CHALLENGES AND OPPORTUNITIES FOR NUTRITION EDUCATION AND TRAINING

R. KOMSA (BU)
Challenges and Opportunities for Education in Nutrition

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Healthy behaviour
Challenges In Education In Nutrition

A healthy existence is to a large extent dependent on healthy behaviour\textsuperscript{1,2}.

Dietary behaviour and Physical activity are the most important behavioural determinants of health\textsuperscript{2}.

Eight out of ten of the leading causes of morbidity and mortality in the world are nutritionally related.

Malnutrition is highly prevalent in hospital setting - 35-65%.

1 Ezzati et al, 2002
2 Mokdad et al, 2004
Challenges In Education In Nutrition

Learning objectives

What

Why we face this problem?

So What

...and what could be done?

Whats on!

...today and in the future?
There is an increasing concern over the inadequate amounts of education in nutrition.

**Malnutrition**

- Wound healing
- Muscle strength
- Anastomotic dehiscence
- Respiratory problems
- Pneumonia
- Diminished immune defense
- Septic complications, multiple organ dysfunction
- Mortality
- Length of hospital stay

**BMI and Mortality 35-69 years old**

Higher BMI related to:
- Increased cardiovascular disease and cancer mortality.

**Prevalence of Malnutrition**

- Ambulatory outpatients: 1-15%
- Institutionalized patients: 25-60%
- Hospitalized patients: 35-65%

Malnutrition is a challenging issue for hospitals and communities, which is not given proper attention. This observation is supported by a wide-ranging evidence.
Challenges In Education In Nutrition

All health care professions need basic training to effectively assess dietary intake and provide appropriate guidance, counseling, and treatment to their patients.

Understanding and applying nutrition knowledge and skills to all aspects of health care are extremely important.

Is it something new that we learned just now, in last months, years or .....decades?
Do doctors know how much nutrition patients need—a survey from Germany?

Clinical case:

• A 76-year-old male patient is suffering from persistent and severe dysphagia due to a brain-stem stroke that occurred 10 days earlier.

• Any type of oral nutrition is actually impossible. Therefore, the patient must be tube fed for an uncertain period of time.

• The patient is well-orientated, has no paralysis and is mobile within the ward.

• The patient has a normal body weight of 76 kg and a body height of 1.83m (body mass index = 22.7 kg/m2).

• The patient had no previous weight loss and does not suffer from any nutritionally relevant comorbidity.

• The patient is to be transferred to a rehabilitation ward.

  • 1. to estimate the patient’s daily energy
  • 2. to estimate fluid requirements
  • 3. to provide a recommendation for the dosage of tube feeding with a standard formulation
  • 4. to provide a recommendation for additional fluid intake.
Do doctors know how much nutrition patients need—a survey from Germany?

PUBLIC HEALTH NUTRITION HIGHLIGHTS SHORT COMMUNICATION

Nutrition education in European medical schools: results of an international survey

M Chung1,4, VJ van Buul2,4, E Wilms1, N Nellessen1 and FJPH Brouns1

Consumers and patients are unsure of whom to trust for nutritional advice. Although medical doctors are seen as experts in nutrition and their advice is regularly followed, data are lacking on the amount of nutrition education in European medical school curricula. In line with US research, we distributed a survey on required and/or optional nutrition contact hours to medical education directors of all accredited medical schools (N=217) in Western European Union countries (N=14). In total, respondents from 30 medical schools (13.9%) from 10 countries (42.9%) provided their training information. The data revealed a wide variability in the intensity of nutrition education among the medical schools.

### Table 1. Basic self-reported information on responding medical schools per country and their total required nutrition education in the medical curricula

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of responding medical schools</th>
<th>Total number of medical schools</th>
<th>Number of students per university</th>
<th>Duration of preclinical phase (in years)</th>
<th>Duration of clinical phase (in years)</th>
<th>Total required nutrition education in hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1</td>
<td>4</td>
<td>2350±0</td>
<td>2.5±0.0</td>
<td>3.5±0.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Belgium</td>
<td>2</td>
<td>10</td>
<td>2082±1247</td>
<td>4.0±1.4</td>
<td>2.5±0.7</td>
<td>90.0±14</td>
</tr>
<tr>
<td>Denmark</td>
<td>0</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>1</td>
<td>32</td>
<td>1800±0</td>
<td>3.0±0.0</td>
<td>3.0±0.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Germany</td>
<td>7</td>
<td>36</td>
<td>2064±691</td>
<td>1.9±0.4</td>
<td>4.3±0.5</td>
<td>113±5.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>2</td>
<td>6</td>
<td>950±71</td>
<td>2.0±0.0</td>
<td>3.0±0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Italy</td>
<td>0</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malta</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>3</td>
<td>8</td>
<td>2793±1102</td>
<td>3.3±0.6</td>
<td>3.0±0.0</td>
<td>21.7±21.0</td>
</tr>
<tr>
<td>Portugal</td>
<td>1</td>
<td>8</td>
<td>1880±0</td>
<td>2.0±0.0</td>
<td>4.0±0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Spain</td>
<td>2</td>
<td>33</td>
<td>1185±445</td>
<td>2.0±0.0</td>
<td>4.0±0.0</td>
<td>50.0±14.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>3</td>
<td>6</td>
<td>1340±350</td>
<td>1.7±0.6</td>
<td>3.7±0.8</td>
<td>125±7.8</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10</td>
<td>27</td>
<td>1259±440</td>
<td>2.2±0.4</td>
<td>3.1±0.5</td>
<td>220±16.8</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>217</td>
<td>1679±760</td>
<td>2.3±0.8</td>
<td>3.5±0.7</td>
<td>23.68±17.6</td>
</tr>
</tbody>
</table>

*All values are mean±s.d.
Nutrition Education hours in Europe

Table 2. Distribution of required hours of nutrition education

<table>
<thead>
<tr>
<th>Course</th>
<th>Number of universities</th>
<th>Amount of nutrition education (in contact hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated nutrition course</td>
<td>16</td>
<td>9.6 ± 14.0</td>
</tr>
<tr>
<td>Physiology/pathophysiology/pathology</td>
<td>20</td>
<td>6.4 ± 8.5</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>19</td>
<td>3.4 ± 4.4</td>
</tr>
<tr>
<td>Integrated curriculum (for example, problem-based learning)</td>
<td>20</td>
<td>3.1 ± 3.5</td>
</tr>
<tr>
<td>Clinical practice</td>
<td>16</td>
<td>5.7 ± 8.3</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>1.41 ± 2.7</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>23.7 ± 17.6</td>
</tr>
</tbody>
</table>

*All values are mean ± s.d.  †Most universities (n = 18) offered more than one course in which nutrition education was provided.*
Distribution of nutrition education in 67 Japanese medical schools

1958 Results from a survey of medical schools in 1958 indicated that 12 of 60 medical schools (20%) offered a special course in nutrition.

The AMA Council on Foods and Nutrition reported that nutrition in the U.S. medical schools received "inadequate recognition, support and attention" (White et al., 1961).

1963 AMA council and the Nutrition Foundation sponsored a nationwide conference in Nutrition in Chicopee Falls, Massachusetts to share ideas about improving nutrition in medical education.

1963 AMA produce recommendations ......that each medical school should designate a committee to develop a teaching program in nutrition.

1969 On December 2nd, President Richard Nixon officially opened the White House Conference on Food, Nutrition and Health.

1971 A survey of second-year medical students concluded that students' knowledge of the essential concepts of nutrition as defined by the White House conferees was generally inadequate. (Phillips, 1971)
1985 National Academy of Sciences Recommends a separate 25-h nutrition course with reinforcement in clinical clerkships

1989 Committee on Medical Education Published 26 priority topics for incorporation in medical school curriculum including obesity, diet, hyperlipidemias and atherosclerosis, diet and diabetes………..

23 new medical schools that were established in the United States from 1960 to 1971, most were not planning nutrition programs (White et al., 1972)

1977 AMA survey - of 102 Medical Schools less than 19% had a nutrition course. In 95% MS Nutrition was taught in the frame of basic disciplines

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2008–2009 survey found that U.S. medical students received only an average of 19.6 contact hours of required nutrition instruction over all 4 years of medical school. 25% of MS met the minimum 25 hours

2010 Survey, published in Acad Med 27% of medical schools have a course in nutrition

Research Article J Biomed Edu S 18 % of medical schools met the minimum 25 hours
Distribution of the required nutrition contact hours among the various types of medical school courses

Distribution of the required nutrition contact hours (i.e., the actual number of hours of nutrition education) among the various types of medical school courses (109 MS US)

Distribution of the total hours of required nutrition instruction at U.S. medical schools.

Representatives from 109 U.S. medical schools (2010)
# Required nutrition education hours at US medical schools over time

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Avg (SD)</td>
<td>20.4 (13.6)</td>
<td>22.3 (15.3)</td>
<td>19.5 (13.5)</td>
<td>19.0 (13.7)</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>18</td>
<td>20</td>
<td>16</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td>19/102</td>
<td>39/112</td>
<td>32/106</td>
<td>26/105</td>
<td>22/121</td>
</tr>
<tr>
<td>%</td>
<td>18.6%</td>
<td>35%</td>
<td>30%</td>
<td>25%</td>
<td>18%</td>
</tr>
</tbody>
</table>

This could be because existing education is either inadequate or ineffective, both of which provide an argument for greater attention to nutrition.
Categories of nutrition-related education identified by the survey respondents as requiring more instruction (N = 65). The respondents were all graduates of the Gulf Medical University in Ajman, United Arab Emirates.

Distribution of the survey respondents by country of present employment (N = 65). The respondents were all graduates of the Gulf Medical University in Ajman, UAE.

78.5% felt that they had not received adequate instruction in the field of nutrition during their undergraduate medical curriculum.
Several surveys have examined the practice behaviors of physicians.

These surveys have found that physicians agree on the importance of nutrition in their medical practice but do not feel comfortable and adequately prepared to provide nutrition counseling to their patients.

Historically, nutrition education has been underrepresented at many medical schools.
History of education in medicine and nutrition

Historically, nutrition education has been underrepresented at many medical schools – according to medical authorities.

The history of the development of medicine as a profession – from antiquity through to the beginning of the 21st century – provides many vivid examples that illustrate how medicine and medical education has evolved over time in the strong relationship with nutrition.
I will apply dietetic measures for the benefit of my patients according to my ability and judgment;

Hippocratic Oath

Let food be thy medicine and medicine be thy food

Mural painting showing Hippocrates and Galen (XII cent. St. Mary's Cathedral, Anagni, Italy)
The most famous and important exponent of Greek medicine and father of modern Western medicine (Kos, about 460 BC – dead in Larissa, 377 BC)

Hippocrates

The legacy of Hippocrates is a collection of 53 treaties contained in 72 books received the general name of Corpus hippocraticum (M.C.) or Hippocratic treaties.

The basic concept concerning nutrition assumed that overeating, unhealthy and not balanced nutrition were dangerous for the human body.
In the case of a fever - phonodes, the prohibition of solid foods infusions for the first seven days of the disease, if the patient was too weak, he had to ingest a little barley infuse twice a day, with the lowering of the fever, the patient can eat, between the seventh and the ninth day, millet during the day, pumpkin or chard and watered wine in the evening. After the ninth day the patient continued a very weak diet.

To treat jaundice involving the liver
In the first ten days the patient must abstain from solid foods and he has to feed himself through the barley infusion.
The influence of Greek medical practices dating back to the fifth century B.C. has had an immeasurable impact on the development of medicine in the West over the subsequent centuries.

- The School of Dogmatists was founded by Thessalus, Draco, and Polybus, the Hippocrates' sons.
- Based mainly on the Hippocrates treaties presented in 72 books of “Corpus hippocraticum”.
- Galen was his true successor and developed the perceptions of Hippocrates.

Scientific background of Medicine

- Renascence - a new light within the Western medical tradition.
- Later, 18-19 centuries were related to more scientific medicine: microscope, X-rays, photography, chemistry.
- First steps of pharmaceutical chemistry.

Herbal Medicine in Ancient Rome
Ancient Roman medicine used Herbs and food

- Fennel having calming properties.
- Elecampane (used to help with digestion).
- Garlic - beneficial for health, particularly for the heart.
- Fenugreek (used in the treatment of pneumonia).
- Silphium (utilized for a wide variety of ailments and conditions, especially for birth control).
- Willow (used as an antiseptic, now it used to produce aspirin).
- The true literary source devoted to Roman food was a cookbook attributed to Apicius.
GOLDEN AGE of Nutrition

- Graham Lusk and Wilbur Atwater - metabolism and energy requirements, energy values of CHO, Fats, proteins
- Sir Frederick Gowland Hopkins - vitamin hypothesis
- Casimir Funk – vit. B1
- Elmer McCollum - vitamins and trace minerals

Impact of malnutrition on mortality after surgery

<table>
<thead>
<tr>
<th>Preop weight loss</th>
<th>Postop mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20%</td>
<td>3.5%</td>
</tr>
<tr>
<td>&gt; 20%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Historical highlights in the development of clinical nutrition

Arvid Wretlind - Father of TOTAL Parenteral Nutrition

1946 - Intravenous infusion of plasma proteins in man with demonstration of positive nitrogen balance - Albright/Forbes/Reifenstein

1947 - First intravenous protein hydrolysate available commercially in Europe

1932 - Sir David Cuthbertson - Pioneer of modern perioperative metabolism

Description of increased nitrogen losses in urine resulting from catabolic response to major limb trauma in animals and man
Science in Medicine

• In 1908, Flexner published his first book, “The American College”.
• In 1910 he published the Flexner Report, on the state of American medical education which led to far-reaching reform and introduction of fundamental sciences.
• In 1912 he examined medical education in German Empire, Austria, France, England, and Scotland.

Undergraduate Basic Science   3-4 years
Undergraduate Clinical Course 3-4 years
Willow bark extract by boiling in acetic anhydride was converted into aspirin.

Willow bark extract became recognized for its specific effects on fever, pain and inflammation in the mid-eighteenth century.
By the nineteenth century pharmacists were experimenting with and prescribing a variety of chemicals related to salicylic acid, the active component of willow extract.
Abraham Flexner’s report in 1910: “proper basis of medical education is essential background for medicine.

Medical study was redistributed into basic science and clinical clerkships.

As a consequence the education in nutrition was switched to physiology and biochemistry.

Development of science stimulated growth of pharmaceutical science.

Development of pharmaceutical science stimulated a growth of pharmaceutical industry.

Changed balance between dietetic approach to treatment and innovative treatment by new drugs.
So what? What is about Learning medicine? Nutrition?

Learning nutrition

Undergraduate Basic Science 2 years (3-4)
Undergraduate Clinical Course 4 years
Postgraduate 3-5 years
Live Long Learning and practice 30-40 years

Learning nutrition
Expanding the minds, a challenge to think differently: The Future is Now

- Virtual reality
- Nanotechnology
- Stem cells technology
- 3D Bioprinting
- Wearable gadgets
- Personalized medicine
- Big data Analysis
- Artificial intellect
The Future is Now: Virtual Reality

Pokémon brings us to this lecture
Virtual / Augmented Reality in Operation Theatre

Cutting-edge theatre: world’s first virtual reality operation goes live
Nanomedicine Nanotechnology

Cancer treatment
Rapid dissolution of ZnO nanocrystals in acidic cancer microenvironment leads to preferential apoptosis of cancer cells.

247 nanomedicine products that are approved or in various stages of clinical study.
3D bioprinting research. Laboratories have successfully recreated human ears, noses, skull bones, jaw bones, tracheas, ears, noses, skin sections, bladders, arteries, and fat. Recreating human vasculature, seen here in a 3D CT scan of a human heart, is difficult using current 3D printing techniques.
Wearable gadgets

An Explosion of Connected Health Technology
Big data is a term for data sets that are so large or complex that traditional data processing applications are inadequate. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy.
Predictive Medical Technologies analyzes records of intensive care patients to detect events that might be signals of adverse events, such as cardiac arrest or arrhythmia. Once trends are identified, real-time monitoring of patients can spot similar patterns and give doctors critical early warning.
“Search engines won’t wait for you to ask for information. They will know you like a friend, aware of your concerns and interests at a detailed level.”
Ray Kurzweil

Personalised medicine, new technology, new skills, big data analysis
Learning medicine

- Undergraduate Basic Science: 2 years (3-4)
- Undergraduate Clinical Course: 4 years
- Postgraduate: 3-5 years
- Live Long Learning and practice: 30-40 years

Learning nutrition
Reform in medical education

• Change in the curricula
• Clinical contacts from the 1st year of study
• Innovative technology in medicine
• Opening mind for teaching approaches
• Virtual sessions in anatomy, surgery,……
• Simulations in clinical departments
• Innovative Evaluation tolls
• External courses – web platforms
• External learners MOOC courses

Is there a place for training in nutrition
BLOOMS TAXONOMY

KNOWLEDGE
- Recall of information;
- Discovery; Observation;
- Listing; Locating; Naming

COMPREHENSION
- Understanding; Translating;
- Summarising; Demonstrating;
- Discussing

APPLICATION
- Using and applying knowledge;
- Using problem solving methods;
- Manipulating; Designing; Experimenting

ANALYSIS
- Identifying and analyzing patterns;
- Organisation of ideas; recognizing trends

SYNTHESIS
- Using old concepts to create new ideas;
- Design and Invention; Composing; Imagining;
- Inferring; Modifying; Predicting; Combining

EVALUATION
- Assessing theories; Comparison of ideas;
- Evaluating outcomes; Solving; Judging;
- Recommending; Rating
The Future is Now: Medical education for the 21st
Social Media in Education
Medicine and in Clinical nutrition

Youtube
Whats up
Twitter
Reddit
Hashtag
Instagram
Linkedin
Research gate
The Educator as a Maker Educator

- Lead Learner
- Safe Environment Manager where learners feel safe to take risks
- Relationship Enabler - Builder face to face, online, PLNs, Mentor
- Resource Suggester and Provider
- Educator as a Maker Educator
- Technology Tutor
- Process Facilitator for producing, assessing, developing, creating, revising
- Normalizer of ambiguous Problem finding and Solving of failure as iterative
- Feedback Facilitator
- Tour guide of Learning possibilities
Many barriers exist for healthcare professionals to better education in nutrition a limited number of medical nutrition educators, already crowded curricula, and no mandate across all healthcare fields for increased emphasis on nutrition education.
Lifelong Learning Programme
Clinical Nutrition and Metabolism

World wide success of
LLL Program of ESPEN

To improve professional competencies of MDs and health professionals in Clinical Nutrition and Metabolism

www.lllnutrition.com/
Lifelong Learning Programme
Clinical Nutrition and Metabolism

Online activities - virtual -

Introduces the learner to the topic and facilitates self-study

Educational activities

Supplements online Module with intensive real-time training, followed by evaluation

More than 1000 Live Courses
39’000 participants

More than 35’000 participants
LLL Courses in the World
The importance of nutrition in maintaining good health is widely recognized. Addressing nutrition in patient care is among the core responsibilities of doctors.

Therefore, there is a manifested interest to enhance the nutrition education received by medical students.

A structured Pre-G LLL course on Clinical Nutrition aiming to improve the knowledge and skills of medical students was developed by KEPAN, based on the material of the world known educational ESPEN LLL Programme on Clinical Nutrition.

The Pre-G LLL course on Clinical Nutrition consist of 11 essential and 7 optional topics (under development).

Creation of optional topics along with the essential topics aims to increase the adaptability of the Pre-G LLL course.

Topics
1. Malnutrition, Nutritional Screening and Assessment
2. Nutrition Requirements: Energy, macronutrients, water, electrolytes
3. Nutrition requirements and common deficiencies of vitamins, trace elements and antioxidants
4. Healthy Eating and Preventive Nutrition
5. Metabolic Response to Starvation, Surgery and Acute Illness
6. Medical nutritional therapy: oral, enteral, parenteral. Part 1
7. Nutrition in Obesity
8. Nutrition in Liver and Gastrointestinal Diseases
9. Nutrition in Hemato-oncology Diseases
10. Pediatric Nutrition
11. Nutrition in the Elderly
Consider a course of Nutrition

The Medical Education Tree

Faculty Development

Teaching Groups, Mentoring, Coaching

1:1 Teaching

Inter-professional Collaboration

Creating Curriculum

Developing Ed Tools (apps and Web Sites)

Create a case

Writing Cases

Create a web site

The Medical Education Tree

Consider a course of Nutrition
Learning is LL process

We are still there looking for good opportunities for nutrition? EDUCATION?

What it is about?

Thank you!
Modern approaches and technologies in learning
The knowledge, skills in nutrition and personal attributes must contribute to better performance and ultimate result in patient health.

Health literacy as empowerment
Ongoing Activities That Advocate For Changing The Curriculum For Health Care Professionals

- “Future Directions for Implementing Nutrition across the Continuum of Medical Education, Training, and Research,” a meeting convened by the National Heart, Lung, and Blood Institute (NHLBI) September 2012.

- Recommendations: to implement nutrition across the continuum of medical and health care profession education, training, and research.

E-learning

Continuous, applied, Flexible/

Choice:
For me, in time,
For now, enough

Computers:
courses, desks & learning centres

IT as tools
Learning objects rule!

Digitization and Virtualization of Education:

Speed of mind absorption = speed of technology
Health literacy
Health promotion and prevention efforts

• Health literacy as empowerment

• Strengthening active citizenship for health by bringing together a commitment to citizenship with health promotion and prevention

• Efforts and involving individuals in: understanding their rights as patients and their ability to navigate through the health care system; acting as an informed consumers about the health risks of products and services and about options in health care providers, and acting individually or collectively to improve health through the political system through voting, advocacy or membership of social movements.