

Nutrition education in medical schools (NEMS) project: Promoting clinical nutrition in medical schools – Perspectives from different actors

S U M M A R Y

Keywords:

Human nutrition
Clinical nutrition
Education
Medical school
Curriculum
Teaching

Background & aims: Nutrition education is not adequately represented in the medical curriculum, and this prompted the European Society for Clinical Nutrition and Metabolism (ESPEN) to launch the Nutrition Education in Medical Schools (NEMS) Project in 2017. The aim of this original paper was to describe the perspectives of different actors in the promotion of nutrition education in medical schools.

Methods: On 11 November 2021, an online meeting was held on this topic, where nine representatives from different backgrounds participated in the scientific programme. More than 640 participants registered to this webinar.

Results: The different models of Nutrition Education in Medical Schools were introduced by Prof. Cristina Cuerda (Spain) and Prof. Maurizio Muscaritoli (Italy). The students' perspective was given by Ms. Alexandra Archodoulakis (Germany) and Ms. Sila Gürbüz (Turkey), representing the European Medical Students' Association. The dietitian's perspective was given by Dr. Kirsten Berk (The Netherlands), whereas Dr. Matti Aapro (Switzerland) gave the medical doctor (oncology)'s perspective. Ms. Clare Farrand (Australia) gave the WHO perspective and Dr. Kristiina Patja (Finland) explained the healthy lifestyle teaching to medical students. Lastly, Prof. Michael Chourdakis (Greece) and Prof. Zeljko Krznaric (Croatia) hosted the round-table discussion.

Conclusions: There was strong agreement among the representatives from different settings joining this ESPEN initiative that increasing nutritional knowledge and skills of young doctors is now possible and will launch a virtuous cycle that will proactively involve all the other healthcare professionals working in the nutritional field.

1. Introduction

The double burden of malnutrition includes both undernutrition and overweight/obesity, as well as diet-related non-communicable diseases (NCDs) [1]. According to the World Health Organisation (WHO), every country in the world is affected by one or more forms of malnutrition and combating it is one of the greatest global health challenges. A health consequence of the overweight and obesity are the NCDs (cardiovascular diseases, diabetes, cancer, etc.), which are preventable, and one of the objectives is to ensure that people have access to a healthy lifestyle [2]. A key strategy to support healthy eating in populations is to advocate it through healthcare services. In many countries, healthcare professionals (HCPs), including physicians, are trusted to apply nutrition-related knowledge and skills in practice to support patients in order to manage behavior-related NCDs and other diet-related conditions for which poor nutrition is a major risk factor [3]. Disease-related malnutrition (DRM) is another entity that requires physicians to recognize and apply nutrition knowledge in practice. DRM is underdiagnosed and underreported

despite its significant negative impact on global clinical outcomes [4], as well as on the quality of life of patients. Most physicians are unable to correctly identify and support patients who are at risk of malnutrition or malnourished. Regardless of their discipline, almost all physicians will deal, at some point, with malnourished patients or patients requiring nutritional guidance. Also, it is not uncommon for physicians to overestimate their nutrition knowledge and prescribe artificial nutrition or participate in related decision making [5]. This highlights the importance of providing adequate clinical nutrition training to all HCPs in order to perform appropriate screening, assessment, and treatment of nutritional problems in all clinical settings [6].

Although attempts have been made to improve clinical nutrition education in medical schools, more than half of graduating medical students report that the time dedicated to clinical nutrition instruction is insufficient [7–11].

Considering all of this, the European Society for Clinical Nutrition and Metabolism (ESPEN)'s [12] work in the pre-graduate setting started in 2017, when a survey was launched among representatives from all 57 Council members and different university

centres within their respective countries. A total of 56 questionnaires from academic centres that were located in 29 countries (22 from Europe, 4 from Asia, 2 from South America, and 1 from Australia) were analyzed. The results showed a high variability within each country, in terms of the model of integrating the nutrition content (compulsory and elective), number of hours or years when it was imparted (vertically integrate). Also, the list of contents covered by clinical nutrition instruction was highly variable among centres. The list included items such as: malnutrition/screening, nutritional assessment, nutrient requirements, energy expenditure, enteral and parenteral nutrition, micronutrients, etc. The authors of the survey concluded that clinical nutrition was not well represented in the curriculum [6] and this prompted the ESPEN Executive Committee to launch the Nutrition Education in Medical Schools (NEMS) Project and form a core working group, including members of the Nutrition Education Study Group (NESG) previously created.

The next step consisted in a kick-off meeting in Brussels in July 2018 together with ESPEN and University delegates. The meeting ended with the publication of an ESPEN position paper whose aim was to “*identify a minimum curriculum knowledge in nutrition that serves to improve the training of the future doctors and how to solve the main barriers of its implementation in university centres*” [13]. The minimum curriculum knowledge included 5 learning objectives and 21 topics covering the three domains of human nutrition: basic nutrition, public health nutrition (applied nutrition) and clinical nutrition.

The NEMS meeting held on 19th January 2020 on this topic, attended by 51 delegates (27 council members) from 34 countries, and 13 European University representatives, represented a significant step forward, moved towards implementation of nutrition education in medical education in general and in clinical practice in particular, in compliance with the aims of the ESPEN-NESG. The symposium ended with the presentation of the Manifesto for the Implementation of Nutrition Education in the Undergraduate Medical Curriculum that was signed by the participants and is available in the article by Cuerda et al. [14].

The next step was the implementation of the NEMS project through the identification of 4 medical schools in Europe as flagships: *La Sapienza*, Roma, Italy; *Universidad Complutense de Madrid*, Madrid, Spain; Aristotle University of Thessaloniki, Thessaloniki, Greece and University of Zagreb, Zagreb, Croatia.

Apart from the universities, the NEMS project is also reaching professional societies such as the European Medical Students' Association (EMSA) [15], European Federation of the Associations of Dietitians (EFAD) [16], European Cancer Organisation (ECO) [17], Optimal Nutritional Care for All (ONCA) campaign [18], European Association for the Study of Obesity (EASO) [19], United European Gastroenterology (UEG) [20], European Patients' Forum (EPF) [21], World Organization of Family Doctors (WONCA) [22].

The NEMS Project has also collaborated with the European Commission through the Health Policy Platform and with WHO [23].

The aim of this original paper was to describe the perspectives of different actors in the promotion of nutrition education in medical schools.

2. Methods

On 11 November 2021, an online meeting was held on this topic, where 9 representatives from different background participated in the scientific programme and at the activity there were more than 640 registered participants.

3. Results

3.1. The Students' perspective

The students' perspective was given by Ms. Alexandra Archodoulakis (Germany) and Ms. Sila Gürbüz (Turkey), representing the European Medical Students' Association (EMSA), as EMSA President and EMSA Public Health Director, respectively.

EMSA envisions a united and solidary Europe in which medical students actively promote health and its mission is to empower medical students to advocate health in all policies, excellence in medical research, interprofessional healthcare education and the protection of human rights across Europe. EMSA is formed of 110 Faculty Member Organizations from 28 European Countries. It is the only association representing students in the European Medical Organizations [24], which is a network of different medical organizations in Europe. The association is active in different European Commission projects, expert groups, joint actions, and public consultations and is also working with different professional non-governmental organizations. It is also part of the European Healthcare Students' Association Summit (EHSAS).

Medical students should not only receive knowledge from the three domains of human nutrition but also learn to make connections between them.

The overarching idea of the students' perspective is that, in order to make a change, one has to start with oneself. Stress factors, inequalities, as well as lack of knowledge, are the culprits of the malnutrition present among medical students.

According to the article of Alghamdi et al. that aimed to compare the awareness and knowledge of dietary habits among medical and non-medical students, medical students were having a higher level of awareness about the dietary and lifestyle habits, but it was not reflected in their practice which needed to be taken care of [25]. This highlights the weakness of nutrition education received in medical school. The EMSA aims to draw attention to nutrition education and raise awareness to a variety of activities (advocacy, events, education, community, clinical).

3.2. The role of dietitians in nutrition education

The dietitian's perspective was given by Dr. Kirsten Berk (The Netherlands) on behalf of the European Federation of the Associations of Dietitians (EFAD).

Increasing nutrition education is of high importance in The Netherlands. A study conducted on behalf of the Ministry of Health, Welfare, and Sport among 6 medical faculties, showed that the 6 years of bachelor/master phase only include 29 h of education on nutrition and only 30 h of education on lifestyle (e.g., exercise, smoking, stress). In the same study, 80% of the students and general practitioners indicated that they wanted more education about nutrition, as well as when and to whom they could refer their patients regarding nutrition and lifestyle.

Not only it is important that the doctor of the future knows the importance of good nutrition, and the nutritional therapy options for different conditions, but also that he/she develops the attitudes to work in multidisciplinary teams with dietitians and other HCPs involved in nutritional care programs [26].

At Erasmus Medical Center, with the largest medical faculty in the Netherlands, the medical curriculum is currently being revised, which is a great opportunity to incorporate more education on nutrition and lifestyle. One of the learning goals/end terms of the new medical curriculum at the Erasmus Medical Center is as

follows: “based on the latest scientific insights, the Erasmus doctor of 2030 fulfils an active motivating, referring and coordinating role regarding nutritional and lifestyle interventions within individual patient care and at group/population level”. The new curriculum will start in 2023.

Additionally, to reach the goal at national level in The Netherlands, a platform has been put together, called “Platform Nutrition Netherlands”, where different professionals organizations are represented, such as the associations of dietitians, nutritional scientists, doctors interested in lifestyle, medical students, and consumers/patients’ organizations. One of the aims of this platform is for more nutritional education in all medical programmes, closer collaboration between faculties and more efficient exchange or development of higher-quality materials. Moreover, in the Netherlands, in most medical universities, postdoctoral dietitians are involved in teaching activities. This is important because dietitians are the experts in healthy eating and the dietary management of various diseases. Teaching medical students should not only be done by medical doctors. In addition, there is increasing attention to interdisciplinary education, in which students with different (para)medical backgrounds receive joint project education. The resulting cross-fertilization stimulates better cooperation between future physicians and dietitians/nutritional scientists.

3.3. How can nutrition education benefit from cancer patients?

Dr. Matti Aapro (Switzerland) gave the medical doctor (oncology)’s perspective.

Firstly, by avoiding malnutrition using good nutrition, we can prevent obesity. Obesity is an adiposity-based chronic disease, which can be the cause of different types of cancers (20% of cancers are obesity related). Also, obesity can delay a cancer diagnosis and negatively influence effective treatment of cachexia.

Given that malnutrition can complicate cardiovascular disease, diabetes, cancer and so on, teaching nutrition during medical school might be even too late. The prevention of these diseases and the importance of nutrition should be discussed earlier in life (kindergarten or even earlier).

Secondly, nutrition can help patients undergoing surgery, radiation therapy and medical therapy. According to a Position Paper of a European School of Technology Task Force [27], which looked at the role of nutrition in patients undergoing major surgery, in order to decrease the time of hospitalization and the risk of complications, which are numerous in cancer patients, it is important to maintain the nutrition status of patients with head and neck cancer undergoing radiation therapy. For all patients, oncologists should consider three supportive care issues: ensuring sufficient energy and protein intake, maintaining physical activity to maintain muscle mass and (if present) reducing systemic inflammation [27].

However, medical oncologists are not aware of the clinical guidelines on cancer patients, such as those offered by ESPEN [28]. The European Society for Medical Oncology (ESMO) has published a guidance on nutrition in cancer patients [29], however the information on nutrition needs to be known by the oncologists in general and become practice changing. “We have a lot of work to do in this direction”, says Dr. Matti Aapro.

Looking at the programme of the course aimed at medical students interested in medical oncology that ESMO prepares in collaboration with the European School of Oncology (ESO), there is not a single lesson on supportive care or nutrition [30].

The ECO is formed by 36 member societies and 20 patient advocacy groups, working together to build consensus and achieve improvement in cancer care. Its aim is to reduce the burden of cancer, improve outcomes and the quality of care for cancer patients, through multidisciplinary and multi-professionalism.

ESPEN is also a member of ECO, and ESPEN can influence the following focused topic networks of the organisation: “Prevention network”, “Quality Cancer Care Network” and “Survivorship and Quality of Life Network”.

3.4. The WHO perspective

Ms. Clare Farrand (Australia) gave the WHO perspective, sharing the work on promoting better nutrition and health in the WHO European Region.

The WHO European Office for the Prevention and Control of Noncommunicable Diseases (NCD Office) leads the work of strengthening national capacity in all 53 countries of the WHO Region to prevent and control NCDs.

The technical officer of the Nutrition, Obesity and Physical Activity team focuses on supporting member states to develop and implement policies, to promote healthy lifestyles, including improved nutrition and increased physical activity.

Raising awareness, education and information amongst HCPs and the population about the importance of nutrition, clinical nutrition and NCDs is vital to achieve all global goals and ensure health and well-being for all.

Nutrition is essential for the success of all the sustainable development goals (SDGs) [31], towards a healthier and more sustainable future. The ambition to end hunger, achieve food security and improve nutrition, promote sustainable agriculture, and promote good health and well-being, are captured in SDGs 2 and 3. However, at least 12 of the 17 goals contain indicators that are highly relevant to nutrition.

WHO recommends the implementation of “best buys” and other recommended interventions for the prevention and control of NCDs.

NCD Office’s main goals are to support the efforts of WHO/Europe to reduce the burden of NCDs in European Region and to help Member States implement NCDs Strategy via strengthening surveillance, population prevention, and high-risk interventions.

The number of deaths and years lived with disabilities (DALYs) related to NCDs in 2010 and 2016 in the WHO European Region are very high compared to other causes, such as infectious disease and injuries.

3.4.1. Healthy diets

Unhealthy diets are one of the most important risk factors for NCDs in the Region. They are associated to a high risk of developing obesity, CV disease, diabetes, and some types of cancer. As a result, one of the major challenges for countries is to promote healthier diets amongst the population.

Consuming a healthy diet throughout the life course helps to prevent malnutrition in all its forms, as well as a range of NCDs. The exact formula of a diversified, balanced, and healthy diet will depend on individual characteristics, such as age, gender, lifestyle, and degree of physical activity. As well as cultural context and locally available foods and dietary costumes. However, the basic principles of what constitutes a healthy diet remain the same. WHO has a number of recommended policies to improve the food supply, specifically related to reducing salt consumption, eliminating trans fats, protecting children from the marketing of unhealthy products, as well as promoting breast-feeding [32].

3.4.2. Breast-feeding

Breast-feeding is widely recognized as the best option for infant feeding and is considered a critical element for public health. The short and the long-term benefits of breast-feeding for children and mothers has been very well documented. Breast milk is the ideal food for infants, it is safe, it is clean, and it contains antibodies

that protect against many common childhood illnesses. Moreover, research shows the protective effect of breast-feeding in the incidence of NCDs, notably obesity, CV disease and diabetes. The International Code from 1981 aims to stop aggressive and inappropriate marketing of breast-milk substitutes and also to create an overall environment that enables mothers to make the best feeding choice, based on impartial information and free of commercial influencers.

The NCDs Office has been active especially during the COVID-19 pandemic, when many countries were worried about the safety of breast-feeding. Through position papers and peer review literature, WHO emphasized the importance of continuing breast-feeding even in suspected cases of COVID-19 amongst mothers, provided that appropriate precautions were taken [33].

3.4.3. Composition, labelling and marketing of baby foods in Europe

Continuing through the life course, WHO also addresses the composition, labelling and marketing of baby foods in Europe and helps Member States to support families and babies. The promotion of the intake of healthy foods in the Region is related to the objective of ending childhood obesity. Currently, the prevalence of overweight and obesity within the Region ranges from less than 10% to over 40%. Some of the worst affected countries, mainly in Southern Europe, have seen the prevalence of childhood overweight and obesity plateau or even decline, due to the policy actions that have been implemented. Some examples of WHO reports on this theme include: “Ending inappropriate promotion of commercially available complementary foods for infants and young children” [34] and “Commercial foods for infants and young children in the WHO European Region” [35].

3.4.4. The FEED cities projects

The FEED cities project are food environment studies where data are collected on the availability of the most commonly consumed foods in that specific country and analyzed for salt and trans fats [36]. This data is used to inform the policy actions within the specific country. Currently, approximately 10 FEED cities projects are on-going.

3.4.5. Front-of-pack food labelling (FOPL) policies in the WHO European Region

There has been an increased global interest in nutrition labelling as a policy tool to which governments can both guide consumers to make health food purchases and improve their eating choices, but also as a driver for the food industry to reformulate their products to reach a healthier nutritional profile and a better rating on the front-of-pack labelling. The reason why the front-of-pack nutrition labelling is important is because over one-quarter of all foods purchased by households across Europe are highly processed; marketing claims and point-of-purchase promotions are highly prevalent; nutrition labelling provides an important tool to support consumers make healthier food choices; labelling can also drive food product reformulation. The five-step approach that countries can follow to develop and implement an evidence-based FOPL scheme is described in “The Manual to develop and implement front-of-pack nutrition labelling” [37].

3.4.6. Healthy and sustainable diets

Human health and environmental health are deeply interconnected, so for this reason the Office is engaging in a number of projects concerning health and sustainable diets. These projects reflect the needs and concerns of the member states. The projects that the Office has underway are exploratory actions which aim to provide evidence-based actions on issues such as dietary shifts, food reformulation, digital food environments.

There is increasing evidence that limiting consumption of meat and dairy products can contribute to lowering the environmental impact of diets. At the same time, the markets for ultra-processed plant-based substitutes for meat and dairy is expanding to meet these consumer demands. However, there are significant knowledge gaps in the nutritional composition of these foods.

3.5. Healthy lifestyle teaching to medical students

Dr. Kristiina Patja (Finland) explained the healthy lifestyle teaching to medical students.

According to Dr. Patja, there should be a focus on health (physical, psychological, social, and spiritual health) and well-being, not only disease management. Currently, our resources are focused primarily on tertiary care, secondary care, and hospital care.

However, if we want to seek efficiency, we should reallocate our resources in more system-based way acknowledging the advantages in utilizing health behavior science and technology throughout lifespan. Primary prevention should receive sufficient resources.

The lifestyle and health behaviors should not only be targeted towards the sick, but also to those at risk and to the entire population. At the same time, the cost growth is curbed by preventing future illnesses.

When looking at the nutrition coaching for health promotion activities, the digital tools are safe, scalable and can be used to train capacities and skills needed in this new environment.

The EU-wide study, which collected practices from 208 educational organizations, 28 countries and 15 professions, showed that all health professions have defined health promotion competencies. Education systems have been proactive in developing multiprofessional frameworks for enhancing learning and there is a willingness to continue collaboration. Competency profiles provide solid basis for health promotion and disease prevention.

In those professions, like physicians, in which lifestyle is a less prominent component, emphasis is placed on knowledge rather than on skills and behaviors (psychiatry and social workers). Whereas, in those professions in which lifestyle is a prominent component, emphasis is placed on knowledge and skills rather than attitudes (sports medicine and public health). Therefore, increasing multi-professionalism has a lot of potential to generate added value in medical education.

The multiprofessional tobacco cessation training course from the University of Helsinki, which involves medical students, Dentistry and Pharmacy students showed that the students did understand the role of multiple professions involved in tobacco cessation.

The needs of society will not be met by a single point of view. The current challenges in health promotion in relation to education and healthcare systems are summarized in [Table 1](#).

The broadest perspective must be used, as the roles and responsibility of different professionals require system thinking by being exposed to other professions. The courses where health behavior and health promotions as a holistic frame provide students a good ground for system thinking. Also, the students must acquire coaching skills, which are necessary to put in practice with the patients.

3.5.1. The shared goals for health promotion education by the 2030s

- Health promotion is done at all levels of society: system understanding promotes multiprofessional collaboration.
- Paradigm shift from treating patients to coaching patients.
- In education, emphasis is still on the individual patient level, rather than the population impact.

Table 1
The current challenges in health promotion in relation to education and healthcare systems.

Dimension of the change	For educators in graduate level	For educators in CPD at healthcare system levels
Environmental	Sustainability and ecological approaches System thinking	Resource constrains and reallocation due to population changes Roles and responsibilities of professions in change
Societal	Health inequalities as such and inequality in health literacy and digital exclusion Consumerism in health Digital	Integration of services, population health impact Resources and structures for effective CPD (willingness to invest)
Professional	Continuous competency development skills Interprofessional collaboration skills	Competency and team-based education skills Acknowledgement of lifestyle medicine and coaching skills required for all professions
Technological	Data literacy, digital tools, ethics, artificial intelligence applications Adaptation and implementation of technology in education	Adaptation and implementation of technology in care and providing skills for professionals and patients

- Understanding that collaborative care is the most effective and efficient.
- Changes in care delivery alongside digital evolution: digital health and coaching are already here, but not seen in educational programs.
- Cost-effectiveness constraints and value-based healthcare with new advocacy: low awareness of health economics may be disadvantageous for advocacy of health promotion, which requires influencing decision-making on public funding.

3.6. Round-table discussion

Prof. Michael Chourdakis (Greece) and Prof. Zeljko Krznicar (Croatia) hosted the round-table discussion.

M. Chourdakis discussed with the student representatives the importance of pushing the information on an up-ward direction to the authorities, which might be helpful as well. Although, it cannot be generalized, it seems that the students are not actively involved in this idea. It is useful to show examples of actual faculties that already started to implement changes through their local Faculty member-based organization.

ESPEN can help the faculties that lack of the personal or the materials using the Pre-G LLL, which is a structured course on Clinical Nutrition, and developing new materials covering the learning objectives and topics identified in the NEMS project, aiming to improve the knowledge and skills of medical students.

3.6.1. Take-home messages

Human nutrition is a complex matter which deserves careful attention by institutions.

Nutrition education in medical schools is still insufficient.

Consequently, knowledge about the negative consequences of nutritional issues on health are dramatically limited amongst HCPs globally.

Whatever the methodology used in the different countries, universities and medical schools, a joint effort should be made to implement nutrition education in HCPs formula.

4. Conclusions

Nutrition education in medical schools still represents an unmet need worldwide.

Young doctors will have to face old and new nutritional challenges, including the fight to overweight, obesity and disease-related malnutrition, they will have to help people adopting dietary lifestyles which are not only able to reduce the risk of NCDs, but which are also environmentally sustainable. Among these strategies, encouraging mothers to breastfeed their babies and

promoting transparent food labelling and fostering research among medical students and young doctors on alternative nutritional sources may play a significant role in public and environmental health. Besides, young doctors should possess competences and skills to include nutritional issues in their everyday clinical practice, thus defending people and patients from the risks of malnutrition and of false or not scientifically correct nutritional information. A joint effort from scientific societies, universities/medical schools and global institutions is warranted to ensure the minimum set of nutritional knowledge indispensable for young medical graduates. There was strong agreement among the representatives from different settings joining this ESPEN initiative that increasing nutritional knowledge and skills of young doctors is now possible and will launch a virtuous flywheel that will proactively involve all the other HCPs working in the nutritional field.

Authorship contributions

CC and MM equally contributed to this manuscript. All authors read and approved the final paper.

Conflict of interest

The authors declare they have no conflict of interest that might have interfered with the conception and preparation of this manuscript.

Acknowledgments

The authors thank Loredana Arhip, PhD, MSc, RDN, Madrid, Spain, for her helpful editorial assistance in the preparation of this manuscript.

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