in these populations, as evidenced by their adaptive history.

Nations undergoing a nutrition transition are shifting away from the traditional staples and food culture in harmony with the populations' biocultural background. Fortunately, all LA's countries have rich biodiversity and agricultural heritage to provide traditional staple foods related to healthier dietary patterns that should be rescued [6]. Indeed, it is recognized that the primitive Mediterranean diet was nutritionally enhanced by the introduction of New World foods (*aka* Mesoamerica and Peru) [21]. Therefore, much work is needed to promote natural local products that are ultimately part of a sustainable diet. For example, the Mexicans are populations where personalized medicine and nutrition strategies could be somehow easily applied. Like many others in LA, the Mexican population's genetic structure comprises a tripartite Native American, European, and African ancestry that expresses important biological mechanisms regulating the responses to ambient factors such as diet. In a population where obesity has peaked at 72.5%, NAFLD is reaching third place as a cause of liver disease, and no current pharmacological treatment is available; nutrition interventions are key elements to reduce the consumption of a hepatopathogenic diet [22].

In a recent nutrigenetic study, patients without overt chronic disease followed a 24-week nutritional intervention protocol denoted as the GenoMex diet based on the Mexican population's genetic makeup and food culture [7]. The main results were a reduction in fat mass and a significant improvement of anthropometric and biochemical parameters. Interestingly, patients who were carriers of the *MTHFR* 677T allele showed an apparent decrease in insulin resistance, a harmful condition involved in the progression of many chronic diseases. This result could have been related to the fact that careful attention was given to the menus' food composition to ensure a correct RDA of folates, among other components, as provided by the traditional Mexican diet. Folates are involved in nutrient-gene interactions that modulate lipid metabolism [23]. Therefore, it is promising that closing the gap between the genes modulating nutrient metabolism and the diet composition can improve metabolic abnormalities among individuals. Notably, the GenoMex diet included Mesoamerican staple foods recognized as UNESCO's World Heritage under the same principles as the MedDiet. Although it is known that the nutritional potential and benefits of the traditional Mexican diet and its constituents are often mistakenly undervalued among modern societies [24], ongoing research is demonstrating the importance of salvaging the eco-friendly advantages of healthier traditional diets worldwide [6].

Therefore, further efforts to continue research in genome-based nutrition and its applications to prevent and manage chronic liver diseases are needed [13]. We propose that the regional CPGs be improved with dietary recommendations that are more suitable for LA's populations. That the consumption of endemic produce be promoted as part of a sustainable food chain, keeping in mind that chronic diseases have a more significant impact on low and middle-income social classes due to poor accessibility to healthier diets. Updated continuing education programs organized through joint actions between medical and nutrition professionals within the ALEH delegations is advisable to prevent and treat chronic liver diseases such as NAFLD [19,25]. Regional genome-based nutritional strategies empowered by studying each population's genetic background, foods, and food culture are needed in LA.

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Conflict of Interest

The authors have no conflict of interest to declare

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