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Jones, Glenys; Craigie, Angela M.; Zaremba, Suzanne M. M.; Jaffee, Ally; Mellor, Duane D.

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## Teaching Medical Students about Nutrition – From Basic Principles to Practical Strategies

Glenys Jones<sup>\*1</sup>, Angela M Craigie<sup>2</sup>, Suzanne Zaremba<sup>2</sup>, Ally Jaffee<sup>3</sup>, Duane D Mellor<sup>4,5</sup>.

1. Association for Nutrition, UK; 2. Ninewell Hospital and Medical School, University of Dundee, UK; 3. NHS Luton & Dunstable Hospital, UK; 4. Aston Medical School, Aston University, UK; 5. Centre for Health and Society, Aston University, UK

\*corresponding author

### Abstract

Poor nutrition is widely recognised as one of the key modifiable risks to health and life, with doctors in an ideal position to recognise when sub-optimal nutrition is impacting on their patients' health and provide them with advice and support to create sustainable and achievable diet and lifestyle modifications. However, it has been acknowledged that nutrition training within medical schools is extremely varied, and in many cases inadequate. The AfN Undergraduate Curriculum in Nutrition for Medical Doctors provides medical schools with guidance on what should be included in the training of all medical students. This paper discusses three key ways in which medical schools can support the implementation of nutrition into their teaching; incorporating nutrition within the core medical curriculum teaching, the use of subject specific experts to support and deliver nutrition training, and the inclusion of nutrition within formal assessment so as to reinforce and cement learnings into practical, applicable actions and advice.

### Key Points

1. Suboptimal diets are linked with increased morbidity and mortality risk
2. NHS Long Term Plan commits to increasing nutrition within medical professionals' training
3. Nutrition training is currently insufficient in many medical schools
4. Nutrition can be a conduit to contextualise biomedical and social science concepts
5. Nutrition should be included within the core curriculum teaching in medical schools
6. Utilising nutrition specialists aids understanding and awareness within medical students
7. Incorporating nutrition questions within formal assessments can support medical students to improve their communication, diagnostic and referral skills

The role of nutrition in health and wellbeing is widely recognised. Numerous research studies and expert bodies have found that poor diets are associated with more deaths worldwide than tobacco smoking and healthier dietary patterns are correlated with an increase in life expectancy (1–4). Poor nutrition during the first 1000 days of life can negatively impact brain development, and in turn long term health and development (5). Malnutrition contributes to over 45% of child deaths (6,7), with worldwide 1 in 3 children under 5 years old being malnourished and two thirds having poor dietary intakes, contributing to poor development, learning and immunity (8). Therefore, with food poverty increasing, it is important for medical practitioners to recognise the association between food insecurity, suboptimal dietary patterns and ill health(9). This should include an understanding of food provision and feeding practices especially with respect to introduction of complementary foods and the behaviour and developmental influences on nutrition and eating as part of their paediatric training. It is essential that nutritional education is delivered in a culturally sensitive and aligned way, so that it

is inclusive with respect to the communities and settings that our medical students are starting to practice in.

Suboptimal nutrition is the leading preventable cause of both morbidity and early mortality across a range of non-communicable diseases(1), with malnutrition costing the NHS billions of pounds every year(10,11). Yet it has been widely publicised that UK medical students and doctors report the nutrition education within their medical training as inadequate(12–14).

To help address this, the NHS Long Term Plan has committed to ensuring a greater inclusion of nutrition within the training of medical professionals(15). Further exploration of research in this area shows a divergence in the assessed amount of nutrition related teaching within medical curricula and the amount perceived by students(13,16–18). This highlights the need to support both medical students and teaching personnel in identifying and flagging nutrition related teaching content and opportunities.

In the UK, the Association for Nutrition (AfN) brought together stakeholders from across nutrition, dietetics, medicine, academia, and government to develop the AfN UK Undergraduate Curriculum in Nutrition for Medical Doctors(19). The curriculum was created to be incorporated within the core teaching of medical schools. It includes clearly stated outcomes for graduates that are linked to the GMC Outcomes for Doctors and detailed teaching points to aid in its delivery. The curriculum does not provide medical students with the breadth and depth of knowledge required of a registered nutritionist (RNutr or ANutr) or dietitian (RD), but instead focuses on creating a foundation of knowledge and understanding of relevant areas of nutrition science to support future doctors in their practice and development into foundation years training and beyond.

To equip our future generations of doctors to fully support their patients, and considering the increasingly recognised impact dietary choices have on health and disease progression, nutrition needs to be sustainably embedded within the training of all medical schools. We present three key factors for successful and achievable nutrition education in medical schools.

### **Incorporation and spotlighting of nutrition within core teaching**

As previously discussed, there has been much discussion around the amount of nutrition education in medical schools(13,20,21). The value of using nutrition to contextualise both biomedical and social science concepts in pre-clinical and early medical school teaching cannot be underestimated. Including nutrition teaching in the early stages of the medical student's journey and using the highly relatable links offered when discussing nutrition and food, has the potential to support students' understanding of what can be abstract scientific concepts through the linking of basic science to a readily identifiable food stuff or narrative (22). Whilst emphasis is often placed on teaching nutrition in respect to how it pertains to the clinical setting, the underpinning links of the biomedical sciences and social sciences can be seen in the practice of nutrition both clinically and in public health. This

supports an integrative approach being more appropriate than nutrition being taught as a standalone module.

An integrative approach requires a reflective analysis of current teaching, plus clear signposting of themes and opportunities where aspects of nutrition science, its principles and implementation in practice, can be utilised to enhance teaching. This would ultimately aid a clearer understanding of nutrition for medical students. It would also highlight the fact that underpinning biomedical sciences are the foundation of both nutrition(23) and medicine curricula(24), with these standards having many commonalities in cell biology, genetics, biochemistry, and physiology(25).

With the acknowledged challenges of studying and practicing medicine, physical and mental wellbeing are increasingly being identified as areas medical students, along with practising doctors, need support with. Therefore, as part of the core induction and welcome to medical school, the inclusion of wellbeing activities and sessions on nutrition are a logical step. This allows students to recognise their understanding of the role food has in their lives and how it may influence their own health. It has been suggested that medical student's dietary habits as well as their ability to offer nutrition advice to others can be improved by this type of education (26). This can then be linked to core biochemistry teaching to raise awareness of how nutrition and the availability of nutrients, as substrates and co-factors in pathways as fundamental as glycolysis, can help to contextualise both subjects and incorporate nutrition within core teaching.

Foundational nutrition teaching incorporated within a medical student's preclinical years, can then be extended through and into clinical skill development, and in particular the development of consultation skills where the focus is on supporting individuals to make changes and affirming logical lifestyle, including dietary, changes. In this way nutrition education can be used to support a number of learning outcomes in GMC Outcomes for Graduates, including 14 j, l and m, which focus on negotiating change linked to a patient's preferences, developing a management plan and supporting patient self-care (24). It is important to build the development of these consultation skills after students have obtained a solid foundation in the principles of biomedical sciences which include nutrition along with an appreciation of evidence-based medicine. This can be developed further with clinical experiences and understanding through specialisms. This can range from different modes and routes for nutrition support used in gastroenterology to the education and self-management seen in diabetes and metabolic disease services. This is then complemented through multidisciplinary clinical teaching, alongside access to academics who are registered nutritionists (ANutr/ RNutr) or dietitians, and can ensure information is appropriate, evidence informed and representative of current practice and nutrition related healthcare.

### **Utilising the knowledge and skills of subject specialists**

While some components of the curriculum can be delivered by tutors without nutrition qualifications, there are many where the subject specific expertise and skills of registered nutritionists (ANutr/RNutr) and/or dietitians is important and can ensure a level of accuracy and depth to students' learning.

Dietitians and registered nutritionists (ANutr/RNutr) working in clinical environments and within public health, are well placed to teach medical students core clinical knowledge and skills required to achieve safe patient care within their area of specialism. Registered nutritionists (ANutr/RNutr) and dietitians working in non-clinical areas can utilise their training and experience in nutrition research, health promotion and/or public health to educate students in pre-clinical areas. These can include the foundations of nutrition science, dietary recommendations (across the lifespan), and disease prevention and management, as well as transferable skills such as research methods and critical appraisal.

Dietitians and registered nutritionists (ANutr/RNutr) understand the role of the doctor within their specialty area of practice and can educate and support medical students to understand areas around scope of practice, including appropriate patient referrals to nutrition/dietetic services and appreciation of the responsibilities of other healthcare professionals. Interprofessional working is essential for patient safety and outcomes, not to mention respecting the diverse roles of individuals that make up the healthcare team(27). The need for multi-disciplinary working is crucial given the high demand for supporting more diverse patient populations, such as those within communities at high risk of poor health and social outcomes(28–30), people being discharged from hospital(31), and older people living in residential care homes(32). When considering the needs of groups at nutrition risk, aspects of socioeconomic inequalities should include the use of food banks and how this impacts individuals living with chronic disease. Such populations can experience a higher prevalence of malnutrition amongst other nutrition concerns(10). Medical students can develop a holistic approach to patient care, improve communication and problem-solving skills, and grasp a firm understanding of healthcare systems by working in a multi-disciplinary fashion.

Actively including NHS dietitians and registered nutritionists (ANutr/RNutr) in nutrition education also offers the opportunity for these professionals to develop in a pedagogical capacity, widening their professional portfolio, expertise, and networks, quickly becoming a core asset to the medical school team. Arranging staff training on teaching methods can act as both an incentive and opportunity to upskill the nutrition and dietetic workforce, and to meet the skills required for undergraduate teaching.

Harnessing the support from the wider RD, RNutr and ANutr workforce can provide the capacity to teach the larger student numbers resulting from the ongoing commitment to expand the medical workforce in the UK(33). This, together with the skills of these subject experts, also enables more small group nutrition teaching to be carried out, in turn encouraging more interaction, discussion, critical thinking, and improved knowledge retention(34).

One example of how medical schools can utilise the expertise of these nutrition professionals is via the Scottish Government's funding of Medical Additional Cost of Teaching (ACT), which can be used to deliver nutrition education to medical students(35). Indeed, within NHS Tayside, current ACT funding is used to employ a dietitian within the University of Dundee's nutrition education team to develop and deliver key competencies in clinical nutrition, provide dietetic backfill where required, and embed core teaching into the MBChB curriculum.

## **Inclusion of nutrition within assessments and practical clinical examinations**

The use of Objective Structured Clinical Examinations (OSCEs) is common in medicine, often initially used developmentally as formative assessments and developing as the course progresses to be more complex. They allow students to demonstrate practical skills in a controlled environment, including in the early years of medical education(36).

The principles of the AfN curriculum(19) recognise and requires nutrition to be integrated into the core medical curriculum, from the start of a medical educational programme, extending beyond the theoretical aspects of the biomedical and social sciences to include teaching aimed at developing clinical skills. A sensible starting point can be to integrate nutrition, diet and lifestyle-focussed material within clinical skills development, thereby contextualising conversations and encouraging meaningful connections to be made. This is not without risk, and it needs to be delivered in a way that is mindful, acknowledging that some medical students may be living with eating distress and eating disorders. Therefore, it is vital that these activities are developed and supported by appropriately trained staff, with consideration for the provision of trigger warnings at the start of sessions, alternative tasks such as exemplar food intakes for those who might find recording their own food intake distressing, and simulated patients when practicing anthropometric measurements. These sessions should be delivered within a medical curriculum and support structure which supports students to be open about their mental health in line with GMC standards (37). This allows for the further development of consultation and communication skills, which can increase medical students' confidence to discuss diet and lifestyles with patients. These skills, understanding, and the relevance of nutrition, can then be highlighted and recognised through their inclusion in both applied knowledge test examinations and OSCEs.

Nutrition has been highlighted as an underpinning way of delivering concepts to medical students, from biochemistry to public health, epidemiology linked to wellbeing, and in early clinical skill development. This provides an opportunity to use nutrition as part of lifestyle counselling within early year education. Once developed, building on theoretical teaching which is already central to medical education, can be assessed in both a formative and summative way. This has the effect of normalising the expectation that nutrition is a core part of assessment, enabling students to engage in holistic and evidence informed lifestyle evaluations, discussions and support from early on in their medical careers. Although this paper describes how nutrition education can be integrated into medical education, this could equally apply to other health professions including dentistry, nursing, optometry and pharmacy education (38–41). As these healthcare professionals can all have a role to play in conducting initial patient consultations, such as routine health checks, lifestyle counselling and nutrition referral pathways would be a valuable part of their education. With an integrated approach in medicine and other healthcare disciplines, this early exposure to nutrition should not only enhance patient care, but also provide students with opportunities to increase their awareness and discover areas of interest that may influence their future areas of practice and specialism. In future it would be

useful to evaluate if such initiatives increase interest and applications in areas related to nutrition such as gastroenterology.

The value of using nutrition and lifestyle conversations early in medical education is the facilitation of the development of patient-centred and culturally sensitive conversations. The challenge and benefit of including health related conversations about food and nutrition, allows for the early introduction of conversations aimed to prevent stigma, and allow students to develop strategies to sensitively discuss health related issues, including body weight and its relationship to health(42). It is essential stigma is approached early, as weight stigma has been identified as a barrier to effective communication and care and it is an area many professionals are challenged by and seek to challenge to improve their delivery of healthcare messages and interventions(43). These sessions should be led by suitably qualified professionals, who can adapt activities if required to account for individuals with a current or history of eating disorders who may require additional support, referral or activity amendments.

Incorporation in assessment can also help students develop awareness of their limitations, a clear pathway to refer onward to other health professionals including dietitians and registered nutritionists, and confirmation that the advice they can offer is often centred on affirming patient and carer ideas and signposting to evidence informed advice often set out in guidelines and on official websites.

## **Conclusion**

Medical students have called for medical schools to explicitly incorporate nutrition into the core medical curriculum, for appropriate identification of when nutrition could be a factor in their patient's presentation, preparing and enabling them to discuss nutrition with their patients and support them with encouraging health promoting behaviours and dietary choices(44). Indeed, between the NHS Long Term Plan, medical students and stakeholders across nutrition and medicine there is a united call for nutrition to be embedded into the training of our future doctors(13,15–17,22,44). The time is now here for medical schools to demonstrate their innovative and forward-thinking training, by integrating the AfN UK Undergraduate Curriculum in Nutrition for Medical Doctors(19) into their teaching provision and preparing their graduates with the knowledge and skills needed to aid their practice and improve patient care. The undergraduate curriculum has appeared to lag behind the postgraduate speciality curricula of the Colleges, with respect to clear structure and learning outcomes on nutrition. However, this perhaps reflects the broader nature of undergraduate education and an already very busy curriculum. Despite these challenges, the suggestions highlighted in this paper can go some way towards enabling nutrition to be fully integrated in the undergraduate medical curriculum, before medical students go onto their subsequent postgraduate training, ultimately improving patient and population health.

## **Disclosures:**



The authors are all members of the AfN Interprofessional Group on Medical Nutrition Education and were involved in the development of the AfN undergraduate nutrition curriculum for medical doctors.

Dr Ally Jaffee is co-founder of Nutritank, an advocacy group campaigning for nutrition education within medical student training

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