Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities

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There has been a tremendous shift in the quantity and quality of the human diet over the last decades. On the one hand, nutritious food is more readily available, resulting in improved nutrition and the opportunity for better health. However, on the other hand, there is a higher consumption of saturated fats, salt, and sugar. Despite increased overall wealth, there remains a health disparity, particularly in low-income populations in developing countries, giving rise to the double burden of obesity and malnutrition. Indeed, data from the latest WHO/UNICEF/World Bank Joint Child Malnutrition Estimates indicate that around 155 million children under the age of 5 years are stunted, 41 million are overweight, and 52 million are wasted. Furthermore, developed countries are also witnessing a dramatic rise in diet-related disorders, such as cardiovascular disease and type 2 diabetes.

Despite the explosion of information on diet, health, and nutrition, changing an individual’s eating habits is a difficult task. We now have a better knowledge of the forces that shape a person’s eating behavior, and it is high time to leverage nutrition education to drive healthy food choices for a better quality of life.

The importance of nutrition education as an integral part of day-to-day life was in the centerpiece of the 92nd Nestlé Nutrition Institute Workshop “Nutrition Education: Strategies for Improving Nutrition and Healthy Eating in Individuals and Communities,” which took place in Lausanne in September 2018.

Nutrition education may be defined as a combination of educational tactics accompanied by physical or environmental supports, whose purpose is to encourage the voluntary adoption of foods and other lifestyle behaviors that are beneficial for health. The first session on Nutrition education to optimize healthy growth and development during the first 1,000 days, led by Prof. Maureen M. Black, took an in-depth look at what nutrition education really is and how it can be used to influence different target populations, including women, girls, and young children. The second session on the importance of nutrition education in childcare, schools, and communities settings, chaired by Prof. Mary T. Story explored the complexities of eating behavior, underscoring the importance of early childhood as a critical time for intervention. Here, nutrition education efforts in childcare, schools, and community settings play an important role. The
final session with Dr. Helen K. Delichatsios shifted the focus to nutrition education in medical schools. Paradoxically, nutrition education is sorely lacking in many medical schools around the world. This session highlighted the latest educational technologies that are being used in medical school curricula, as well as methods for bringing nutrition to the clinic. Altogether, the 3 sessions in the workshop cover the basis of how nutrition interventions can be designed and delivered to improve food choices and ultimately, an individual’s health.

On behalf of the Nestle Nutrition Institute, I would like to thank the 3 Chairpersons Mary T. Story, Maureen M. Black, and Helen K. Delichatsios for putting the scientific program together.

I would also like to thank all speakers and scientific experts in the audience, who have contributed to the workshop content and scientific discussions.

Natalia Wagemans, MD
Global Head
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The prevalence of childhood obesity has significantly increased worldwide over the past 40 years in nearly all of 200 countries studied [1]. Currently, approximately 50 million girls and 74 million boys, aged 5–19 years, are obese. Although comparable global statistics are not available, nationally representative studies from the United States report that about 8.0% of infants and young children ≤2 years of age have anthropometric values ≥95th percentile of weight-for-length. Overweight and obesity are realized in even greater proportions among some groups of infants and young children [2]. The World Health Organization [3] recommends that a multifaceted approach should be taken for obesity prevention and that interventions in early life, when biology is most “plastic” and amenable to change, are likely to have the greatest positive sustained effects. Despite the rise in obesity prevalence, globally, more children are underweight than obese. In 2016, approximately 75 million girls and 117 million boys were moderately or severely underweight. Many regions of the world continue to deal with the double burden of rising obesity with persistent malnutrition and consequent stunting in infancy and childhood. While access to a safe food supply remains a factor in parts of the world, nutrition education remains paramount in improving the health of these populations.

Nutrition Education: Definition and Features

While there may be no international standard definition, the Society for Nutrition Education and Behavior adopted a definition of nutrition education as: “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition related behaviors conducive to health and well-being and delivered through multiple venues, involving activities at the individual, institutional, community, and policy levels
“Embedded within is the explicit distinction that nutrition education is not synonymous with the provision of nutrition information. Instead, comprehensive nutrition education strategies require actionable behaviors that individuals readily choose to achieve an intended effect.

**Components of Interventions for Healthy Growth Consistent with a Nutrition Education Approach**

Factors associated with healthy growth of infants and young children have previously been identified [5]. In addition to optimizing maternal health and lifestyle in preparation for pregnancy, some modifiable and actionable dietary and feeding-related behaviors have been included in a limited number of interventions (Table 1). Assessment of behavioral mediators, defined as underlying determinants that precede adoption of behaviors, is critical to nutrition education intervention success. Often, the resultant potential mediators included attitudes, beliefs, self-efficacy, social norms, skills, knowledge, and environmental constraints that influence whether or not a target behavior is adopted.

Evidence indicates that nutrition education strategies and interventions, likely to benefit participants, are guided by a theory of healthy behavior. The most frequently reported theories utilized with success include: Social Cognitive Theory, including promotion of self-efficacy, Theory of Planned Behavior, and the Health Belief Model. An educational approach rooted within anticipatory guidance, as a method to proactively

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<th>Table 1. Actionable, modifiable dietary and feeding-related behaviors associated with healthy growth during the first 1,000 days</th>
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<td>Adjust energy intake/expenditure to achieve recommended weight gain during pregnancy</td>
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<td>Consume a nutrient-dense diet during pregnancy and lactation</td>
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<td>Breastfeed the infant</td>
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<td>Offer nutritious complementary foods and beverages at the infant/toddler’s appropriate developmental stage</td>
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<td>Utilize responsive feeding practices and foster healthy eating behaviors through shared family meals/mealtime routines</td>
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<td>Provide the infant/toddler opportunities for physical activity; limit TV and screen viewing time</td>
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<td>Ensure that the infant/toddler has adequate sleep via establishment of sleep hygiene routines</td>
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deliver components of culturally appropriate behavioral messages to parents/caregivers during the period just prior to when the issue would be developmentally relevant to the infant or child has a strong theoretical rationale.

For maximum scalability, consideration of the delivery format of nutrition education interventions requires careful assessment. At present, randomized clinical trials that have included multiple intervention components during the first 1,000 days with outcomes related to growth of infants or young children are primarily clinic- or home-based. Although mHealth or digital interventions document encouraging results, results from multicomponent intervention trials with infants or young children addressing the prevention of excess weight gain, healthy growth, or measures of adiposity in scale-up interventions are limited.

References

Nutrition Education during the Preconception Period

Usha Ramakrishnan

Women's nutrition, starting from infancy through the school-age years, early adulthood, during pregnancy and lactation, and between pregnancies has the potential to affect the health and well-being of the next generation. Nutrition education and counseling (NEC) during pregnancy has been associated with significantly improved pregnancy outcomes; however, the overall quality of the evidence is low. Further, nutrition during the peri-conceptual period may play a crucial role, and practices prior to conception may influence the dietary habits. Observational studies support the importance of nutrition during the peri-conceptual period for improving maternal and child outcomes, but evidence from intervention studies is limited. The most well-known example is the benefits of preconceptional folic acid supplementation to reduce the risk of neural tube defects. The primary studies that evaluated the pre-conception interventions such as supplementation and/or fortification with micronutrients, cash transfers or incentives, and behavior change approaches to improve dietary intakes and maternal nutritional status prior to conception have mixed findings, and NEC is often included as part of the above approaches and/or included in health promotion packages targeted towards women of reproductive age including adolescent girls and/or young adults. A few studies have evaluated the preconception NEC primarily in developed countries, and qualitative studies from poor resource settings suggest that issues such as food insecurity/access need to be addressed along with NEC.

Adolescence is a critical period for physical and psychological growth and development, and it is advisable to track health and nutrition behaviors from adolescence to adulthood. There are examples of case studies and/or subnational programs that have been implemented as part of anemia prevention strategies targeting adolescent girls in countries such as Egypt and India. These programs typically combined NEC with the distribution of iron-folate supplements using different delivery platforms and were found to be successful in reducing the burden of
anemia. There are also examples of school-based programs from Mexico and the US that promote healthy lifestyles by delivering messages to increase physical activity, dietary diversity, and/or reduce the consumption of sugar-sweetened beverages as part of ongoing efforts to reduce the burden of overweight and obesity and other non-communicable diseases such as diabetes which is increasing worldwide and associated with poor pregnancy outcomes.

Reaching young adults is a great challenge, especially in settings where girls are out of school. Efforts to integrate NEC along with the provision of reproductive health services such as family planning and post-partum care in healthcare settings, work-site programs or other innovative platforms including social media are needed. The findings of a large, cluster-randomized controlled trial, evaluating life skills building education provided bimonthly along with the provision of twice weekly MMP supplementation to improve the health and nutritional status of adolescent and young women (15–24 years) in Matiari District, Pakistan is of great interest in this context. The primary outcome is anemia along with other measures of nutritional status and psychosocial well-being. Targeting newlywed couples is another approach that has a lot of potential for delivering NEC, which could be effective in improving preconception health and nutrition and/or delaying age at first birth. There are examples of newlywed programs in Bangladesh, Indonesia, India, and Malawi but these typically include information regarding family planning services and/or health seeking and promotional messages to reduce the risk of HIV and other sexually transmitted diseases. In summary, there is increased global awareness for the need to promote preconception care but further work is needed to carefully develop, implement, and evaluate cost-effective preconception care packages that include NEC using different approaches and delivery platforms, such as schools, health facilities, daycare centers, and/or worksites.
Maternal nutrition plays a critical role in establishing the course of pregnancy and the health of the mother and child at birth and beyond. Current work in the examination of diet with health outcomes focuses on dietary patterns because of the inherent inter-correlation between nutrients and food groups. Recently, the U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (HHS) initiated the Pregnancy and Birth to 24 Months Project to examine diet-related topics of public health importance during pregnancy, infancy, and toddlerhood [1]. Four systematic review (SR) questions assessed how dietary patterns before and during pregnancy relate to outcomes in mothers and their offspring during the period January 1980 to January 2017 [2]. These outcomes included gestational diabetes (GDM), hypertensive disorders during pregnancy (HDP) (i.e., gestational hypertension, pre-eclampsia, and eclampsia), birth weight, and gestational age (preterm birth, PTB). Evidence on the relationship between diet during pregnancy and GDM was mixed and considered insufficient to draw a conclusion. Five articles examined the association with HDP; the evidence in this review was found to be limited in support of an association between dietary patterns higher in vegetables, fruits, whole grains, nuts, legumes, fish and vegetable oils and lower in meats and refined grains and a reduction in the risk of HDP. For the outcome of PTB, more consistent evidence was found with 5 of the 8 studies that examined the relationship between dietary patterns during pregnancy and overall PTB reporting a significant association. While there were more studies assessing the relationship between dietary patterns and birth weight during pregnancy (n = 17), the evidence was considered inconclusive due to the substantial inconsistency and methodological limitations including a lack of standardization of birth weight for gestational age and sex and no assessment of modification by maternal pre-pregnancy BMI.
There are two additional studies that lend support to the association between dietary patterns and birth outcomes. Martin et al. examined the association between the DASH diet and cardiometabolic markers at mid-pregnancy and found that greater adherence to DASH diet was related to lower maternal fasting glucose, insulin, HOMA-IR, and triglyceride levels with pre-pregnancy BMI attenuating the associations. However, there was no association with total cholesterol levels [3]. The Healthy Start cohort found that a dietary pattern higher in poultry, nuts and seeds, whole grains, cheese, fruits as well as added sugars and discretionary solid fat was positively correlated with maternal gestational weight gain but not mid-pregnancy fasting glucose [4]. Whereas a diet higher in eggs, potatoes, other starchy vegetables, non-whole grains, fruits (citrus, melons, and berries), and discretionary solid fat was correlated with both gestational weight gain and mid-pregnancy fasting glucose levels.

While evidence in support of following specific dietary patterns during pregnancy for an optimal outcome is weak, due to the many methodological limitations of previous studies, there are guidelines that make sense for women to follow. These guidelines include, for example, the healthy dietary patterns included in the 2015-20 Dietary Guidelines for Americans (Table 1) [5]. Key characteristics of these patterns include higher intakes of fish and seafood, vegetables, fruits, whole grains, nuts and seeds, legumes, and vegetable oils.

Maternal weight status, in particular a high BMI (≥30) prior to conception itself, is strongly associated with many adverse birth outcomes. Current gestational weight gain guidelines are dependent on a woman’s starting weight, and intervention studies that have been successful in

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<td>1. Choose a healthy eating pattern at an appropriate caloric level for maintaining a healthy body weight and supporting nutrient adequacy.</td>
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<td>2. Focus on nutrient density, the amount consumed (portion size), and eating a variety of foods across all food groups.</td>
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<td>3. Limit calories from added sugars and saturated fats, and reduce sodium intake.</td>
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<td>4. Shift to healthier food and beverage choices that consider an individual’s culture, personal preferences, and socioeconomic situation.</td>
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<tr>
<td>5. Change is needed at all levels of the social ecological model (individual, interpersonal, policy, environment, cultural) in order for Americans to follow and support a healthy eating pattern.</td>
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helping women gain within the target require frequent, high intensity diet counseling. Intervention studies conducted in overweight and obese women show greater heterogeneity in terms of what works, but it seems prudent to provide counseling to these women even through the interconceptional period to help mitigate pregnancy complications and child outcomes associated with a high BMI in future pregnancies.

Reference

Reading Appetite Cues in Infancy – A Role for Nutrition Education

Marion M. Hetherington and Janet McNally

It is known that babies are capable of varied and numerous communication cues to indicate hunger, appetite, satiation, and satiety. In the hours following birth, neonates signal hunger through agitation, arousal, and ultimately a distress cry. Newborns are also capable of indicating preferences for familiar odors through orientation of the head and mouth. They show a liking towards sweet tastes and a dislike towards bitter tastes. Breast milk contains diverse flavor components, and is perceived as sweet. Thus, infants are equipped to prefer sweetness from birth as a highly adaptive mechanism, whereas an aversion to bitterness may be a protective mechanism against toxins in early life. Breastfeeding increases the likelihood that infants will accept new tastes including bitter tasting vegetables. In addition to the gusto-facial responses associated with basic tastes, which are shared with other non-human primates, infants are known to use gaze, gesture, and vocalization to signal interest and disinterest in foods. These behaviors change over the course of a meal, indicating that infant communication cues are sensitive to changes in need state. These behavioral cues have been coded during mealtime interactions between caregivers and infants, providing evidence of the dynamic nature of the experience. We have conducted a series of studies to investigate communication of infant appetite. These studies have revealed that the number and sophistication of appetite cues increases with age; more frequent feeding cues are observed at the beginning than at the end of a meal showing that cue frequency changes with satiation, that breastfed infants exhibited more engagement and disengagement cues than those who had been formula-fed and that breastfeeding mothers provided fewer distractions during the meal, set up a more ideal feeding environment, and fed more responsively than those who did not breastfeed.

Responsive feeding, where caregivers identify, interpret, and respond to infant cues is recognized as important in promoting self-regulation and preventing over or under-feeding. Research suggests that parental responsiveness to their child’s hunger, appetite, and satiety signals is critical for
the development of healthy eating habits and may affect the weight status and growth rates of their child. For example, a non-responsive feeding style may affect both the frequency of meals offered and the quantities eaten. It is important to support parents to identify, interpret, and respond to these cues (feeding in response to hunger cues, ending feeding in response to satiety cues). However, issues related to attachment, mental health, feeding beliefs, and practices may interfere with responsive feeding. For example, mother-infant attachment and experience of breastfeeding facilitates maternal responsiveness. In addition, babies who have been breastfed display a greater frequency of feeding cues during the meal [1–3]. This demonstrates the bi-directionality and interdependence of infant communication during a feed, namely that more responsive feeding is associated with more proficient communication by the infant. Overall, observational methods have revealed the complex ways in which infants signal energy needs to their caregivers, and in turn whether or not caregivers recognize and react to these signals as part of responsive feeding.

Recently, educational resources have been developed to enhance responsive feeding in caregivers. We have developed an online, video-facilitated educational tool to support parents, caregivers, and healthcare professionals to recognize ways in which infants communicate appetite. To date, we have found that mothers are able to identify hunger cues with ease but are less confident in recognizing and responding to satiation/satiety cues. Potential applications of these methods include interventions to prevent overfeeding and childhood obesity.

Reference

Childhood development during the first 1,000 days forms the foundation for lifespan health, academic success, productivity, and well-being, and is a cornerstone of the United Nations Sustainable Development Goals (SDGs). At least 7 of the 17 SDGs are particularly relevant to young children: goals to end poverty and hunger, to ensure access to quality health, education and sanitation, to achieve gender equality, and to reduce income inequality. Recent evidence has shown that over 249 million children under age 5 years are not reaching their developmental potential [1] largely due to undernutrition, including both macronutrient and micronutrient deficiencies [2]. Children’s growth and development tracks over time, meaning that children who do not reach their developmental potential early in life are at increased risk for poor health and academic outcomes throughout life. Although effective interventions to promote early development have been implemented throughout the world [3], most have been small scale with limited reach, investment, and sustainability.

**Nurturing Care Framework**

The Nurturing Care Framework, introduced in the 2017 *Lancet* series on Early Child Development and adopted by the World Health Assembly in 2018, provides a global framework to promote early childhood development (Figure 1) [4]. Nutrition is a key domain of Nurturing Care, along with health, protection, early learning, and responsive caregiving. These domains are indivisible, meaning that each domain is necessary and no single domain is sufficient.

Implementation of the Nurturing Care Framework is dependent on an enabling environment. Although Nurturing Care is implemented primarily by families through home-based care practices, changing family patterns and increases in maternal employment have resulted in increases in out-of-home care for very young children, often in child care centers.
Thus, to ensure that children are exposed to an enabling environment requires support to households and to child care providers to ensure that caregivers have the physical and mental health, resources, and capacity to provide Nurturing Care.

**Scaling Up Nurturing Care**

As national governments and global leaders adopt the Nurturing Care Framework to ensure that young children reach their developmental potential, implementation guidelines and metrics are needed to help countries monitor and evaluate the effectiveness of implementation strategies and establish sustainable programs. In addition to evaluating changes on SDG indicators, such as the number of children with access to quality early childhood development programs, countries need systematic information on indicators of services, such as reach, coverage, cost, and requirements for training, coaching, and supervision. This information can be generated by a system of accountability that includes valid indicators, quality data, and timely feedback, thereby facilitating continuous quality improvement [4].

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**Fig. 1. Nurturing Care Framework.** Black, The Lancet, 2017; Black, Gove, Merseth, 2017.
Implementation Science

Implementation science includes the methods needed to adopt and integrate evidence-based practices and programs into routine care. Through a continuous cycle of monitoring, evaluation, learning, and adaptation, implementation science provides the tools to adapt programs and practices to increase quality, reach, and sustainability.

This presentation draws on the principles of implementation science, including the methods and strategies needed for families and child care providers to incorporate Nurturing Care into their daily routines. It focuses on child development policies, on program reach to ensure that programs reach families most in need, on monitoring and metrics to learn whether programs are delivering interventions as intended, and on continuous quality improvement to ensure that programs learn and improve: the elements that are necessary for sustainability. The success of the SDGs depends on ensuring that children throughout the world reach their developmental potential, thereby building the capacity for future generations of adults to have the health, intelligence, creativity, and humanitarianism to move the global agenda forward.

References

A healthy diet is central to overall health throughout the lifecourse and is protective against all forms of malnutrition, as well as non-communicable diseases (NCDs) such as cardiovascular disease, diabetes, obesity, and certain types of cancer. Unhealthy diets and physical inactivity are among the leading causes of NCDs throughout the world and contribute significantly to the global burden of disease, death, and disability. Other conditions related to diet, such as hunger, dental caries, and osteoporosis are widespread causes of morbidity [1].

In the United States, about half of all adults – 117 million individuals – have one or more preventable chronic diseases, many of which are diet-related [2]. More than two-thirds of adults and nearly one-third of children and youth are overweight or obese. These high rates of overweight, obesity, and chronic disease have persisted for more than two decades and come not only with increased health risks, but also at high cost in terms of personal quality of life and economic and societal costs. The United States spends approximately $400 billion on obesity and diagnosed diabetes-related health costs each year [2]. Many of the risk factors for diet and weight-related diseases are modifiable and preventable.

Healthy dietary patterns associated with positive health benefits are high in vegetables, fruits, whole grains, seafood, legumes, and nuts; moderate in low- and non-fat dairy products; lower in red and processed meat; and low in foods and beverages with added sugars, and refined grains and sodium and provide a balanced caloric intake [2]. Inadequate nutrition, poor diet quality, and obesity are prevalent among all Americans, but are most pronounced among lower-income households and communities, which often lack access to healthy foods or have access to an overabundance of unhealthy foods, as well as in households with limited time to prepare healthful foods.
Eating behavior is highly complex, resulting from the interplay of multiple influences across different contexts and conditions. Improving dietary and lifestyle patterns and reducing obesity will require addressing not only individual behaviors but the environmental context and conditions in which people live, make choices, and eat. This work will also require addressing inequities that exist in access to healthy foods and healthy environments more broadly in low-income and disadvantaged communities.

Table 1. Definitions and examples of policy, systems, and environmental change approaches to supporting healthy eating

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<th>Type of change</th>
<th>Definition</th>
<th>Examples</th>
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| Policy         | Policies at the legislative or organizational level that create or amend laws, ordinances, resolutions, mandates, regulations or rules | - Calorie and nutrient labeling on menus and displays in restaurant and food retail venues
|                |            | - Nutrition standards for food and beverages available in childcare facilities and schools |
| Systems        | Systems change impact elements of an organization, institution or system, such as changes in rules, processes, procedures, or infrastructure. Systems change and policy change often work hand-in-hand | - Screening for food insecurity in community clinics and developing comprehensive mechanisms to refer food insecure to food | |
|                |            | - Incorporating healthy eating education into all federally funded, evidence-based home visiting models |
| Environmental  | Environmental changes involve physical or observable changes to the economic, social, cultural, or physical environment | - Initiatives to increase the availability and affordability of healthier foods and beverages in food retail environments |
|                |            | - Charging higher prices for less healthy food and beverages to decrease their use |

communities. This paper presents a conceptual framework for understanding the multiple influences on what people eat (Fig. 1) and the linkages between individual-level factors, social environments, physical environments, and macroenvironments [3]. Collectively, these environments influence what, where, and how much we eat. We then discuss policy, systems, and environmental (PSE) dietary change strategies; the goal of which is to make the healthy choice – the easy, safe, and affordable choice and have impact at the population and community level (Table 1). We highlight selected examples of synergistic linkages and interactions between nutrition education and PSE strategies that have proven effective in supporting healthy eating behaviors. Examples include efforts in

**Fig. 1.** An ecological framework depicting the multiple influences on what people eat. Adapted from: [3].
federal nutrition assistance programs, nutrition and food labeling, and food retail settings. This paper will also explore new sectors where this synergistic approach holds promise for improving population health and reducing health inequities. Accelerating progress in improving healthy eating and dietary quality and achieving and maintaining a healthy weight will require multi-level and multi-sectoral approaches by combining direct nutrition education with broader PSE efforts. To have the greatest population health impact, models that have proven effective should be maintained and new approaches that hold promise for underserved communities should be implemented and evaluated. Nutrition education combined with PSE approaches is more effective than either strategy in isolation and both will be needed to reduce the global burden of diet-related chronic diseases.

References

Multi-Level Opportunities to Improve Nutrition Education in Childcare Settings

Dianne S. Ward and Amber Vaughn

Early childhood, from birth to age 5, is a critical period for growth and development. Lifelong dietary habits are being formed, which in turn affect immediate and long-term health, including risk of cardiovascular disease, obesity, and diabetes [1]. Eating a healthful diet and developing a positive relationship with food sets children on a pathway to a lifetime of good health. Unfortunately, poor dietary habits are common among today’s young children [2].

Early care and education settings (ECE) have the potential to exert considerable influence on the eating habits of young children. In the US and most other countries, ECE programs serve large numbers of children. Enrolled children spend 32–36 hours per week and consume 50–75% of their daily caloric intake while in childcare [3].

ECE programs can support children’s development of healthy eating habits through nutrition education, defined as a comprehensive, multi-level approach including education, environmental support, and policy [4]. A useful mnemonic when describing the multiple opportunities for nutrition education in ECE programs is the 4-Ps, which refers to provisions, practices, planned education and outreach, and policy. Explanation and examples of the 4-Ps are presented in Figure 1.

Provisions refer to the facilities, services, amenities, and resources offered by the ECE program in support of children’s nutrition. Specific examples include the food and beverages served; how meals and snacks are provided to children; and the physical support for eating (e.g., child-size utensils), learning (e.g., books and posters), and hands-on experiences (e.g., gardens and play kitchens). When children are served healthful food, allowed to serve themselves, and are reinforced by a physical environment that respects food and its importance, they develop a lifelong appreciation for healthy food.

Practices refer to the relationship teachers and other staff establish with the children around food and eating. Teachers and staff can
support healthy eating by sitting with the children during meals, eating
the same food, using enthusiastic language to talk about healthy food,
and offering praise and encouragement when children try new or less
familiar food.

 Planned education and outreach includes formal nutrition lessons
for children, professional development for staff, and engaging families in
the support of healthy eating. Nutrition lessons can be stand-alone educa-
tional sessions about a nutrition topic or integration of nutrition concepts
with other learning standards. Professional development builds necessary
knowledge and skills needed to support children’s nutrition, but can also
be beneficial for the staff’s own nutrition education. Outreach to parents
should foster partnership between ECE and home to ensure that children
receive consistent nutrition messages.

 Policies are written plans or course of action that govern how ECE
programs operate. By formalizing policies in written documents and
sharing those with families and the public at-large, ECE programs solidify
their commitment to children’s nutrition education.

 Most ECE programs fail to implement the full range of best prac-
tices possible to provide optimal nutrition education. An example of an
effective strategy for improving ECE program’s nutrition education is Go
NAPSACC – an online, interactive, change management system that pro-
vides a suite of tools that guide ECE programs through continuous qual-
ity improvement [5]. Go NAPSACC’s 5-step change process encourages
reflecting on current nutrition practices, setting goals and planning for
action, taking that action, obtaining education and training, and revising/repeating the process (Fig. 2).

An important “call to action” directed at nutrition experts, health professionals, and policy-makers encourages them to support ECE programs in the implementation of a comprehensive nutrition education program that supports young children and their families.

**Reference**

Food and Nutrition Education, Policy and Training in the UK

Roy Ballam

The importance of food and nutrition education in schools has never waivered in my personal view, having originally trained as a “food” teacher. What has changed is the societal context in which food and nutrition education now sits: increasing rates of childhood obesity, resource challenges in schools, and issues relating to teacher recruitment and training.

In the context of child health in the UK, the focus is centered on childhood obesity, with one in ten children aged 4–5 years being overweight or obese when they start school, rising to one in three children by the age of 11–15 years. There is clearly a call to action in relation to obesity; however, there are also concerns over other aspects of children’s diets.

The National Diet and Nutrition Survey shows low intakes of a number of micronutrients, as well as fiber, and 16% of children aged between 5 and 15 years ate the recommended five or more portions of fruit and vegetables a day. This suggests that there is an issue with the whole diet, not just one that focuses on overweight and obesity. In addition, many children are also not reaching the recommended one hour of physical activity per day.

The UK government has introduced a number of measures through the Childhood obesity – a plan of action, including a soft drinks levy (sugar tax), a sugar reformulation program reduction in the food most commonly eaten by children, introducing a Healthy rating scheme for schools, promoting physical activity, and updating school food standards. While the importance of food education in the formal school curriculum is mentioned, no specific recommendations are made.

The curriculum in England specifically includes ‘cooking and nutrition’, requiring pupils aged 5–14 years to be taught about food origins and provenance, cooking and food preparation, and applying healthy eating and nutrition. However, research indicates that since its introduction in 2014 there has been no change (or a decrease) in lesson length, funding, and teaching resource provision. Teachers also report that they are
constrained by a lack of time, budget, and resources to deliver the food skills and knowledge in the curriculum and have limited opportunities for continuing professional development. All teachers should receive training in relevant aspects of nutrition and have an understanding of the important role they play in supporting the health and wellbeing of children in their care. It has been suggested that Key Performance Indicators for delivering food education in schools should be established, helping to set out minimum learning experiences that school pupils should receive as part of their education entitlement.

Another vehicle to support the promotion of food and nutrition is through health promotion programs. A number of such programs are funded by local authorities, providing holistic support through a whole school perspective. In addition, there are many other organizations nationally and locally, typically non-profit, that also offer advice and support in health promotion. For example, British Nutrition Foundation runs a Healthy Eating Week for schools providing a focal point during the year. Schools welcome these types of health promotion programs, enabling them to engage in national initiatives, implement health promotion activities, and develop competence.

While it is acknowledged that there are a number of issues, it must be remembered that there is also a lot of great work happening in our schools every day. The focus must be on ensuring that policy and practice directly address these issues. Food and nutrition education must be compulsory in all our schools; teachers should be supported professionally through their teaching career; and those supporting food and nutrition in schools must work together to make a lasting difference which is lifelong for children.
Community Policies to Change Food Access to Improve Nutritional Health

Patricia B. Crawford

It is well established that poor diet is a major contributor to many conditions including cardiovascular disease, obesity, type 2 diabetes, dental caries, and some cancers. The sheer number of individuals affected suggests that new intervention strategies must be employed to reach large segments of the population, and in particular, the most vulnerable populations with the highest rates of disease. Changing the food environment to provide more healthful, affordable, accessible foods is an effective and feasible strategy for improving the nutritional health of the population and reducing disparities. In addition, there is increasing evidence that changing the local food environment can be a determinant of population weight status [1].

Underlying food environment changes to improve the nutritional health of the population is healthy food access. This includes both increased access to healthy foods and reduced access to less healthy foods. The community strategies deemed most likely to improve the nutrition and health of the population are interventions to alter food and beverage pricing and interventions to change the availability of healthy foods in nutrition assistance programs [2]. Changing the food environment in the retail food sector is a third community strategy that is promising.

**Strategy 1. Reducing access to less healthy foods and beverages through the use of food and beverage taxes**

Food and beverage taxation addresses the affordability dimension of food access. Current interest is particularly high in implementing sugar-sweetened beverage taxes to reduce consumption of less healthy beverages as they have been demonstrated to be associated with serious health issues such as obesity, type 2 diabetes, and cardiovascular disease. Countries around the world have implemented beverage taxes beginning decades ago [3] (Fig. 1). The data from evaluation studies in Mexico and
Berkeley, California have documented significant reductions in sugar-sweetened beverage purchases. In both these studies, reductions in purchases were particularly high among lower income households. Early results from a study of Philadelphia’s relatively recent beverage tax found significant reductions in the consumption of soda and energy drinks, as well. While the primary benefit of a beverage tax has been to decrease consumption, revenue generation can be employed to support government programs linked to community health and education. Further, beverage taxes have contributed to the current movement to increase water consumption and ultimately, may contribute to the reformulation of sweetened beverages.

**Strategy 2. Improving access to healthy and decreasing access to less healthy foods and beverages in food programs serving low income populations**

Some government food programs such as the school lunch program and the WIC have found that regulating the kinds of foods offered in the programs can positively affect the diet quality of program participants. The charitable food system comprised of food banks from across the
United States is estimated to serve one out of seven Americans every day. Food banks have redirected contributed foods to the poor without regard to nutrition guidance until recently. Now with a better understanding of the food preferences of the users of the charitable food system [4] and a better understanding of the benefit of nutritious food provided in this setting with the control of disease [5], food banks are making great strides in changing food offerings (Fig. 2). Feeding America, a non-profit organization supporting the charitable food system, has developed new nutrition guidance for food banking which is presently being adopted by food banks across the nation.

**Strategy 3. Promoting healthy food purchases in the food retail environment**

Retail food outlets play a critical role in food availability. Retail interventions generally fall into three areas: price interventions in the form of incentives, vouchers, coupons, and rebates; food access interventions including the opening of new stores and various food delivery programs; and store-based interventions including nutrition education, product placement, and food and beverage stocking changes. The
effectiveness of retail strategies to improve nutrition varies by the ways in which these strategies are employed to increase access to healthy foods.

References

The global and national food and nutrition situation indicates that more than 900 million people are hungry worldwide, yet more than 1 billion are overweight adults. In a study carried out by DOST-FNRI and Save the Children in 2013, Php 328 Billion or 2.84% of the Gross Domestic Product are lost due to child undernutrition while around Php 1.23 billion are lost due to stunting-related grade level repetition.

With cognizance of the malnutrition problem, an integrated plan of action for nutrition was formulated by the national multi-sectoral nutrition community, consistent with the global call to eradicate malnutrition. Commonly known as the Philippine Plan of Action for Nutrition (PPAN) 2017–2022, the plan is an integral part of the Philippine Development Plan 2017–2022. It is consistent with the Administration’s 10-point Economic Agenda, the Philippine Health Agenda, and the development pillars of malasakit (protective concern), pagbabago (change or transformation), and kaunlaran (development).

Major changes in our food system and eating environments over the past decades have been driven by technological advances, food and agricultural policies, and economic, social, and lifestyle changes. More processed and convenience foods are available in larger portion sizes and at relatively low prices. There are fewer family meals, and more meals are eaten away from home. Thus, policies and programs are extremely important to help make the healthful choices.

In the Philippines, Republic Act (R.A.) No. 11037 known as the Masustansyang Pagkain para sa Batang Pilipino, aims to combat hunger and undernutrition among Filipino children. Under this, the Department of Social Welfare and Development (DSWD) implements a supplemental feeding program for daycare children while the Department of Education (DepEd) enforces the school-based feeding program. On the contrary, the rising obesity rates among Filipino children and adults have motivated policy makers to implement policies that can improve access to affordable, healthy foods, and increase opportunities for physical activity in
schools and communities across the country. One example is the DepEd Order 13, S. 2017 on Policy and Guidelines on Healthy Food and Beverage Choices in Schools and in DepEd Offices for the promotion and development of healthy eating habits among the youth and its employees. This DO from DepEd led to a subsequent issuance of a local ordinance in some cities (Pasig and Quezon City). Excise tax on sweetened beverages (SBs) is one of the new taxes imposed under Republic Act (RA) 10963 or Tax Reform for Acceleration and Inclusion (TRAIN) Law which took effect last January 1, 2018.

The Industry sector has its respective shares in various nutrition education campaigns in the country. To name a few, the NutritionSchool.ph was launched in support of a common passion for wellness and nutrition education. To address the problem of child undernutrition, the United for Healthier Kids (U4HK) was launched in 2014. Other initiatives also include promotion of fortified milk drinking among school children through Laki sa Tibay School Nutrition Education and Pamilyang Laki sa Tibay Community Nutrition Education.

While it is apparent that eliminating hunger and malnutrition is technically feasible, the challenge lies in generating the requisite political will, developing realistic policies, and taking concerted actions nationally and internationally. Action and advocacy by many stakeholders are needed to overcome these barriers. Past successes that can point the way forward include effective public health approaches to complex problems such as tobacco use, motor vehicle crashes, and occupational safety. These successes provide a template for a healthier food system: address the consumer, the product (agricultural commodities, food), the environment (retailers, restaurants), and the culture (unhealthy eating, marketing). Strong government policy is crucial to achieve a healthy, equitable, and sustainable food system that benefits all.
Counterbalancing the Uncertainties of Medical Nutrition Education with Effective Online Instruction

Martin Kohlmeier

Practicing physicians need to recognize nutrition-related health challenges in their patients and know what to do about the detected problems [1]. It takes at least 25 to 30 hours of medical school instruction to achieve just basic nutrition competencies. Because most medical students get significantly less than this minimum, they are not adequately prepared to deal with common nutrition-related challenges in practice. The majority of all accredited US medical schools require less than 25 hours of nutrition instruction across the entire four-year curriculum and a few still fail to require any nutrition education at all. Medical schools in other countries struggle with the same instructional deficits, and many fail altogether to address the need for proper nutrition training. It is clear what physicians need to know about nutrition to serve their patients. First, the science, how foods work in health and disease; then best nutrition practice, recognizing nutrition problems, and what to do about them; and finally getting the message across, which often means to help their patients help themselves. The greatest deficits exist in assessing individual patient needs, blending nutritional therapies with medical treatments, and finding effective solutions for better health.

The Nutrition in Medicine project (NIM, nutritioninmedicine.org) has demonstrated that computer-based nutrition instruction is effective and efficient, particularly as an integral component of clinical training. A majority of US medical [2] and osteopathic [3] schools use the NIM materials. Institutions in more than twenty countries also find them useful.

The online courses cover a full curriculum from basic science to clinical practice. Interactive lessons, skill-building exercises, and practice challenges allow learners to progress at their own pace. Since lifestyle change depends on effective communication, the lessons teach specific phrases to be used for motivational interviewing and other proven approaches. There is also an opportunity to hone clinical skills with simulated patient
interactions (Fig.1). These are timed exercises that reflect the situation in patient care where assessment and guidance have to be provided in an appropriately efficient manner.

A particularly useful feature of computer-based teaching is that machines can measure learning success, even while the session is still in progress. If they have not achieved the required learning outcome, instruction can seamlessly loop through another set of lessons or exercises to improve comprehension. This ensures that all users learn what they need to know, not just a few with interest in the topic. Yet another strategy is to test content familiarity beforehand to tailor instruction to the needs of the individual learner and thereby shorten required session duration while retaining much of the learning effect and long-term retention [4].

### Table 1. Improved practice patterns after just one hour of online training

<table>
<thead>
<tr>
<th></th>
<th>Baseline, %</th>
<th>Three months later, %</th>
</tr>
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<tbody>
<tr>
<td>address nutritional issues at new OB appointment</td>
<td>57.9</td>
<td>64.5</td>
</tr>
<tr>
<td>advise about gestational weight gain</td>
<td>33.2</td>
<td>77.4</td>
</tr>
<tr>
<td>calculate BMI at OB visit</td>
<td>78.4</td>
<td>93.3</td>
</tr>
<tr>
<td>discuss nutritional issues during GYN visit</td>
<td>16.2</td>
<td>43.3</td>
</tr>
<tr>
<td>refer to an RD</td>
<td>36.8</td>
<td>56.7</td>
</tr>
</tbody>
</table>

![Screen capture of a patient simulation](image_url)

**Fig. 1.** Screen capture of a patient simulation to practice nutrition assessment and dietary guidance of a patient with an atherogenic lipoprotein profile.
Online nutrition instruction can change practice patterns. In one study [5], residents and fellows in gynecology and obstetrics learned to use effective assessment and counseling tools with their patients. Before their one-hour learning session, most of these physicians rarely or never advised their pregnant patients about proper weight gain. Three months later, most of them had made it a routine part of patient work-up (Table 1). There was similar improvement in several other practice activities, such as discussing nutritional issues during a gynecological visit or referring to a dietitian. This is at least a start that can be replicated without too much difficulty across all medical disciplines and worldwide.

It should be evident that computer-based instruction can help to reduce the worrisome training deficits of physicians and other healthcare providers. Because the materials are provided online, the instruction is highly scalable and also cost effective. Something needs to change, and we know how to get it done.

References
The NNEdPro Global Centre for Nutrition and Health: A Consolidated Review of Global Efforts Towards Medical and Healthcare-Related Nutrition Education

Sumantra Ray

Whilst there is much focus on applying resources to the generation of evidence from human nutrition research, whether these involve experiment, observation or intervention, there is considerably little investment in development and evaluation of effective approaches to apply the available knowledge base. Furthermore, when translating nutrition knowledge to the population at large, there are barriers to implementation, retention, and sustained impact, often due to largely unregulated public information on nutrition causing significant confusion and conflict. Healthcare professionals therefore have a key role in becoming reliable knowledge brokers translating nutrition science to clinical or public health practice. However, with the exception of dietitians, who are relatively few in number, other segments of the healthcare workforce receive little or relatively inconsistent training in practice-ready aspects of nutrition.

Over the past decade, the NNEdPro Global Centre in Cambridge (www.nnedpro.org.uk) has been working as a partnership between doctors, dietitians, nutritionists and others, both within and across borders to assess practice gaps affecting patients and the public. This is typically followed by taking a step back to look at the available nutrition evidence base – where this is adequate but can benefit from better evidence synthesis for education versus where there is a need for further primary research to strengthen the evidence base – and then taking a step forward to develop, deliver, and evaluate the impact of bespoke nutrition education interventions on the knowledge, attitudes, and practices of the healthcare workforce. Whilst focusing on
the nutrition education of healthcare professionals, the NNEdPro lean-innovation approach spans over 40 projects and initiatives in over 12 countries using the Knowledge-to-Action Cycle as a framework to ignite the implementation potential of high quality research to promote best practice.
Nutrition and physical activity behaviors influence health and disease, and contribute to the leading causes of death in the US. Yet, studies have shown that nutrition education in medical schools is inadequate and there have been minimal to no improvements over the past 30 years. Although physicians in the US are not confident to counsel patients in nutrition-related conditions, little is known about nutrition education and training in residency and fellowship programs.

In recognition of the need to develop and enhance undergraduate and graduate medical nutrition education, the National Heart, Lung, and Blood Institute (NHLBI) and the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health established the Nutrition Academic Award (NAA) Program in 1997 [1]. The NAA awarded grants to 21 US medical and osteopathy schools to improve teaching of nutrition principles and clinical practice skills with an emphasis on preventing cardiovascular diseases, obesity, diabetes, and other chronic diseases. Educational resources were developed including the *Nutrition Curriculum Guide for Training Physicians* (2002) which offered more than 400 educational objectives that medical students, residents, and fellows need to attain upon graduation.

Since the NAA effort, nutrition and lifestyle champions have developed several models to incorporate nutrition in the medical school curriculum. Examples include online educational modules, hands-on culinary workshops, dedicated courses, and integrated content that may include threads throughout undergraduate medical education. In some schools, nutrition groups of interests (or clubs) led by medical students facilitated education and dialog on nutrition from the bottom up. These champions have also continued to advocate for inclusion of nutrition content in the US Medical Licensing Examination and for recognition of medical nutrition as a national subspecialty in medicine.
In 2012, NHLBI in partnership with the American Society for Nutrition (ASN) convened a workshop *Future Directions for Implementing Nutrition across the Continuum of Medical Education, Training, and Research* to develop recommendations for remodeling nutrition education, training, and research [2–4]. As medical education has shifted to a competency-based system [5], a subsequent NHLBI workshop held in 2017 recommended an inter-professional approach to update the NAA curriculum guide; the development of medical nutrition Entrustable Professional Activities (EPAs), competencies, and milestones; and further research in medical nutrition, metabolism, and lifestyle.

In both NHLBI workshops, establishment of a mechanism to coordinate multiple stakeholders was identified as critical to advance a medical nutrition education agenda. Given its leadership role in nutrition research and education, ASN was identified as the organization best positioned to coordinate activities to promote effective development and implementation of nutrition education in medical and allied health professional schools; and harmonize ongoing efforts to achieve the best possible outcomes. Recently, the ASN Board approved the establishment of a coordinating center to guide the nutrition education of healthcare professionals. A planning committee defined the effort’s scope, governance structure, and timeline and completed a gap analysis. This effort will focus on the following to impact medical nutrition education:

- **Coordination of Resources**: Collect, centralize, and distribute multi-disciplinary educational resources, credentialing resources and practice and reimbursement resources
- **Networking and Community Building**: Develop a repository of links/networks/contact information to organizations/schools/committees in order to increase the organization of already available educational data, educational materials, exam questions etc.
- **Confirmation of Objectives**: With stakeholders, define 1) provider competencies (specific tasks that involve knowledge, skills, and attitudes) for medical schools and 2) Entrustable Professional Activities (EPAs, tasks that define a profession) for residence programs.
- **Capacity Building**: Train “nutrition ambassadors” to conduct and consult on education programs for healthcare professionals within and outside of the US.
- **Research**: Identify and disseminate funding opportunities
- **Advocacy**: Advocacy for education, legislation, and/or research funding

Funding and partners are currently being sought to launch and administer this coordinating center through a public-private partnership platform.
Reference

Culinary medicine is an evidence-based field of medicine that combines nutrition science and culinary arts to create food that is delicious, promotes wellness, and prevents and treats disease. The field was created to address the missed opportunities presented by nutrition education at all levels of medical education and in medical practice. Current nutrition curricula are limited in time, scope, and content applicable to direct patient care. An additional barrier to adequate and effective nutrition education in medical school is that the majority of instruction occurs in the preclinical years, disconnected from active patient care. Moreover, the content is primarily comprised on topics, such as biochemistry, molecular biology, and micronutrient deficiencies, which are of little use when conducting dietary counseling with patients.

It is difficult to parse the limited nutrition offerings in most medical schools with data identifying diet as the single most significant risk factor for morbidity and mortality in the U.S. [1]. There has never been a more important time to equip physicians with the abilities to effectively evaluate, prevent, and treat food-related disease. Skills required to do this include taking a dietary history, assessing food access and cultural aspects of diet, motivational interviewing around making healthy dietary changes, and counseling on how to cook and eat healthy, delicious food that is accessible in terms of budget, time, skills, and other resources.

Culinary medicine is a hands-on, practical approach to nutrition education that brings students into the kitchen to learn how to prepare delicious, healthy food while simultaneously learning key nutrition lessons. It moves nutrition education away from a focus on nutrients towards a focus on food. This, in turn, aligns the healthcare professional’s approach to dietary counseling with the way that patients understand it best.
Table 1. Considerations in planning a culinary medicine course for healthcare professionals or trainees

**Teachers and Students**
- Who are the students? What level of medical training do they have?
- Who will teach the course (e.g., physician-chef, chef, dietitian, nutrition faculty, students, etc.)?

**Time and Duration**
- How much time is reasonable to expect from participants and what time(s) would be most convenient for them?
- What type(s) of class sessions will be held (e.g., demonstration, hands-on, online, lecture, direct patient care, etc.)?
- How long will class sessions be? (Hands-on cooking sessions are generally 1-1/2 hours or longer.)
- How many class sessions will be held? If more than one session, will they be condensed into a limited timeframe or organized into a longitudinal course?

**Curriculum and Content**
- Will a preexisting curriculum be used as is, modified for use, or will a new curriculum be created?
- How will the culinary medicine course be connected with the broader medical curriculum, if applicable?
- What dietary philosophy will be used? What are the nutrition science underpinnings of this?
- What supportive or preparatory materials will accompany the hands-on sessions? Will they be required before, after, or during the session?

**Course Credit**
- Will the class be for credit? What type of credit?
- What is the timeline and process for making credit available (e.g., listing in the course catalog or getting approval to offer CME, etc.)?

**Cost**
- Costs that may need to be planned to include space rental, groceries, equipment/supplies, instructor/assistant salary, cleaning staff, printing/administrative, and curriculum (if not creating your own).
- How will costs be covered (e.g., institutional support, grants, donations, fundraiser, charge a class fee, etc.)?

**Rules, Regulations, and Safety**
- Who will learn, explain, and enforce kitchen sanitation and safety rules?
- What health and fire codes must be adhered to and how does this impact what can be cooked?
- When will the course leader obtain Servsafe (or similar) certification to ensure sanitary cooking practices throughout the course?
- What is your plan if anyone gets hurt? Do you have a waiver of liability and emergency contact information from participants?
- Do you have a basic first aid kit for minor cuts and burns?
- Will class participants sign waivers so photos and videos from the course can be posted publicly for promotional purposes?
The first nutrition elective with a cooking focus held in a U.S. medical school was taught in 2003 at the State University of New York-Upstate campus [2]. However, culinary medicine courses started to become more widely available in the past five years, due largely to the opening of the Goldring Center for Culinary Medicine in 2013 at Tulane University School of Medicine. Tulane’s culinary medicine curriculum is the most widely used in medical education; to date, the program has been licensed to 39 medical schools across the U.S. [3, 4]. A separate, novel curriculum was developed in 2016 by the author and colleagues.
at Stanford University School of Medicine [5]. The course is taught as a quarter-long elective by physician-chefs using a blended classroom approach. Evaluation of knowledge, attitudes, and behaviors around cooking, eating, and patient dietary counseling have been compared between students and waitlisted controls. Preliminary data analysis showed significant improvements in numerous areas including basic cooking techniques, health eating behaviors, and confidence in planning balanced meals [5].

As the number of culinary medicine courses grows among medical education programs, so do the number of approaches to teaching the topic. Courses range in number of classes, placement in the larger medical school curriculum, and type of instructor. No single dietary philosophy is employed, and classes take place in settings ranging from pop-up conference room kitchens to dedicated teaching kitchens. This flexibility affords nearly any medical practice or educational setting the ability to provide some amount of culinary medicine content. Other important considerations when planning a culinary medicine course are shown in the Table 1. Beyond medical school, residency programs – primarily those focused on prevention and lifestyle medicine – are also beginning to add culinary medicine classes to their curricula. Culinary medicine continuing medical education opportunities have been available since the annual Healthy Kitchens, Healthy Lives conference began in 2007 in California. Additionally, some large healthcare systems offer physicians on-site culinary medicine courses, such as Kaiser Permanente’s Thrive Kitchen [3]. Finally, those seeking in-depth training can become certified in culinary medicine through programs like the Certified Culinary Medicine Specialist from Tulane or the Plant-based Nutrition Certificate from Cornell.

Culinary medicine makes nutrition education practical and directly applicable to the lives of both practitioners and patients. For these reasons, it has led to greater engagement in nutrition education by trainees and practicing clinicians alike. Given the increasing prevalence of diet-related diseases, demand for culinary medicine courses will likely continue to grow.

References


Integrating Nutrition Education into Clinical Practice

Helen K. Delichatsios and Anastassios G. Pittas

The physician-patient interaction is a prime opportunity for patients to appreciate the link between nutrition and health. Integrating nutrition education into clinical practice has challenges and opportunities, which can be considered from three distinct, yet overlapping perspectives: physician, patient, and self [1].

Even for physicians who understand the importance of nutrition and intent to practice nutrition education, there are numerous barriers including brief contact times, lack of financial incentives, competing demands, skepticism of the effectiveness of nutrition education, fear of offending patients, lack of a clear approach to nutritional counseling in clinical practice, and inadequate training, skills, and tools [2, 3]. These challenges and barriers can be addressed with tactics and tools that are simple, effective, affordable, and scalable, thereby making nutrition counseling feasible with only incremental burden in physicians’ time and energy.

Tactics for physicians include: (1) Assess BMI at every visit. A weight gain of one or two pounds per year is insignificant, but a trend can progress to a clinically significant weight gain over a decade. (2) Add obesity or overweight on the problem list alongside other chronic problems, such as hypertension and diabetes. This prompts the physician to think about and manage obesity/overweight as a separate condition. (3) Assess diet. This can be done in a time-efficient fashion by any dietary assessment method that is easy to administer and provides immediate feedback by identifying areas of improvement that address nutrition priorities [4]. (4) Acknowledge risk. Patients may not appreciate the risks, given the high prevalence of overweight and obesity in today’s world. (5) Be mindful of language. For example, say “a person with obesity” rather than “obese person.” (6) Write a prescription. Like other medical conditions (e.g., hypertension), prescriptions for dietary advice can be powerful, e.g., “cook once per weekend with your family.”

When trying to incorporate healthier eating habits into their lives, patients report many of the same barriers that physicians face when
counseling patients about nutrition – lack of time, competing demands, skepticism of the effectiveness of nutrition change, lack of a straightforward approach to following healthy nutrition at home or work, fear of offending family members, and inadequate skills and personal tools. A focus on psychology, technology, and team approach can pay dividends. Concepts such as mindless eating, decision fatigue, and food environment should be included in nutrition counseling. Digitally savvy patients can maintain healthy nutrition habits through numerous apps for tracking of behaviors and counseling. Any change requires persistence and can be more successful if a team is employed. Such a team includes the patient, his/her environment, other components of the healthcare team (e.g., dietician, counselors), and the physician serving as a pivot to leverage the expertise of other members of the team.

An approach to nutrition education that addresses challenges faced by both physicians and patients is a Culinary Shared Medical Appointment. Bringing a group of 8–10 patients together for a session lasting 90 minutes offers a more relaxed environment to discuss both medicine and nutrition, and offers an opportunity to engage in cooking of simple recipes, tasting, and eating together. Patients re-learn to enjoy food in the company of others and get reconditioned to associate healthy food with authentic pleasure: the pleasure of real food, enhanced by its visual, acoustic, tactile, and gustatory qualities.

Many physicians do not prioritize personal wellness and eating habits. Looking inward and taking care of themselves not only reduces the probability of burnout but also translates to providing better care for patients [4]. Healthcare professionals should take advantage of their influential role in promoting healthy nutrition. By understanding challenges faced both by physicians and patients, practicing physicians can use simple tactics to seamlessly integrate nutrition education in clinical practice.

Reference

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