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Educating health care professionals on the importance of proper diets. An online course on nutrition, health, and sustainability

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Abstract

The majority of university curricula for health professionals does not incorporate courses on human nutrition and its links with human and planetary health. This primarily applies to medical and pharmacy students, who have important counseling roles and are at the forefront of public health. To address this important issue, EIT Food recently launched an online course on nutrition, health, and sustainability. Learners were able to provide feedback on the course through an end-of-course survey and social interaction on the FutureLearn platform. The course was very well attended worldwide and received positive feedback from learners. A total of 3,858 students enrolled in the program, from >20 countries. Learners reported inadequate training on nutrition in their own curriculum and indicated they would use key insights from the course to inform their own practice. This report provides insights from the course, which could be used as guidance for future initiatives.

Keywords: nutrition; education; food sustainability; health; micronutrients; micronutrients; public health

Introduction

A healthy diet is the best predictor of a long healthy life expectancy and, conversely, when inadequate and/or improper is a prognosticator of a sharply curtailed expectancy (Kalache et al. 2021). Indeed, some reports place improper diets and lack of physical exercise as the second risk factor of all-cause mortality (Mokdad et al. 2004; Kris-Etherton, Petersen, Despres, Braun, et al. 2021). Therefore, it is very important for healthcare professionals to have an awareness to engage with patients who might have anecdotal evidence.

Nutrition science is complex. Unlike pharmacology, the effects of food and food component are relatively small and become visible after years of exposure (Visioli 2012). Also, it is almost impossible to perform randomized controlled trials of food items and to use placebos, not to mention controlling for seasonality variations of foods nutrition composition and accounting for the impact of the food matrix on potential health effects. All these difficulties notwithstanding, some guidelines are being formulated and public health bodies are at work to implement them (Kris-Etherton, Petersen, Despres, Anderson, et al. 2021).

Moreover, a large proportion of the world population is 'over fed and under nourished', i.e., caloric/energy excess and lack of essential nutrients. This can lead to health deficiencies, rapidly increasing global obesity rates, excess chronic diseases, and premature mortality (Willett et al. 2019; Kalache et al. 2021).

In addition to the aforementioned, it should be highlighted that food insecurity remains a matter of concern worldwide (Norris et al. 2021; FAO 2021). Yet, the prevalence of poverty and extreme poverty in the global population is slowly declining (Roser and Ortiz-Ospina 2013; World Bank 2020). Parallelly, the world population is continually increasing (Food and Agriculture Organization of the United Nations 2017). Both these facts concomitantly mean that more people need access to food, whose production must increase to match the demand (Hemrich 2020; FAO 2021). Unfortunately, this leads to over exploitation of

resources, e.g. overfishing, land impoverishment, overly large use of pesticides and herbicides, and land grabbing just to name a few (Willett et al. 2019).

In this scenario, it is surprising that most university curricula for health professionals worldwide omit teaching on human nutrition and its links with human and planetary health (Kahan and Manson 2017; Ball, Hughes, and Leveritt 2010; Devries et al. 2014). This is significant for medical and pharmacy students, who have important counseling roles and are at the forefront of public health and facilitators of behavior change.

To address the knowledge gap, the European Institute of Innovation and Technology (EIT) Food recently launched an online course on nutrition, health, and sustainability. The aim of this report is to describe the results the course, which can be used as guidance for future initiatives. In particular, we report how many students accessed the course, what was their feedback and how fixing weaknesses will further strengthen future similar initiatives.

Methods

In 2020, EIT Food convened a group of experts participating in the European Knowledge and Innovation Community (KIC) network. Acknowledging the lack of education on human nutrition pervasive of global tertiary education, the initiative was launched to prepare a three-week course encompassing key aspects of human nutrition, including sustainability of future food systems and diets.

The overarching goal of the course, as seen by its structure, are: a) to learn the fundamentals of nutrition; b) to gain insights on the importance of macro and micronutrients; and c) to address the nutritional needs through life, how they evolve and facilitate behaviour change. All enclosed in a sustainability framework to underscore the interconnection of food at many levels : social, societal, and environmental.

Several meetings were held online and the final version of the course – called Nutrition, Health, and Sustainability (NHS) - was agreed upon on 25 September 2020. We

used the FutureLearn platform and ran a first, two-week release of the course from 30 November 2020 to 23 January 2021. The course was advertised via the International Federation of Medical Students Associations, social networks and by snowball advertisement, using the teachers' contacts and participating universities' networks. Participation in the first edition of the course was limited to medical students.

Following the positive feedback that was received (e.g., course feedback and reviews, online interactions with the attendees, direct exchange in the Q&A board), we further improved the course and expanded it to a three-week program. Three more editions were then launched (from 19 July 2021 to 19 September 2021 Run 1, then from 18 October 2021 to 2 January 2022 Run 2, and from 4 April 2022 to 31 December 2022), of which the second featured a collaboration with FOR9A (aka Forsa), a platform connecting young people across the Middle East and North Africa with educational and professional opportunities worldwide.

The syllabus included a variety of topics such as, e.g. the role of diet on health and disease, society (dietary trends, cultural importance of food, etc.), diet composition (macro- and micronutrients), diet and non-communicable diseases, nutrition guidelines, diet and food systems, and the relation between healthy diets and the environment.

The total cost was 60K EUR over 3 years including staff costs, travel/subsistence/accommodation, and marketing. The complete course can be found (and accessed) here. Note that a final knowledge test (if successfully completed) grants students a certificate of completion. The course is available in English and Spanish.

Results

A total of 5,523 (as of 11th July 2022) students enrolled in the program. In terms of country distribution, Egypt and the United Kingdom were the countries with the majority of attendees, accounting for 12.78% and 12.54%, respectively (Table). Twenty-five percent of

participants declared being medical students and 21% as medical/healthcare professionals, although the course was open to students of any background.

Seventy-two percent of students were females, 27.6% were males, and 0.4% nonbinary (Figure). Nearly 23% of learners declared to be employed full time, 15.6% were working part time, and 16% were retired (Figure). Most, i.e. 22.6% of students reported to be in the 18-25 age group and 18.5% were older, i.e. 26-35 (Figure).

Key feedback from participants confirmed that nutrition and food are scarcely addressed in the core curriculum around the globe, with responses indicating a content of 2-8 hours typically. This figure does not include biochemistry, physiology, and other technical content regarding the uptake of nutrients in the body, but rather the number of hours focused on the role of food and healthy nutrition in the context of a healthy lifestyle and as a possible pathway for the treatment of typical food-related non-communicable diseases.

Learners were encouraged to engage in conversations throughout the course (see Supplementary File 2 for examples). Of note, 59% of students declared that the course exceeded their expectations, whereas another 37% was fully satisfied with the NHS course. Further, 93% of participants stated that they gained knowledge. From a medical training viewpoint, it is worth underscoring that 74% of participants stated that they immediately applied the information learned right after completing the course.

The participants also provided key insights through the social interaction of learners on the FutureLearn platform. They reported multiple uses of the content, namely: a) To inform their own practices as a consumer, both to improve their own health and to live more sustainably; b) To inform their practice in engaging with potential patients, both in supporting healthier lifestyles and as an additional potential treatment pathway for certain diseases; or c) To inform community-based and public health advice, towards both healthier populations and more sustainable communities.

Discussion

Proper training on human nutrition, the past, present, and future of diets, and the effects of what we eat on the environment, are predominantly absent from medical schools' and other health professionals' curricula. This is unfortunate because a) the lay public and, hence, patients are very interested in the health effects of what they eat and b) balanced diets lessen the burden of non-transmissible diseases and contribute to health span (Willett et al. 2019). There is no rapid solution to this issue because it would take many years to change educational programs worldwide. Nonetheless, web-based platforms now allow for relatively easy access to very large number of academic courses.

EIT Food convened a group of experts and used an online educational platform to reach out to interested students worldwide. Our experience indicated the success of this initiative, which can be replicated by other suitable scholarly bodies. This is important from an educational perspective in that it suggest that online teaching – if carefully crafted and supervised - can bring about tangible results in a short timeframe.

The success of the course is testified by the numerous positive feedbacks that were posted by a variety of students (see examples in Supplementary File 1). Some negative comments (Supplementary File 1) helped the organizer fine-tune later runs.

One issue that became apparent from reading some commentaries is that of regional differences. To address it, we tried to provide guidelines from different regions when national dietary guidelines were discussed and participants were stimulated to lookup the guidelines from their respective country and engage in discussion about the similarities and differences.

There are at least three advantages associated with using an online platform. The first, obvious one is that the course can be attended by a very high number of students, disposing of the need for large auditoriums and associated technical equipment, in the end abating costs. Another one is that the course is available 24/7 and can be followed by a

diverse cohort, e.g. working students (Figure). Finally, the course can be rapidly modulated based on feedback and can be updated based on the most recent scientific literature. The major drawbacks are probably a) the need for students to have access to internet (which, alas, is problematic in many areas of the world); b) to be proficient in English or Spanish and to be internet-savvy; and c) the absence of face-to-face interactions with teachers, which has been an important part of education since Aristoteles and his Peripatetics. However, it is very likely that future, digital native generations will be able to access wide-band connections, virtual reality tools, and many other innovations we can only imagine to facilitate their learning. In the long-term, our course maybe helpful to improve the public health nutrition and reduce hospital economic burden via general practitioner/medical service (fostering lifestyle interventions and becoming agents of change).

In conclusion, we built and ran a successful international online course on nutrition, health, and sustainability. We hope that other educational bodies will follow this example and implement other courses with the ultimate goal of filling gaps in schooling, especially higher education.

Declaration of interest

The authors declare no conflict of interest associated with this paper.

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References

Ball, L. E., R. M. Hughes, and M. D. Leveritt. 2010. "Nutrition in general practice: role and workforce preparation expectations of medical educators." *Aust J Prim Health* 16 (4):304-10. doi: 10.1071/PY10014.

Devries, S., J. E. Dalen, D. M. Eisenberg, V. Maizes, D. Ornish, A. Prasad, V. Sierpina, A. T. Weil, and W. Willett. 2014. "A deficiency of nutrition education in medical training." *Am J Med* 127 (9):804-6. doi: 10.1016/j.amjmed.2014.04.003.

FAO, IFAD, UNICEF, WFP and WHO. 2021. "The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all." In. Rome: FAO.

Food and Agriculture Organization of the United Nations. 2017. "The Future of Food and Agriculture. Trends and Challenges." In, edited by FAO. Rome, Italy.

Hemrich, G. 2020. "The Role of Food Systems in Shaping Diets and Addressing Malnutrition: Delivering on the Sustainable Development Agenda." *World Rev Nutr Diet* 121:116-26. doi: 10.1159/000507495.

Kahan, S., and J. E. Manson. 2017. "Nutrition Counseling in Clinical Practice: How Clinicians Can Do Better." *JAMA* 318 (12):1101-2. doi: 10.1001/jama.2017.10434.

Kalache, A., R. P. Bazinet, S. Carlson, W. J. Evans, C. H. Kim, S. Lanham-New, F. Visioli, and J. C. Griffiths. 2021. "Science-based policy: targeted nutrition for all ages and the role of bioactives." *Eur J Nutr* 60 (Suppl 1):1-17. doi: 10.1007/s00394-021-02662-5.

Kris-Etherton, P. M., K. S. Petersen, J. P. Despres, C. A. M. Anderson, P. Deedwania, K. L. Furie, S. Lear, et al. 2021. "Strategies for Promotion of a Healthy Lifestyle in Clinical Settings: Pillars of Ideal Cardiovascular Health: A Science Advisory From the American Heart Association." *Circulation*:CIR0000000000001018. doi: 10.1161/CIR.0000000000001018.

Kris-Etherton, P. M., K. S. Petersen, J. P. Despres, L. Braun, S. D. de Ferranti, K. L. Furie, S. A. Lear, et al. 2021. "Special Considerations for Healthy Lifestyle Promotion Across the Life Span in Clinical Settings: A Science Advisory From the American Heart Association." *Circulation*:CIR0000000000001014. doi: 10.1161/CIR.0000000000001014.

Mokdad, A. H., J. S. Marks, D. F. Stroup, and J. L. Gerberding. 2004. "Actual causes of death in the United States, 2000." *JAMA* 291 (10):1238-45. doi: 10.1001/jama.291.10.1238.

Norris, S. A., E. A. Frongillo, M. M. Black, Y. Dong, C. Fall, M. Lampl, A. D. Liese, et al. 2021. "Nutrition in adolescent growth and development." *Lancet*. doi: 10.1016/S0140-6736(21)01590-7.

Roser, M., and E. Ortiz-Ospina. 2021. "Global extreme poverty." Accessed 22 december. https://ourworldindata.org/extreme-poverty.

Visioli, F. 2012. "Can experimental pharmacology be always applied to human nutrition?" *Int J Food Sci Nutr* 63 Suppl 1:10-3. doi: 10.3109/09637486.2012.665439.

Willett, W., J. Rockstrom, B. Loken, M. Springmann, T. Lang, S. Vermeulen, T. Garnett, et al. 2019. "Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems." *Lancet* 393 (10170):447-92. doi: 10.1016/S0140-6736(18)31788-4.

World Bank 2020. "Poverty and Shared Prosperity 2020: Reversals of Fortune." Washington, D.C. World Bank.

Figure legend

Figure. Distribution by gender (Panel A), employment status (Panel B), and age (Panel C).

Data are percentages

Supplementary File 1

Examples of students' feedbacks. Comments were anonymized to comply with the General Data Protection Regulation law (Regulation (EU) 2016/679 of the European Parliament and of the Council).

Supplementary File 1

Examples of discussion prompts.

Table. Enrolments by country (top 15)

Country	Enrolments
United Kingdom	518
Egypt	496
Algeria	217
Saudi Arabia	194
Morocco	158
Jordan	153
Australia	122
Netherlands	113
India	106
Iraq	105
Italy	84
United States of America	83
Spain	78
Turkey	63
Palestine	55