Comment on "guiding global best practice in personalized nutrition based on genetics: the development of a nutrigenomics care map"

Comment on "*Guiding Global Best Practice in Personalized Nutrition Based on Genetics: The Development of a Nutrigenomics Care Map*"

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Care maps have been developed and used effectively in health care as they provide guidance to help implement evidence-based practice. In the study by Horne et al[1], the authors have developed a nutrigenomics care map as a guideline for global best practice in providing personalized nutrition services. Since nutrigenetics is becoming more common in clinical practice, developing a nutrigenetics care map is a commendable initiative by the authors. However, there are major methodological errors and inappropriate usage of terminologies which can lead to misinterpretation of the map.

Firstly, throughout the article, the authors have used the term 'Nutrigenomics', which refers to the changes induced by diet on the genome, transcriptome, proteome, metabolome, and epigenome[2-4]. But the article does not discuss any of these aspects rather it focuses on genotype-based dietary advice, which refers to 'Nutrigenetic testing'. This incorrect usage of the terminology changes the focus of the article and can lead to misinterpretation of the concept[5]. In fact, the authors have used the guidelines demonstrated by Grimaldi et al[6], who had proposed a draft framework to assess the strength of the evidence for scientific validity of nutrigenetic knowledge. Hence, the authors should have used the term ‘Nutrigenetics’ to demonstrate the use of genotype-based dietary advice.

Secondly, we are concerned about the statement that, *'This care map is generalizable to dietetics practice globally*'. There are several nutrigenetic studies which have been carried out in Caucasians; but very few good quality studies are available in lower middle-income countries (LMICs)[7]. Prescribing a personalized diet for a population should be based on the nutrigenetic findings from that population. Given the lack of nutrigenetic studies in LMICs, majority of the genetic testing centres are using the data from Caucasians and prescribing diets to their clients who belong to a different ethnic group. To date, there is no legal system that monitors the use of such data to prescribe diets in LMICs and this can lead to the use of this

map as a base to offer genetic testing, which might not be applicable for LMICs[3]. Hence, the ethical approval to prescribe genotype-based dietary advice should be a part of the care map.

Thirdly, the map fails to incorporate the role of nutrigenomics, metagenomics, and epigenetics in personalizing an individual's diet[8 9]. The map focuses only on genotype-based dietary advice; but genetic variations explain only a small fraction of the interindividual variation in chronic diseases such as obesity[10]. Hence, the full potential of personalised nutrition requires in-depth knowledge of genetics and omics approaches, delivering a comprehensive platform picture of an individual's metabolic status. Most importantly, a robust scientific validity of these variations considering ethnic background is critical for the diet/nutrition recommendations.

As professionals with interest in nutrigenetics and nutrigenomics, we do see this article as an interesting paper for a population where several nutrigenetic studies have been published. But we are concerned about globalizing the concept, as there are limited studies and awareness on nutrigenetics in LMICs; hence, the chances of misinterpreting the information are high. We would appreciate if the authors could develop a map considering these issues, which will improve the patient care.

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References:

1. Horne JR, Nielsen DE, Madill J, et al. Guiding Global Best Practice in Personalized Nutrition Based on Genetics: The Development of a Nutrigenomics Care Map. *J Acad Nutr Diet* 2021 doi: 10.1016/j.jand.2021.02.008 [published Online First: 2021/03/22]
2. Ramos-Lopez O, Milagro FI, Allayee H, et al. Guide for Current Nutrigenetic, Nutrigenomic, and Nutriepigenetic Approaches for Precision Nutrition Involving the Prevention and Management of Chronic Diseases Associated with Obesity. *J Nutrigenet Nutrigenomics* 2017;10(1-2):43-62. doi: 10.1159/000477729 [published Online First: 2017/07/10]
3. Fenech M, El-Sohemy A, Cahill L, et al. Nutrigenetics and nutrigenomics: viewpoints on the current status and applications in nutrition research and practice. *J Nutrigenet Nutrigenomics* 2011;4(2):69-89. doi: 10.1159/000327772 [published Online First: 2011/06/01]
4. Reddy VS, Palika R, Ismail A, et al. Nutrigenomics: Opportunities & challenges for public health nutrition. *Indian J Med Res* 2018;148(5):632-41. doi: 10.4103/ijmr.IJMR_1738_18 [published Online First: 2019/01/23]
5. Weir M, Morin K, Ries N, et al. Canadian health care professionals' knowledge, attitudes and perceptions of nutritional genomics. *Br J Nutr* 2010;104(8):1112-9. doi: 10.1017/S0007114510002035 [published Online First: 2010/06/17]
6. Grimaldi KA, van Ommen B, Ordovas JM, et al. Proposed guidelines to evaluate scientific validity and evidence for genotype-based dietary advice. *Genes Nutr* 2017;12:35. doi: 10.1186/s12263-017-0584-0 [published Online First: 2017/12/23]
7. Vimaleswaran KS. A nutrigenetics approach to study the impact of genetic and lifestyle factors on cardiometabolic traits in various ethnic groups: findings from the GeNuIne

Collaboration. *Proc Nutr Soc* 2020;79(2):194-204. doi: 10.1017/S0029665119001186 [published Online First: 2020/02/01]

8. Vimaleswaran KS, Le Roy, C.I., Claus, S.P. . Foodomics for personalized nutrition: how far are we? . *Curr Opin Food Sci* 2015;4:129–35.
9. Goni L, Cuervo M, Milagro FI, et al. Future Perspectives of Personalized Weight Loss Interventions Based on Nutrigenetic, Epigenetic, and Metagenomic Data. *J Nutr* 2015;146(4):905S-12S. doi: 10.3945/jn.115.218354 [published Online First: 2016/03/11]
10. Lamiquiz-Moneo I, Mateo-Gallego R, Bea AM, et al. Genetic predictors of weight loss in overweight and obese subjects. *Sci Rep* 2019;9(1):10770. doi: 10.1038/s41598-019-47283-5 [published Online First: 2019/07/26]