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**Nutrition education in UK medical
schools: a qualitative study of
attitudes, barriers and facilitators**

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Acknowledgments

Project Development

In 2018, the General Medical gave the Association for Nutrition (AfN) responsibility for developing an updated nutrition curriculum for medical schools. An inter-professional working group was formed by the AfN, and this group had developed a draft copy the revised nutrition curriculum.

Dr Glenys Jones of the Association for Nutrition (AfN) gave a talk at LSHTM to the MSc Nutrition for Global Health cohort, and following this talk proposed that a qualitative student summer project could be done to support the work of the AfN in developing the updated medical school curriculum.

After I expressed my interest, Glenys advised discussing ideas with Dr Marko Kerac, MSc programme director, who is a member of the inter-professional working group that was set up by the AfN to assist with curriculum development. Dr Kerac suggested a qualitative piece of work that would help to identify barriers and facilitators to increasing nutrition education. Following discussion with Marko, Glenys outlined what she had in mind for the project and expressed that she would like part of the project to involve receiving feedback on the new curriculum. I agreed to produce for the AfN a separate report with these comments.

Based on these discussions and bringing in my own ideas I wrote a draft 'protocol' which Dr Kerac checked and provided feedback on as well as answering queries I had.

Contact, Input and Support

Given the qualitative nature of the project and previous contact with Claire Thompson regarding another qualitative project idea, I asked Claire if she would be able to supervise. She agreed and answered queries related to the CARE form and checked the CARE form after submission. Following a request for clarification on the CARE form, Dr Kerac provided guidance on how to respond.

Dr Jones assisted with development of a recruitment email to send to medical school staff, and checked over a draft interview topic guide with example questions. She also checked over the participant information sheet and consent form and made comments on changes I should make with wording before submitting as part of the CARE form and sending to

potential participants. Dr Jones also provided a list of people I could potentially contact for interview and provided the draft curriculum that was to be sent to participants. She gave no further input into the project.

Claire was met with or contacted several times throughout to provide guidance and answer queries – including on writing the topic guide, carrying out the NVIVO analysis, and writing the results.

Main research

Claire provided guidance throughout the main research as described above. 2 fellow students allowed me to practice the interview on them and I made small changes to wording of some questions following this as well as felt more prepared to do the real interview. Otherwise, the project work (recruitment, interviews, transcription, analysis and writeup) was solely done by the author (Patrick Cromb).

Write up

A family member proofread the report and provided feedback on grammar. Claire Thompson read one draft and provided feedback.

Abstract

Background

In recent years, medical students and practicing doctors in the UK have expressed a desire for nutrition to form a greater part of the undergraduate medical (MBBS/ MBChB) curriculum, and have put pressure on medical schools to make changes in this area. However, there is limited published research that aims to understand attitudes of senior medical school faculty towards this or what barriers and facilitators are preventing or driving the provision of nutrition education, in the specific context of the United Kingdom.

Aim

Explore attitudes of medical educators towards recent pressure to increase nutrition education in UK medical schools and identify factors that prevent or facilitate increased nutrition, to inform the direction of future research and the approach of those attempting to implement or advocate for increased nutrition education.

Methods

Thematic analysis was carried out using NVIVO 12 on the transcripts of semi-structured interviews with 10 staff members from 9 UK Medical Schools. Staff were either employed in a role related to nutrition education or curriculum setting.

Results

Limited time in a crowded curriculum came across as the most significant barrier. Factors relating to staffing, such as staff being trained in nutrition and staff motivation, emerged as key themes among barriers and facilitators. There was limited support for additional nutrition teaching in the core curriculum among senior staff. This was not due to negative attitudes towards nutrition, but other factors such as limited time.

Conclusions

Attitudes towards increased nutrition are mostly supportive or sympathetic, but many barriers exist to implementing nutrition in the core curriculum. Advocates for nutrition may achieve greater success by focusing on promoting content to be completed outside of core teaching time such as online materials. Future research could quantify the relative importance of barriers, facilitators and attitudes identified here.

Introduction

Importance of nutrition in health care

Good nutrition is fundamental to health. Despite much confusion amongst the public and in popular media about diet, a broad consensus exists among national and international health organisations regarding what constitutes a healthy dietary pattern that “helps to prevent malnutrition and non-communicable diseases”.¹ Failure to achieve certain elements of these accepted healthy eating guidelines, such as having a low fruit or wholegrain intake, constitutes a ‘dietary risk factor’ for disease.

The Lancet Global Burden of Disease study identified that 11 million deaths and 255 million disability-adjusted life-years (DALYs) in 2017 were attributable to dietary risk factors.² In England, known risk factors explain 40% of ill health, and the largest contribution (10.8%) comes from poor diet (total dietary risk factors).³

One of the principal functions of the health care system is the management of diet-related non-communicable diseases. Not only can appropriate nutrition prevent these diseases, but it can also help to manage them and reduce the risk of complications. For example, National Institute for Health and Care Excellence (NICE) guidelines state that diet should be the first line management option for type 2 diabetes.⁴ Diet-related non-communicable diseases usually develop over a long period, so health care professionals can also play a role in helping to slow or prevent the progression of disease through appropriate and evidence-based diet and lifestyle advice.

Health professionals must also be able to recognise and treat undernutrition. Undernutrition can adversely affect every system of the body and is a major cause of death and disability worldwide, including in the UK,⁵ where 29% of adults admitted to hospital in the UK are at risk of undernutrition.⁶

According to the British Nutrition Society, there is a nutritional component to most illnesses and their treatment – whether disease adversely affects nutritional status or poor nutrition leads to disease.⁵ Given its critical importance, it is recognised that doctors should be educated in nutrition and be able to carry out such actions as nutritional assessments or providing evidence-based nutrition advice. For instance, the Royal College of Physicians published a landmark report in 2002 stating that addressing nutrition in patient care is a core responsibility of doctors.⁷

Are medical schools teaching enough nutrition?

Pressure to increase nutrition education

*“We learn nothing about nutrition, claim medical students” – BBC News headline*⁸

In recent years, medical students and practicing doctors in the UK have pushed for more nutrition education at medical schools. There have been numerous articles published in the mainstream media highlighting issues with the knowledge and practices of doctors and calling for changes to medical education as a solution.^{8 9 10} Similar viewpoints have been published in prominent medical journals. For example, an editorial written by two final- year Cambridge medical students entitled ‘ Medical schools should be prioritising nutrition and lifestyle education’¹¹ was published in the British Medical Journal.

The clearest example of pressure from students is the emergence of Nutritank, a nationwide network of medical students whose aim is “to gain confirmation from each UK based medical school that they will commit to increasing nutrition and lifestyle education within their medical school curricula as soon as possible or by the end of 2019”.¹² The organisation was formed in 2017 by two students from Bristol University Medical School, and now at least 20 UK medical schools have a ‘Nutritank Society’. Nutritank have received mainstream media attention including in an episode of *Jamie and Jimmy’s Friday Night Feast* on Channel 4:

*“In Friday Night Feast, the boys hear from medical students in Bristol who say they need more nutrition training, in order to be able to identify the role of diet in some diseases, such as type 2 diabetes and heart disease, and give patients access to the right support for them. They feel they’re not receiving enough education to handle the amount, and the nature of diet-related cases that come into a GP’s surgery.”*¹³

Recent survey data

Published survey data has highlighted low confidence about nutrition among doctors and students, and high dissatisfaction with current teaching on nutrition. In a 2018 survey of 181 students from 11 UK medical schools,¹⁴ 96% said doctors have a responsibility to provide the best evidence-based dietary advice to patients. However, only 21% were confident about UK dietary guidelines and about advising patients about common dietary approaches. Just 14% of students “felt they were receiving a comprehensive and relevant education on diet and nutrition from their medical school” whilst 68% “would appreciate more teaching in this

area”. Another survey of medical students and the clinicians that they shadowed at St George’s Hospital (London) found that: ¹⁵

- only 11% of students had the importance of nutrition highlighted to them ‘regularly’
- only 17% of clinicians frequently emphasised the importance of nutrition problems
- only 7% frequently emphasised the importance of nutrition screening tools
- only 50% of clinicians said they were confident managing nutrition-related problems

The latter two results are consistent with data showing that undernutrition is underrecognized and undertreated in the UK. ¹⁶

Hours

The mean time dedicated to nutrition education in a 5 year medical degree among 11 UK medical schools was in 2016 estimated as 18 hours (ranging from 4 to 40+ hours). ¹⁸ This is below the European average of 23.7 hours, ¹⁹ and the 25-hour minimum recommended by the US National Academy of Sciences. ²⁰ Only 3 of 9 academics representing these medical schools thought that their nutrition training was adequate. ¹⁸

Unpublished survey data collected in 2018 by Nutritank suggests that the hours dedicated to nutrition education may be fewer than previously estimated. Of 244 medical students who were asked “How many hours of teaching have you received on nutrition in the last academic year? (includes lectures, tutorials, e-learning) “, over 71% said 0-2. 90% of these students either ‘agreed’ or ‘strongly agreed ‘that they would like more teaching on nutrition. This data is currently being prepared for publication in collaboration with the NNEdPro Centre for Nutrition and Global Health and was shared with the author following contact with Nutritank.

Increasing nutrition education

Barriers and facilitators

There is limited evidence regarding the factors that are driving/enabling (facilitators) or preventing (barriers) increased nutrition education in the UK. These are important to know, as if nutrition needs to be increased, knowledge of barriers and facilitators can inform the strategies of those seeking to implement nutrition.

In US medical schools, nutrition education is also seen as inadequate.²¹ There has been little discussion of facilitators in the US context, but some barriers have been discussed (although the absence of a barrier can sometimes be interpreted as a facilitator).

According to one paper published by the developers of 'Nutrition in Medicine', an interactive and comprehensive online nutrition curriculum available to all US medical students, the "chief" barrier is that "most medical schools do not have faculty trained specifically in nutrition".²² Blunt and Kafatos (2019) also emphasise this barrier and label the shortage of doctors well-trained in nutrition who are able to train current medical students in clinical nutrition as a 'catch 22'.²³

'Nutrition in Medicine' has helped in addressing this barrier, along with the barrier of 'lack of available time for new lectures or modules'.²¹ Other barriers identified elsewhere include an emphasis on curative rather than preventative medicine, competing topics (curriculum crowding), lack of 'nutrition advocates' and lack of agreement on what to teach.²⁴

Long and Neild (2016), who surveyed representatives of UK medical schools and asked whether they thought nutrition education was 'adequate', also included questions about barriers and facilitators.¹⁸ All three of the representatives reporting nutrition education as adequate cited 'increased formal teaching time devoted to nutrition' and 'better organisation of the nutrition teaching' as facilitators. Additionally the presence of a 'nutrition lead' was associated with greater mean time allocated to structured teaching (25.4 vs 16.2 hours).¹⁸

Of those reporting inadequate nutrition education, 83% said 'lack of prioritisation' was a barrier. 67% said 'unable to devote more teaching time to nutrition' and 'difficulty organising topics and teaching sessions' were barriers.¹⁸

Attitudes

It is unclear what the attitudes of medical school staff in the UK are towards increasing nutrition education. Articles published in the mainstream media on this issue have been one sided and have come from students or practicing doctors arguing for more nutrition education. The potentially opposing views of those who work in medical education have not been published in media articles. There is also no published research that focuses on the views of those who have the most 'power' over the curriculum (with job titles such as Dean of Medical Education). The attitudes of these individuals are important as it is they who ultimately decide whether nutrition education will increase or not.

The role of this study

Whilst there is an obvious desire for more nutrition education from many medical students and practicing doctors, there is a clear gap in knowledge regarding the attitudes of medical school staff towards increased nutrition education. This study aims to provide some clarity on this by asking staff for their opinion towards calls for increased nutrition education, and exploring the reasons for their agreement or disagreement. This will bring more balance to the discussion over nutrition education in medical schools.

This study will also build on the findings of previous research and help identify the key barriers and facilitators associated with increasing nutrition education in UK medical schools. With the exception of Long and Neild (2016), no other research has been published in a UK context that has collected primary data to investigate barriers or facilitators. This study will attempt to address this gap in the literature.

A new nutrition curriculum (study context)

Every UK graduate of a Bachelor of Medicine, Bachelor of Surgery (MBBS / MBChB) degree must be able to meet the competencies outlined in the GMC document: 'Outcomes for Graduates'.²⁵ Therefore, medical school curricula are structured to ensure these outcomes are met. This document "explicitly recognises the need for nutrition within undergraduate medical training, but provides little guidance on its content."²⁶ Therefore a GMC-endorsed nutrition curriculum was devised in 2013 by the Intercollegiate Group on Nutrition (ICGN) of the Academy of Medical Royal Colleges (AoMRC) to "fill that gap".²⁶ However ensuring students meet the knowledge and competencies outlined in the document is only voluntary.

In 2018, the General Medical gave the Association for Nutrition (AfN) responsibility for developing an updated nutrition curriculum to replace the existing AoMRC ICGN curriculum. As part of this research study, participants gave feedback on a draft copy of the new curriculum, which will be passed on to the AfN in a separate report (see Acknowledgments). The introduction of the new curriculum provided a good context to ask other questions related to nutrition education in medical schools that would answer the study objectives, and affiliation of the project with the AfN helped with recruitment of participants.

Aims and Objectives

Aim

Explore attitudes of medical educators towards recent pressure to increase nutrition education in UK medical schools and identify factors that prevent or facilitate increased nutrition, to inform the direction of future research and the approach of those attempting to implement or advocate for increased nutrition education.

Objectives

1. Explore attitudes of UK medical school staff, particularly those who are who are involved in curriculum setting, towards recent pressure to increase the extent of nutrition education in UK medical schools
2. Identify barriers that prevent increased nutrition education in UK medical schools
3. Identify factors that facilitate or encourage increased nutrition education in UK medical schools

Methods

Due to the qualitative nature of the study design, reporting for this section is in accordance with the 32-item 'Consolidated criteria for reporting qualitative research' (COREQ) checklist (Appendix 3).

Study design

This is a qualitative study using semi-structured interviews.

Study location

Nine Interviews were conducted by telephone, and one interview was conducted by Skype. The lead investigator conducted one interview from a classroom at LSHTM and the rest of the interviews at his residence. No others were present.

Sampling and sample size

Sampling was purposive but also based on convenience. The inclusion criterion was that the individual was a staff member or recent staff member at a UK medical school, in a role related to the Bachelor of Medicine, Bachelor of Surgery undergraduate programme (abbreviated as MBChB or MBBS).

Some individuals invited to participate were in a senior role overseeing the entire curriculum, while others were more directly involved in implementing or delivering nutrition education. Due to their influence over what is included in the curriculum, the opinions of the former regarding calls to increase nutrition education were of greater interest. Meanwhile, staff members who were involved in implementing nutrition education would likely be able to provide a clearer picture of what barriers and facilitators to doing so have been. That said, the opinion of all participants towards increased nutrition was still of interest, and senior staff could still share views on barriers and facilitators from an alternate perspective. Furthermore, senior staff were anticipated to be hard to recruit to the study, so having a wider inclusion criterion allowed for a greater number of interviews to be arranged.

Web pages for each of the 33 UK medical schools were browsed to find the email addresses of senior faculty members who had influence over the MBBS or MBChB curriculum.

Where email addresses could be identified, a recruitment email with a consent form and participant information sheet attached was sent. If participants showed interest, they were sent a draft copy of the nutrition curriculum and an interview was arranged.

Of the 16 senior faculty members whose email addresses were obtained and were invited to participate:

- 9 did not reply.
- 2 declined the invitation – one due to busy schedules and one did not give a reason.
- 2 passed the request onto other colleagues who were not key faculty members but were involved in nutrition education implementation, who then accepted.
- 3 accepted.

In addition, Dr Glenys Jones of the Association for Nutrition provided a list of email addresses of individuals that she knew were involved in nutrition implementation or teaching.

Of the 6 contacted:

- 2 did not reply.
- 4 accepted.
- 1 of these 4 participants passed the information sheet on to another member of staff at their medical school who was head of year 3, so was a senior faculty member, but did not oversee the entire curriculum. They agreed to participate.

A deadline was set as the 9th August for the last interview to take place, to allow time for analysis. A total of 10 interviews were successfully arranged and carried out before this date. More interviews would have been desirable for the purpose of data saturation, which was not achieved.

Research team and reflexivity

- Interviewer: All interviews were conducted by XXXX (the lead author).
- Credentials: BSc XXXX, studying for an MSc in Nutrition for Global Health
- Occupation: MSc student
- Gender: Male
- Experience/ training: online resources on interview technique, guidance from Claire Thompson (supervisor and qualitative researcher), textbooks in LSHTM library
- Relationship with respondents: XXXX had no relationship with any respondents beforehand and had never met any of them.
- Participant knowledge about researcher: The recruitment email outlined that XXXX was an MSc Nutrition for Global Health student at LSHTM and that XXXX was carrying out the project in order to complete their MSc, and to support the AfN with the development of a new nutrition curriculum.
- Interviewer characteristics: The research topic was of interest as the lead author had seen media reports of medical students expressing dissatisfaction with the extent of nutrition education taught at medical schools. The lead author had also seen non-evidence-based information regarding nutrition shared by UK-based clinicians in newspaper articles and on social media which suggested a poor understanding of nutrition science. These experiences among others gave the author a slight bias in thinking that nutrition education may need to be increased or improved in medical schools.

Data collection process

Semi-structured interviews were carried out in order to address the study objectives, and to gather feedback about the new AfN nutrition curriculum.

The specific questions asked in order to achieve these objectives differed slightly person to person due to the diversity of the sample. Some participants had less time for the interviews so some questions that probed for more depth were omitted. The topic guide and some example questions were reviewed with the project supervisor and was piloted with a family member and with a fellow student. Some questions were altered following this to make the wording more clear. Some specific questions asked were changed throughout the study based on experience of previous interviews. The topic guide with example questions can be found in Appendix 1. Some specific questions were written beforehand and read out to the

participant. Other questions were thought of on the spot in response to the participants answers.

The interviews lasted between 20-40 minutes, depending on time constraints and how much depth participants gave in their answers. The first interview took place on the 8th July and the last was on the 9th August.

Consent was obtained from all participants by returning a completed consent form (digitally signed, or verbally signed at the start of the interview). Ethical approval for the study was granted by the LSHTM ethics committee (ref:17502).

Data management

Interviews were audio-recorded with QuickTime player on a password-protected laptop. The recordings were transcribed by the author onto Microsoft Word using the same laptop, and the transcription files were saved to an encrypted LSHTM SharePoint. Confidentiality was kept by replacing names with ID numbers on transcripts. All analysis was carried out by solely by the lead author. All participants consented for their identities to be made known to the AfN working group if necessary for follow up on comments. Zotero software was used to manage references. Transcripts were not returned to participants for comment or correction.

Data analysis

The interviews were transcribed without details of pauses and intonation as these were not relevant to the objectives. They were read over several times for familiarisation and initial rough notes were made. The transcripts were then imported into NVIVO12.

A thematic analysis was carried out that was informed by the 'Framework Method'.²⁷ Codes were assigned to relevant passages of text and these codes were organised under one of four predefined categories: Barriers, Facilitators/Drivers, Attitudes/Perceptions, and AfN-related (mainly regarding feedback on the curriculum). Each transcript was coded according to this 'analytic framework' meaning sections of text not deemed to be related to one or more of these 4 broad categories were not coded.

Within these broad categories, codes were organised into subthemes. For the 'Barriers' and 'Facilitators/Drivers' categories, an inductive approach to coding was used, as the codes and subthemes were not predefined (as is the case in deductive coding). In 'Attitudes' and 'AfN related' some subthemes were predefined. Some codes and subthemes were relevant

across multiple categories (for example, an example of a negative attitude may constitute a barrier) but each subtheme was organised under a single category for ease of organisation.

The coding tree with a list of all the subthemes can be found in Appendix 2. A matrix was generated using NVIVO12 as is recommended in the Framework Method,²⁷ which helped to summarise the data and compare across participants.

Major subthemes within or across barriers and facilitators and attitudes were identified and are presented in the Results section. Major subthemes were primarily identified by frequency of similar codes appearing in the data - a technique suggested by Ryan and Bernard (2003)²⁸ - and by using the matrix to compare across each participant for commonalities.

'AfN related' was set aside to be written up to help inform development of the new curriculum and will not be referred to in the results or discussion sections.

Participants did not provide feedback on the findings.

Results

Sample Characteristics

Relevant characteristics of the 10 participants (P1-10) are outlined below. There were 3 senior faculty members who oversaw the entire curriculum in their role (P1-3). P4 oversaw the teaching in year 3, so was senior faculty, but did not have authority over other years as did P1-3. P5-10 were directly involved in nutrition teaching or implementation.

Table 1- Sample Characteristics

Participant	Role/ Recent role	Background	Nutrition background *	Involved in nutrition teaching or implementation
P1	Dean of Medical Education	Medical Doctor	No	No
P2	Dean of Medical Education	Medical Doctor	No	No
P3	Deputy Programme Lead	Biomedical Sciences	No	No
P4	Head of Year 3	Medical Doctor	No	Yes
P5	Leads primary care teaching	Medical Doctor	No	Yes
P6	Leads primary care teaching in one year	Medical Doctor	No	Yes
P7	Employed to review nutrition content in the curriculum and to teach nutrition content	Registered Dietician	Yes	Yes
P8	Lecturer (in physiology and some nutrition)	Registered Dietician	Yes	Yes
P9	Lecturer in basic sciences, nutrition discipline lead	Biomedical Sciences	No	Yes
P10	Involved in implementing nutrition education on a national level	Medical Doctor	Yes	Yes
<ul style="list-style-type: none"> • has completed formal nutrition training, outside of what is taught at medical school or in medical specialty training 				

Attitudes, Barriers and Facilitators - Subthemes

Many subthemes within or across barriers, facilitators and attitudes were identified through organising relevant codes (Appendix 2). The most important and interesting ('major') subthemes that emerged from the data are presented here.

Whilst codes and subthemes were arranged into one of the overarching categories for simplicity, some subthemes were relevant across multiple categories, and the categories are highly interlinked. For example, attitudes can be drivers if positive, or barriers if negative. Therefore, this section is organised by subtheme rather than objective.

Opinion on recent calls to increase nutrition education

Most participants were asked for their opinion about recent calls to increase nutrition education (see Appendix 1-Example Questions) so this was a predefined subtheme.

It was expected that participants directly involved in implementing nutrition would be supportive. Most were, but some gave caveats such as limited curriculum time or students needing to better identify existing nutrition education (discussed further later). Some participants were also asked questions relating to the attitudes of other staff members towards nutrition education, such as whether they had faced resistance when attempting to implement it. The responses informed the conclusion of the 'staff attitudes' subtheme.

Three senior staff were interviewed who had a role overseeing the entire curriculum (P1-3); their opinions were of most interest.

P3 expressed an interest in evaluating whether their university is *“doing enough, in enough detail”*. Their attitude was positive about nutrition overall - like P4 and P8, they thought that nutrition should be a theme or 'thread' that is covered throughout medical training due to its importance.

“health begins with good nutrition and obviously there are many diseases that result from poor nutrition, so over or undernutrition, so it should be a thread that runs through a medical curriculum...and I think it's important that we raise those nutritional aspects in various conditions when we come across them.”

Despite this attitude they were not explicitly supportive of increased nutrition in the core curriculum. The main reasons for this were limited space (time) in the

curriculum: “we are supportive of the general aim because it’s a valid thing you’re trying to do. The restrictions are just time, because other people also have valid arguments” and a belief that they are probably already meeting ‘most’ of the content in the new AfN curriculum.

“When I looked through it I thought we probably are doing most of these ... I don't think it's something that would necessarily require a big change in how the curriculum is delivered”

P2 was supportive of nutrition in medical education generally and the provision of optional nutrition education such as student-selected components or evening sessions run by student societies. But they did not express clear support for increased nutrition in the core curriculum beyond what is required by the GMC (which can be interpreted by medical schools as very little, as there is no specific guidance in the Outcomes for Graduates). They implied that the main barrier to doing so would be a lack of space in the core curriculum.

“I have every support for the nutritional side of education for students and junior doctors, the question is how much can you realistically get into a curriculum ...what we can do is to ensure that there at least is significant nutritional content in the curriculum that fulfils the GMC requirements, and then there is the potential for students to extend their knowledge maybe through SSCs, or through self-directed material...”

P1 was more dismissive, explaining that they review the entire curriculum periodically, and don’t make exceptions for particular topics.

“At any given time, we are not specifically looking at one element of a curriculum. So, we had a huge curriculum review X years ago... we'll have a remapping exercise that will happen in X, and that will be the point at which we do everything.... will it (nutrition) get more or less - dunno. It will depend on the totality of where it is and the other pressures and the other things that are coming up that we think we need to make space for or can reduce space for.”

Throughout their interview, they strongly emphasised the importance of the GMC ‘Outcomes for Graduates’ in deciding what goes into their already crowded curriculum, and suggested advocates for more nutrition should pressure the GMC rather than medical schools. P2 and P3 also emphasised this document as a driving force, although less strongly. If the view of

P1 is representative of senior staff elsewhere, nutrition education may actually have decreased (or will decrease soon) in some medical schools. This is because the 'nutrition assessment' competency present in the 2015 document was removed in the updated 2018 version. This removal was highlighted as a barrier by P6. It would also mean the new voluntary AfN nutrition curriculum would have a limited impact.

“your first port of call probably ought to be the GMC because actually the outcomes for graduates is the national specification... that is the curriculum that we are mandated to provide and regulated on. So if it isn't in there, we might want to do it for the joy of doing it...but its already incredibly hard to get through the totality of the outcomes for graduates... everything we do has to be mapped on to that. So, if it comes from that, by default it will be in all courses. If it can't be mapped onto that, then what you're asking is that we bolt it on as an additional extra for our curriculum.”

P1 also expressed frustration that pressure for doctors to know more about a certain topic “automatically becomes synonymous with the undergraduate or UK primary medical qualification curricula” despite medical education continuing through foundation and specialty training, and therefore they only listen to comments about what should go into the curriculum if they refer to the 'continuum of medical education' as well as the Outcomes for graduates. This should be useful for nutrition advocates to know.

Overall, none of these three senior staff were fully supportive of including more nutrition in the core curriculum. A major change to nutrition teaching did not seem likely at P1-3's medical schools and they did not seem to have been significantly influenced by the recent pressure to increase nutrition.

Signposting and students not identifying nutrition

When discussing calls to increase nutrition and surveys reporting that few hours of nutrition are being taught, six participants (P1, P8, P3, P4, P6, P2) felt that medical students may be failing to identify nutrition education when they receive it. This is because it is usually integrated sporadically into other modules without being signposted clearly, and is taught as an explicit 'nutrition' lecture or module much less often.

“we might teach nutrition throughout the program but if we don't say 'and this is where nutrition is important' we get to the end of the program and they are saying “nobody taught me about nutrition”

despite the fact that it was popping up throughout. So I think we are doing a lot of what's in here (the curriculum) but we're not saying to them "this is nutrition" so they learn about it but they don't know they're learning about it" P3

P2 also thought much of the new AfN curriculum was already being covered but was not signposted.

"Looking through the latest iteration of the document (AfN curriculum), I think that much of it is in there (their own curriculum) but may not be flagged directly or signposted as being nutrition"

The signposting point was immediately raised by P8 when asked their view on the calls to increase nutrition education, showing there is agreement within the sample across both senior faculty and those directly involved in teaching nutrition. *"I agree but they also need to be aware how much already is taught but is not called nutrition."*

"I...had various silly discussions on social media about medics getting no training in nutrition ...I know that's not true but its possibly not labelled strongly."

To back up this point, they said it was almost impossible to fail to teach 'nutrition', albeit in an implicit manner, at medical schools: *"you can't teach GI physiology without talking about nutrition, you can't teach renal physiology or cardiovascular physiology without talking about nutrition"*.

Views on explicit nutrition teaching and surveys

While P6 thought *"I think a bit of explicitness will help, will help its profile as a topic."* and P3 thought that they could "probably do a better job of *highlighting* nutrition in the curriculum", there was limited support among participants for additional 'explicit' nutrition (modules or lectures focusing primarily on nutrition).

P6 and P4 had recently implemented explicit teaching into the core curriculum and were very positive about it. Others (P3, P2, P5) were supportive of explicit teaching but more so outside the core curriculum. P1, P8, P2, and P3 all expressed reservations over implementing additional explicit teaching in the core curriculum. There was a view that explicit teaching may not be as 'useful' as the integrated teaching that dominates presently, such as discussing nutrition as part of cardiovascular disease, or integrating nutritional considerations in patient cases.

"I'm hesitant that If you put hours of isolation in they are probably of little benefit" P8

"One of the risks if you have an extra bolt-on module - yes the students will have more experience of nutrition but not of actually using nutrition" P8

"in order to deliver all of this (the new curriculum), one way could be to just put a bank of lectures in place for the students to sit and listen to, but that's not necessarily the right way to do it" P2

Related to this, P1 P8 and P10 were critical of surveys that count hours and measuring medical schools' provision of nutrition content based on hours. This is highly interlinked with views towards explicit teaching, as this is what is most likely to be recorded in surveys.

"Personally, I think the hours thing is useless, I think it needs to be on outcomes and competencies. (talking about measuring how well different medical schools are doing regarding nutrition)" P10

P1 was very critical of 'hours' as a meaningful measurement. They thought that since "hours are most easy to count in large lecture group didactic teaching sessions, particularly if the topic of the lecture is very focused", pushing for additional hours would "force medical schools to provide all-cohort lectures with a label that includes the word nutrition". This would be harmful as it would "push schools away from clinical experience" and "integrating" and into producing "less useful teaching". To illustrate the problem with surveys, they gave the example of integrating nutrition into patient cases as useful teaching that is not 'explicit'.

"Now one of the approaches to teaching topics like nutrition is to embed learning into a case, and the advantage of doing that is you can give it context, but also you can put it in in different situations. So, you can do a case where the nutrition aspects are utterly central, you could also do a case where the nutritional aspects are important, but kind of peripheral and easy to miss, and you can teach students quite important things... if you then come back and ask me 'how many hours is that', I can't answer the question"

Curriculum crowding and limited teaching time

Limited time for nutrition teaching, in the context of a crowded curriculum, was the most commonly cited barrier. Given that 8 of the 10 participants mentioned this and several said or implied this was the most significant barrier, it is likely that limited time in the context of a crowded curriculum is a major barrier in medical schools across the UK.

P1, P3 and P5 also highlighted that other special interest groups push for more content and also have valid arguments. This was less expected, as nutrition and 'lifestyle' (exercise, sleep, etc.) has been the only 'special interest' area the author had observed as being pushed in recent years. For advocates of more nutrition, it may be useful to appreciate that there are numerous other interest groups doing the same thing, which is not obvious unless you are a senior medical school faculty member.

"Q: Assuming you wanted to increase nutrition, regardless of whether you actually are doing that, what would be the barriers to doing so?"

P2: Curriculum time. We have a very, very full curriculum"

"I think the problem that all medical schools have is that there are many special interest groups out there, all of whom have a valid argument for saying whatever they're pushing is very important... and it's about getting that balance right because there is only so much time that we have to teach the students. We already have a very packed curriculum" P3

There was a sense that if 'something comes in, something else must come out' among several participants.

"One of the other things that I basically look for in any proposal is if anybody says something ought to go in, then I'm very interested in what they think should come out. Because the history of probably the last 40 - 50 years of medical education curricula is more and more stuff getting piled in. So..5 years ago it was genomics - everyone was saying we need a tonne more genomics because that was the new frontier, for example" P1

“you could expand the amount of lifestyle-based teaching a great deal, and that expansion would all be relevant, but it would be at the cost of something else...so I'm just making the point that the value of something does not necessarily merit its place in the curriculum” P5

P7 also acknowledged this barrier, but has had some success by taking the approach of “shoehorning” nutrition into the curriculum with “short and directed” content in order to overcome it – provided module leaders are engaged with nutrition.

“generally its thought that something needs to come out of the curriculum before something extra can be put back in, but how we’ve got around that is making sure that our section is quite short and directed, so for example there is a (condition) project where we weren’t able to get any teaching time but we’ve added in some nutrition resources into the reference list, and for part of their assessment we want a specific consideration of nutrition when they’re writing up their assessment... so time is an issue but I think through negotiation with the curriculum leads you can find a work around , if that module leader is engaged with nutrition”

Staff – training and motivation

The training and motivation of staff working at the medical school emerged as a key theme across both barriers and facilitators.

A lack of adequately trained staff to deliver nutrition content was emphasised as a potential barrier by several participants, including one of the two Deans (P2). This was expected as previous research had emphasised this. It was unclear whether P2 thought that the staff working at their specific medical school at present were insufficient or if they just thought this was a more general problem nationwide. P8, a dietician, did clarify this and thought that the “weight of professionals” in the country overall is an issue rather than necessarily at the medical school they worked at. P10 also viewed it as a general nationwide issue.

“It’s all well and good having a detailed curriculum for medical schools but who is going to deliver it ... because how many med schools have good access to dieticians? Having that weight of professionals would be a bit of a problem ...should we get medics to do it? Some medics may be ok but some might not have that much

training in it ... so are we short of people who are adequately trained in the details of nutrition?" P8

"When you get beyond page 5 (of the draft curriculum) it starts to get very specific and starts to rely on key interests and expertise that may or may not always be available within a medical school. I accept it is available in a wider NHS but It may not always be available immediately to an undergraduate medical school.... at high level, I could probably do it. But actually, if you want somebody who is an expert to do it, that is more of a challenge." P2

P6 also highlighted 'patchy' knowledge as a problem, but for clinicians that were teaching on placements rather than medical school staff. This may be mitigated by providing central 'resources' for students to refer to during these placements, and offering some of the nutrition teaching centrally (at the medical school) during clinical years.

"I think that GP's... and individual tutors' own knowledge might be patchy, because it hasn't traditionally been taught well, and that's one of the reasons why we offer the central teaching and the resources"

P10, who is involved with implementation of nutrition education in medical schools nationally, said that lack of trained staff with adequate knowledge and skills, along with those with adequate knowledge failing to 'take responsibility', were barriers that stood out most in their experience. In particular they highlighted lack of trained staff as a barrier to 'evidence informed' nutrition teaching. This is a useful distinction because having lack of trained staff doesn't necessarily stop nutrition from being taught, but instead may prevent quality teaching that is up to date with current evidence. They imply that as a result some current teaching is not of a good standard despite it appearing as 'very convincing' to medical students.

"there have been many barriers. The one that stands out the most, is there's a lot of people who seem to be 'interested' in nutrition, but very few people who can be responsible, either because they don't want to take responsibility to do the work to embed nutrition in an already crowded curriculum, or, because they want to take the responsibility but they don't actually have the knowledge and skills to do that, because nutrition not being a protected specialism like many

other disciplines means that anyone can self-declare themselves an expert... sometimes there are people who may be really good in their primary medical specialty, but their understanding of nutrition doesn't match with what the cognate nutrition science community would consider to be good evidence-informed nutrition, and ... those people appear very convincing to medical students, to other doctors and also patients and the public"

"Staff not taking responsibility" as a barrier was consistent with motivated staff emerging as a facilitator.

"I think the facilitators were enthusiastic people who were actually prepared to take it forward, so absolutely critical I think in getting it actually done, because it's all very well taking it to some committee and saying we would really like to do this is but it doesn't necessarily happen" P4

"it won't come readily, one person or two people who are passionate need to push it a little bit" P9

This suggests that having a 'nutrition lead', who has formal responsibility for overseeing and implementing the nutrition teaching at a medical school, would facilitate greater provision of nutrition. The participants who were nutrition leads or in similar positions agreed with this.

"Q: and in terms of facilitators ...

A: So, having one person, myself, looking after this work..." P7

The time needed to plan and implement nutrition teaching was also highlighted as a barrier by P7 and P1, which further supports the notion that having a designated staff member employed to do so would be a facilitator.

"our biggest barrier really is finding time (to implement nutrition)" P7

"I have no idea how long it would take us to map the document you provided (AfN curriculum) against our curricula. I'm thinking hours or days." P1

Staff attitudes

Some doctors, including those involved in nutrition education, may have negative attitudes towards nutrition as a science and its role within medical practice, as it hasn't traditionally been emphasised in medical training.

"Nutrition science suffers from an image problem in medical practice. This starts with its subordination in curriculums and qualifying exams. Dietary interventions are considered to be outside of the evidence base, unscientifically "fluffy," and the domain of dietitians rather than doctors." 11

Due to this 'image problem' it was hypothesised that negative staff attitudes towards nutrition may be a barrier in some medical schools. The following quotes from P7 and P2 somewhat support this assumption:

"I think that some of the senior medical practitioners may not feel it's as important as other (subjects), so you need buy in" P7

"I don't think there's been active resistance, there's been a lot of eye-rolling because people don't respect nutrition...people just say "oh, my experience is that nobody really knows what the right thing is in nutrition, so it's too confusing". So, I think people find it confusing and think that incorporating it will cause confusion." P2

Additionally, whilst P9 had been successful in implementing various additional nutrition content in recent years in order to meet the ICGN curriculum, one colleague was resistant: *"I remember one of my colleagues who was a clinician, he was quite happy to take off some of the (nutrition) sessions which we already had, and then I had to yell and say "no, we need it!" "*

However, no participant involved in implementation other than P9 said they had experienced active resistance when implementing new nutrition content. P7 implied that attitudes have improved in the last few years at medical schools due to the current 'wave of enthusiasm' for nutrition.

"it's a very topical subject at the moment, so I think if we had been trying to embed nutrition back in 2013 when the ICGN curriculum guidelines came out, I think it would have been more challenging, but

were trying to ride the wave of this new enthusiasm for nutrition in medicine, so we've had very little overt resistance , nobody's said we don't want you to be delivering this, but less visible resistance where we might not get answers to emails or a response has been the most negative experience”

P7 was specifically employed to review the nutrition content of the curriculum, a position that was not available before, which also implies improved attitudes of the faculty at that particular medical school towards nutrition.

In summary, there were some examples of negative attitudes towards nutrition at the medical schools that participants worked at, but they did not come across as particularly important barrier. Based on this sample, factors other than negative attitudes would appear to be more important barriers to increased nutrition education in the UK.

Clinical placement challenges

It was viewed by P2, P7, P8 and P9 as more difficult to implement and deliver nutrition education in a consistent manner during student's clinical placements. Reasons for this included less control over what was taught and possible shortcomings in the knowledge and practices of clinicians. Some students may learn a lot more about nutrition during clinical placements than others as a result of “chance” – such as where they are assigned to , and whether clinicians they shadow are engaged in nutrition. Since 4 of 10 participants expressed this could be a barrier and the clinical placement component works similarly throughout all UK medical schools, it is likely this is an issue across many medical schools.

“One of the key barriers – it doesn't matter what you teach the students in the sessions, it has to be replicated by the doctors that they meet in clinical practice...if they're not witnessing their seniors talking about nutrition - they run a lot of teaching in medical schools, see one, do one, teach one, but you have to see somebody role modelling how a doctor talks about nutrition first before you feel confident to do that , so this is a whole tier that's missing” P7

“there is an element that some of this will be delivered by chance on clinical placement, the challenge is how to make it more consistent to be able to deliver all the learning outcomes” P2

Having a specific nutrition curriculum

Having a specific nutrition curriculum came across as a facilitator in some interviews.

P3 said the new curriculum would “*inform how some of the teaching is delivered*” and would be helpful in raising the profile of nutrition: “*I think this document... is helpful because it reminds people of why nutrition is important when they are talking about those things in their lectures already*”

Some participants had used the previous curriculum published by the Academy of Royal Medical Colleges Intercollegiate Group on Nutrition (P7, P10, P9, P6). For example, P9 used the ‘ICGN’ curriculum extensively and made several additions of nutrition content in the recent years to align the curriculum more closely with ICGN, and senior faculty were supportive of this.

“This curriculum review ...the director wanted representation of every curriculum and she asked every discipline lead to bring a kind of guideline that had been given for each discipline, so that’s why I got a chance to get ICGN and show it to people and show that I could do it”

But other participants indicated the ICGN curriculum was not used and said that they or other faculty had never heard of it. Some were not sure.

“I am not aware of that document being referred to regularly” P3

The dean who was dismissive of calls to increase nutrition (P1) had “*never come across*” ICGN and also said it was “*relatively unlikely*” that the new AfN curriculum would be used at their university.

P10 said they had used ICGN, but thought the new AfN one ‘*won’t do much on its own*’ and implementation guidance would be desirable to maximise impact.

In summary, much variation between medical schools in their use of special interest curriculums was evident, suggesting that the release of the new AfN curriculum may drive change in some medical schools but will not be a significant driver in other medical schools.

Student voice

Student voice was anticipated by the author to be cited frequently as a driver, with the rise of Nutritank nationally and calls in the media from medical students to increase nutrition.

This was the case with P6 who described how *“two students had signposted to me that our nutrition curriculum was not as good as it could be”*, which then led to more nutrition education being implemented, including a half-day eLearning module. One of the students had done a research project reviewing nutrition in the curriculum. The other was a graduate-entry student and qualified dietician who highlighted shortcomings in nutrition teaching and then helped design the eLearning module. This module was compulsory for all students.

There was an element of chance to this, with the right people being there at the right time, so this may not be particularly relevant in a wider context. Chance emerged as a facilitator sub theme – if certain staff or students are at a medical school, it is more likely to be increased or delivered.

“it just happened that we had a medical student who was interested in trying to produce this resource and my GP colleague who was also really keen on this ...and it just all kind of came together really” P4

P7, who had overseen a large increase in nutrition content from being present in 1 module to 8 modules, named student voice as one of the key drivers for this progress. But since their university is *“really strong on student voice and tailoring the course to student needs”* ‘this might not apply elsewhere.

“key to this has been setting up a medical students society on nutrition... because students know the gaps better than anybody, and where nutrition best fits, and also they have a really powerful voice as well, and are listened to by faculty... so if the students are demanding that they want more nutrition in their curriculum, that’s actually where we’ve been quite successful at getting nutrition content in that I don’t think we would be able to persuade faculty (to include) otherwise.” P7

P7 stressed that without providing strong evidence for nutrition’s inclusion, the student voice wouldn’t have been enough and it might have been put into an optional module instead.

“so the students can be drivers, but the students can be interested in all sorts of things that maybe we don't have space for in the core curriculum but... I felt that I had the evidence to back me up to show that having nutrition in the central curriculum was important” P7

While student voice was emphasised strongly by these two participants involved with implementation it did not materialise as a major theme overall. One participant actually said that students were more of a barrier due to a perception of nutrition as unimportant. This was interesting and suggests that whilst there are many students pushing for this, many other students are uninterested.

“The other barrier is the students themselves ...students are not necessarily attracted to studying nutrition because they don't perceive it to be essential, so I think it's something that needs to be ingrained from earlier, definitely the first year of medicine but potentially it is something that requires attention from school.” P10

‘Offering a solution’ as a facilitator of successful implementation

P7 described how over the last few years, nutrition had been increased from being present in 1 module to being present in 8 modules following their employment to review nutrition content of the curriculum. Below they describe ‘offering a solution’ as a strategy that has been successful in the context of an already crowded curriculum. Utilising this strategy could facilitate increased nutrition elsewhere.

“ it's just taken a lot of work on the ground, so reviewing where we feel nutrition can fit, and then offering as a solution to module leaders, contacting via email saying “I notice you are teaching on cardiovascular disease “ for example, would you like us to come and expand on where you talk about lifestyle factors involved in cardiovascular disease, and that way by offering help , we've been quite successful in getting things in in that sense” P7

P5 also mentioned offering a solution as a facilitator for gaining support from faculty: “very supportive, I think because I came to them with a solution rather than a problem”. These quotes bring further support to the idea that having a nutrition lead is a facilitator (as discussed on page 25), as they are more likely to have the designated time to create solutions.

Discussion

Barriers and facilitators

Key 'barrier' subthemes were identified as limited time in a crowded curriculum, factors related to staffing (particularly lack of training and motivation) and difficulties with implementation and delivery on clinical placements. Many facilitators were identified, but there was less agreement between participants than with barriers. Factors relating to staffing (e.g. motivated staff, presence of a nutrition lead) formed the most clear-cut subtheme. Other barriers and facilitators identified are shown in 'Appendix 2 – Coding Tree'.

Staff training or expertise has previously been called the 'chief' barrier and is cited in various US research.^{23(p22)}²⁴ The results of this study give further support to the argument that this may be a key limiting factor for increased nutrition education in medical schools – particularly nutrition education that is of a good 'evidence informed' standard. Limited time was also expected to feature prominently and is consistent with published research from both the US and UK.¹⁸²⁹ Facilitators have scarcely been discussed in previous literature, although Long and Neild found that presence of a nutrition lead was a facilitator and this also came across in this study.

Attitudes

There was little support for additional nutrition content in the core curriculum from the three members of staff who oversaw the entire curriculum. However, this did not appear to stem from a negative attitude towards nutrition, but from other factors such as limited time or a focus on what is in the 'Outcomes for Graduates'. The attitudes of participants and their impressions of the attitudes of other staff were mostly positive or sympathetic towards nutrition as a science. Some participants did share examples of negative attitudes of other staff, but overall other barriers came across as more important.

It should be noted that attitudes of senior staff at other medical schools who did not agree to participate may be more negative since one might assume individuals willing to participate and give feedback on the new curriculum are more interested in nutrition. Therefore, this is a biased sample towards having a more positive attitude towards nutrition.

'Signposting and students failing to identify nutrition' and 'criticism of surveys on hours' emerged as major subthemes in the 'attitudes' category. Whilst it is likely to be true that students fail to identify some of the nutrition they are taught which contributes to low 'hours' reported surveys, some participants may be failing to appreciate that many students

specifically want more explicit teaching, so even if the implicit teaching was signposted better they would still be pressuring medical schools. In particular, Nutritank have pushed for more content that will help doctors give evidence-based nutrition advice to patients in consultations. Nutritank states the following as 'The problem':¹²

- Not enough time spent educating medical students and doctors in nutrition.
- Doctors don't feel confident discussing nutrition with patients.
- Not discussing nutrition with patients is a missed opportunity.

To resolve this issue of low confidence discussing nutrition, one would assume that easily identifiable, explicit teaching, such as a session about the UK dietary guidelines, would be needed. Given that participants also expressed negative views about explicit teaching being added (in the core curriculum), there appears to be some discrepancy between what students want, what surveys show may be needed, and what medical school staff believe is the right approach.

This criticism of hours is valid and its limited accuracy has been acknowledged by the authors of such surveys, but it is a simple way to attempt to assess medical schools, so will probably continue to be used. Furthermore, professional bodies endorse 'hours' as a way to assess adequate nutrition education,^{30 20} so it is reasonable for nutrition advocates to highlight low numbers of hours.

Strengths

The main strength of the study is that it addresses two gaps in the literature- one regarding barriers and facilitators in a UK context and another regarding attitudes of staff. Despite the limitations of the study, it provides lots of new information regarding these important research questions that have not yet been tackled to any great extent. Whilst Long and Neild looked at barriers and facilitators, it was a survey with predefined barriers and facilitators, rather than a qualitative exploratory work that has both been able to identify new ones and provide specific context and examples through participant quotes to clearly illustrate these barriers and facilitators.

Limitations

The sample size of 10 participants from 9 medical schools would ideally have been larger. Time restrictions for recruitment and limited access to medical school staff except via email addresses available on the medical school websites led to a low total sample size. It was not sufficient to achieve saturation – more subthemes regarding barriers, facilitators and

attitudes are likely to have emerged were more participants interviewed. In particular more staff in senior roles who oversaw the entire curriculum would have been desirable to better answer the first objective. That said, 9/33 UK medical schools represented is enough to base some cautious conclusions on.

Another limitation was that it was the lead author's first time carrying out qualitative research, so interview and coding technique was likely to be suboptimal.

Recommendations

Nutrition advocates

Given time restrictions and several participants expressing concerns with explicit teaching in the core curriculum, it may be a more realistic goal for advocates of nutrition education to push for an increase in optional nutrition teaching - such as the addition of nutrition-related student-selected components (SSCs), online modules in nutrition, and so on.

One specific form of optional teaching could be a series of online modules endorsed by the GMC, for all UK medical students to complete in their own time. This could be modelled after the 'Nutrition in Medicine' online materials developed at the University of North Carolina.³¹ Alternatively, the Nutrition in Medicine materials could be promoted and publicised to UK medical students. It is unclear if many UK-based medical students or doctors currently take advantage of these materials. Online modules would simultaneously tackle the 2 most important barriers identified in this study - lack of trained staff and limited curriculum time.

Future research

Now that this exploratory qualitative study has identified numerous potential barriers and facilitators, a survey questionnaire can attempt to quantify the importance of these different barriers and facilitators among a large representative sample of UK medical schools.

Similarly, for attitudes, a survey could be carried out on a representative sample of senior medical school staff that oversee the curriculum, informed by the results of this study.

Further qualitative research would also be of value due to the study limitations, which included failing to achieve data saturation.

This project focussed on nutrition education in the undergraduate medical curriculum. As pointed out by P1, calls to increase any particular topic are often automatically targeted at the undergraduate curriculum rather than specialty or foundation curricula. Future

researchers and advocates for nutrition may want to try to identify whether more nutrition should or could be incorporated into those curricula.

The introduction section highlighted research that showed shortcomings among UK doctors such as low confidence on managing nutrition related problems. The extent of this research is very limited. Whilst not the focus of this paper, P7 said they were able to add nutrition into the core curriculum due to “having the evidence to back me up” so if more research is done to better quantify the nutrition-related shortcomings of doctors, this will provide a stronger basis for calls to increase nutrition (or not, if the findings are more positive).

Conclusion

This study has shed new light on barriers and facilitators that may be preventing or driving increased nutrition education at UK medical schools. Many factors identified are likely to be relevant across the whole of the UK as well as in other countries. Future research can build on this exploratory work and attempt to quantify the importance of these different factors or develop solutions that account for them. This study has also investigated attitudes towards increasing nutrition education among staff and found limited support for additional nutrition in the core curriculum among senior staff and a sceptical view towards ‘explicit’ nutrition teaching, showing a discrepancy between the desires of students who are pushing for more nutrition, and medical school insiders.

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Appendix

Appendix 1 – Topic Guide with Example Interview Questions

Topic Guide

Introduction

- Greeting – thank them for taking the time
- Ask if they have any questions
- State the objectives of the research (it is in information sheet but just to reclarify in order to prime them to answer with those in mind)
- Ask them for a brief background of their career, to explain what their role at the medical school involves, and if they have an interest in nutrition

Main interview

- Opinion on calls for more nutrition – mention Nutritank, media articles, surveys showing very few hours taught, etc.
- Form a picture of the general ‘situation ‘ at their medical school regarding nutrition - How is nutrition teaching changing at their medical school? Are they planning to change anything in future? Have they made any changes in recent years? If so why? Was there any resistance? Have they got a nutrition lead? Etc. Probe their answers, bearing in mind the objectives and any time constraints.
- Asking about the general situation provides context to ask about barriers and facilitators. Sometimes barriers and facilitators will come out without asking explicitly about them. But also separately ask what do you think the main barriers / facilitators are.
- Attitudes of other staff towards nutrition
- Use of ICGN curriculum and will the new AfN one be used

Curriculum feedback

- Ask them for feedback on the draft curriculum

End

- Anything else you would like to add
- Thank them again for their time

Example questions

- You may be aware that in the past few years there have been calls in the media from both practicing doctors and medical students to increase the extent of the nutrition education that is provided at medical schools in the UK.

For example there was a BMJ editorial in 2017 published by a couple of Cambridge medical students, titled 'medical schools should be prioritising nutrition and lifestyle education', and the student led organisation Nutritank has branches at Medical Schools nationwide and have received media attention for their campaigning. They have also carried out surveys which claim very few hours of nutrition are being taught, and show high dissatisfaction with current teaching.

Nutritank's main aim as stated on their website is "To gain confirmation from each UK based medical school that they will commit to increasing nutrition and lifestyle education within their medical school curricula as soon as possible or by the end of 2019. "

One of the things I want to find out from this research is whether senior medical school staff members like yourself who are involved in setting the curriculum agree with this sentiment. So please could you share your general views on this recent pressure to increase nutrition education? Do you agree that there should be more ?

- This new AFN curriculum is to replace the curriculum produced in 2013 by the Academy of medical royal colleges intercollegiate group on nutrition. Just like the new one, that curriculum was endorsed by the GMC but was not compulsory to follow and was intended as a guidance document. From your knowledge how influential was this curriculum for guiding the nutrition education that is taught at X?
- Is nutrition education something you're looking to increase at X?
- Have there been any recent developments in the last few years in nutrition teaching?
- When the new AfN curriculum comes in will you be adapting your teaching to fit that?

- What do you think the main barriers have been /would be to increasing nutrition education?
- What has driven things forward or has been/ would be a facilitator for increased nutrition?
- I sent you a draft of the new AfN curriculum. First can you share your general thoughts and any feedback you have, then I will ask you some specific questions.

Appendix 2 – Coding Tree

1. Attitudes

- Attitude about additional explicit hours
- Attitude about surveys
- Attitude of other staff towards nutrition
- Attitude about a doctors role regarding nutrition
- How nutrition content should be delivered
- Students not identifying nutrition
- Signposting nutrition content
- Views towards calls to increase nutrition
- Attitude about ICGN/AFN curriculum

2. Barriers

- Staffing:
 - attitudes
 - having adequately trained staff to deliver or implement nutrition
 - Staff not motivated enough / not taking responsibility to put in the work
- Clinical placement challenges
- Curriculum Crowding
- Finding time to do the work needed to implement nutrition into the curriculum
- GMC outcomes for graduates- limited and decreasing nutrition content (removal of 'Nutrition Assessment' competency)
- Student perception
- No 'natural home' for teaching on healthy diets in curriculum
- Make changes to entire curriculum periodically according to outcomes not isolated calls

3. Facilitators / Drivers

- Chance
- Offering a ready-made solution
- Culture of the university and city
- Curriculum space
- Having a specific nutrition curriculum
- Student voice

- Guidelines on how to implement the new curriculum
- National documents (NHS 10-year plan, foundation curriculum)
- Enthusiastic and motivated staff
- Having a nutrition lead designated
- Positive attitudes from staff in general about nutrition, particularly powerful staff
- Having research available to back up why it should be included
- Visibility or footprint of nutrition
- Current 'wave of enthusiasm' for nutrition

4. AfN related

- Curriculum feedback
- Accreditation system
- Use of new curriculum

Appendix 3 – COREQ checklist

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Table 1 Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?
2.	Credentials	What were the researcher's credentials? <i>E.g. PhD, MD</i>
3.	Occupation	What was their occupation at the time of the study?
4.	Gender	Was the researcher male or female?
5.	Experience and training	What experience or training did the researcher have?
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement?
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? <i>e.g. personal goals, reasons for doing the research</i>
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? <i>e.g. Bias, assumptions, reasons and interests in the research topic</i>
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? <i>e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis</i>
Participant selection		
10.	Sampling	How were participants selected? <i>e.g. purposive, convenience, consecutive, snowball</i>
11.	Method of approach	How were participants approached? <i>e.g. face-to-face, telephone, mail, email</i>
12.	Sample size	How many participants were in the study?
13.	Non-participation	How many people refused to participate or dropped out? Reasons?
Setting		
14.	Setting of data collection	Where was the data collected? <i>e.g. home, clinic, workplace</i>
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?
16.	Description of sample	What are the important characteristics of the sample? <i>e.g. demographic data, date</i>
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?
20.	Field notes	Were field notes made during and/or after the interview or focus group?
21.	Duration	What was the duration of the interviews or focus group?
22.	Data saturation	Was data saturation discussed?
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?
Domain 3: analysis and findings		
Data analysis		
24.	Number of data coders	How many data coders coded the data?
25.	Description of the coding tree	Did authors provide a description of the coding tree?
26.	Derivation of themes	Were themes identified in advance or derived from the data?
27.	Software	What software, if applicable, was used to manage the data?
28.	Participant checking	Did participants provide feedback on the findings?
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? <i>e.g. participant number</i>
30.	Data and findings consistent	Was there consistency between the data presented and the findings?
31.	Clarity of major themes	Were major themes clearly presented in the findings?
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?

Appendix 4 – Consent Form



CONSENT FORM FOR PARTICIPANT AND REPRESENTATIVE



Title of Project: Increasing nutrition education in medical schools – a qualitative study of attitudes, barriers and facilitators

Name of Principal Investigators: XXXX (LSHTM) , XXXX (LSHTM), Dr Glenys Jones (AFN)

If you have further questions later regarding the study please contact:

- 1) XXXX |
- 2) Glenys Jones g.jones@associationfornutrition.org Office: 020 3198 9308. M: 078 9989 6170

This consent form is for staff at UK medical schools that have been invited to participate in the above named study.

Statement	Y/N
I confirm that I have read and understood the information sheet for the above named study. I have had the opportunity to consider the information, ask questions and have these answered satisfactorily.	
I understand that my consent is voluntary and that I am free to withdraw this consent at any time without giving any reason and without my medical care or legal rights being affected.	
I agree for an audio file of the interview to be recorded .	
I agree for anonymised quotes from the interview to be used in the publication or report released on the study.	
I agree to members of the AFN inter professional working group tasked with developing the curriculum to be informed of your identity in case they want to follow up on any specific comments made on the curriculum.	
I agree to taking part in the above named study.	

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Printed name of participant/Representative

Signature of participant/Representative
(or thumbprint/mark if unable to sign)

Date

--	--	--

Printed name of person obtaining consent

Signature of person obtaining consent

Date

--	--	--

Principal Investigator

Signature of person obtaining consent

Date

Appendix 5 - Participant Information Sheet

Participant Information Sheet

Title of Project: *Increasing nutrition education in medical schools – a qualitative study of attitudes, barriers and facilitators*

Introduction

You are invited to take part in a research study. Joining the study is entirely up to you. Before you decide, you need to understand why the research is being done and what it will involve. Ask questions if anything you read is not clear or you would like more information. Please feel free to talk to others about the study if you wish. Take time to decide whether or not to take part.

What is the purpose of the study?

The GMC is supporting the Association for Nutrition with its responsibility to develop an updated nutrition curriculum to replace the existing curriculum created by the Intercollegiate Group on Nutrition (ICGN) of the Academy of Medical Royal Colleges. This is scheduled to go for public consultation in the Autumn.

The AfN would like to receive feedback on a draft of the curriculum from selected staff members at UK medical schools in June/ early July as a 'pre consultation' to help inform the final document. They hope that the changes made following this feedback will help improve the probability of successful uptake of the curriculum by medical schools and would like to involve medical schools in the process of curriculum development.

In light of the recent pressure from qualified doctors and student groups such as NUTRITANK to increase nutrition education in medical schools, the study will also explore what the facilitators and barriers are to doing so and whether insiders at medical schools agree with this sentiment.

Why have I been asked to take part?

You have been invited because you are/have been involved with setting the curriculum at a UK medical school, or are/have been involved in the implementation of nutrition education at a UK medical school.

Do I have to take part?

No. It is up to you to decide to take part or not. If you don't want to take part, that's ok. If you agree to take part, we ask you to sign a consent form. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part?

We will first send you the latest draft of the new AfN curriculum.

We will then conduct an interview, either by telephone, skype, or face to face depending on location and your preference.

In the interview we will ask some questions related to the objectives of the study (identifying attitudes, barriers and facilitators regarding increasing nutrition education). The interview will take 20-40 minutes and will be recorded as an audio file.

What will I have to do?

Answer some questions in a semi structured interview. You do not have to answer every question and we will simply move on to the next question if you choose not to answer a particular question. You can say as much or as little for each question as you like.

How will confidentiality be maintained ?

To enable you to speak freely with both positive and negative reflections on the subject, interviews will be anonymised and the final report will not link specific quotes to any particular person or institution, and you will be labelled in the report as 'medical school representative a , b , c, etc.

Only the lead investigator XXXX will be present in the interview . If conducted on skype or telephone I will conduct the interview in a room in my place of residence or at LSHTM with no others present . If in person , it will take place in a private room with no one else present.

The interview audio file and written transcription file will be anonymised. Your recording will be assigned an id number , and only the lead investigator (XXXX) will have access to a password protected file linking the number with your name.

To help with potential future AfN work on this subject, if you give permission, your identity may be revealed to members of the AfN working group if they want to follow up on certain comments. You can opt in or out of this by signalling yes or no (Y/N) on the consent form.

What are the possible benefits?

The information we obtain from the interviews will help develop a curriculum that takes into account the views of medical schools themselves. It will allow you to play a role in shaping the development of a key GMC endorsed document that will guide the education undergraduate medical students receive across the UK .

What if something goes wrong?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions (contact details below) If you remain unhappy and wish to complain formally, you can do this by contacting LSHTM. The London School of Hygiene and Tropical Medicine holds insurance policies which apply to this study. If you experience harm or injury as a result of taking part in this study, you may be eligible to claim compensation.

Can I change my mind about taking part?

Yes. You can withdraw from the study at any time.

If you withdraw from the study, we will destroy your recorded interview files and consent form.

What will happen to the recording of the interview, transcription files and consent forms?

The recordings, transcription files and consent forms will be stored in a password protected file on the lead investigator XXXX hard drive. At the end of the project, all of these files will be destroyed.

What will happen to the results of this study?

The study results will be compiled into a report that is submitted for marking as part of the assessment for the MSc Nutrition for Global Health at LSHTM . It will also be compiled into a separate report to the Association for Nutrition working group to use to inform development of the final curriculum to be submitted for public consultation. It may be submitted for publication in a journal in future and you will be informed if this is the case.

Who is organising and funding this study?

The study has no funding. It is organised by XXXX, a student at the London School of Hygiene & Tropical Medicine, and Dr Glenys Jones, chief executive of the Association for Nutrition. XXXX takes responsibility for the collection, storage and analysis of your data.

Who has checked this study?

All research involving human participants is looked at by an independent group of people, called a Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by The London School of Hygiene and Tropical Medicine Research Ethics Committee (ref: 17502).

Further information and contact details

Thank you for taking time to read this information leaflet. If you think you will take part in the study, please read and sign the consent form , and return to XXXX at the email address given below.

If you have any questions or concerns about the study and your participation, please contact the investigators at their details below:

1. **XXXXX**
2. **Glenys Jones** g.jones@associationfornutrition.org **Office: 020 3198 9308 M: 078 9989 6170**

You will be given a copy of the information sheet and a signed consent form to keep. Thank you for taking the time to read this sheet.