ISSN: 2643-4512

Babyar. Int Arch Public Health Community Med 2019, 3:023
DOI: 10.23937/2643-4512/1710023
Volume 3 | Issue 1
Open Access

International Archives of
Public Health and Community Medicine

NARRATIVE REVIEW

Out of a Silo, Into Everyday Healthcare: Nutrition Inclusion in Medicine

Julie Babyar, RN MPH*

1239 Symphony Way, Vallejo, CA, USA

***Corresponding author:** *Julie Babyar, RN MPH, 1239 Symphony Way, Vallejo, CA 94591, USA*

Abstract

Background: Nutrition science is currently viewed as part of healthcare, in a separate silo Nutrition science is currently not fully integrated into medicine. Food safety, malnutrition, access and quality issues, chronic conditions and obesity are all components of nutritional health, nutritional health is not viewed as a specialty partner with everyday presence. Additionally, research on nutrition is unorganized and lacking.

Main body: Research and healthcare delivery of nutrition has the opportunity to transform. Global governance takes initiative on many access, safety and quality initiatives, and these can partner with medicine to deliver better health. Nutrition can become a part of everyday health assessments and conversations, allied health and nutritionists can become widely available in primary care and research can organize for basic, cellular and translational nutrition insight.

Conclusion: Medicine must bring nutrition science into scope, not just by way of clinician advisory but through true medical specialty inclusion. From the office to the bedside, from cellular to clinical research, nutrition science must become part of everyday medicine. Nutritional research must plan for the best designs in effort for optimal healthcare impact.

Keywords

Nutrition science, Nutritional health, Nutritional medicine, Nutrition research

Abbreviations

ASPEN: American Society for Parenteral and Enteral Nutrition; CDC: Centers for Disease Control and Prevention; ESPEN: European Society for Clinical Nutrition and Metabolism; FENS: Federation of European Nutrition Sciences; FANS: Federation of Asian Nutrition Sciences; GMOs: Genetically Modified Organisms; GEMS: Global Environment Monitoring System - Food Contamination Monitoring and Assessment Programme; IMMPaCt: International Micronutrient Malnutrition Prevention and Control Program; JECFA: Joint FAO/WHO Expert Committee on Food Additives; LC: Library of Congress; MENANA: Middle East and North Africa Nutrition Association; NAL: National Agricultural Library; NLM: National Library of Medicine; NCPM: Nutrition Care and Process Model; WHO: World Health Organization

Background

Nutrition is a critical element of health. Still, nutrition has yet to be fully understood, with broad definition and indeterminate science. A joint statement released by the National Agricultural Library (NAL), the National Library of Medicine (NLM) and the Library of Congress (LC) defines nutrition as "science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease, and the processes by which the organism ingests, absorbs, transports, utilizes and excretes food substances" [1]. However it is often the simplistic approach, beneficial to the body, in which nutrition is described. In example, the World Health Organization describes nutrition as the intake of food considered in relation to the body's dietary needs [2]. Thus, the holistic and comprehensive concept clarifies that nutrition is a science rooted in substance interaction with an expanded definition in health.

Focal points of nutritional issues vary by country, culture and need. Approaches to ensuring proper nutrition vary worldwide and are dependent on local priorities. In instance, the most recent Prevention Status Report for the United States, which summarizes lead health agencies such the CDC, US Surgeon General, Institute of Medicine and Community Preventive Services Task

Citation: Babyar J (2019) Out of a Silo, Into Everyday Healthcare: Nutrition Inclusion in Medicine. Int Arch Public Health Community Med 3:023. doi.org/10.23937/2643-4512/1710023

Accepted: June 10, 2019; **Published:** June 12, 2019

Force, highlights four major policy objectives the nation has as priorities: limiting less nutritious foods and beverages in schools, initiating standards for food and beverages sold on government property, including obesity prevention standards in state regulations of licensed childcare facilities and promoting evidence-based practices for breastfeeding support in health centers. Additional strategies include physical activity requirements in schools as well as retail food policies [3]. In contrast, many other countries place priorities such as access to food and malnourishment programs as priorities. In some low- and middle-income countries, many are undernourished. Community approaches may range from trade policies to food banking to postpartum nutrition education campaigns.

Despite local differences, all approaches view nutrition as a critical pathway to health and global agencies strive for comprehensive standardized guidance. This is true in global goals outlined by WHO, the United Nations (UN) and professional nutrition associations. In instance, the Nutrition Care and Process Model (NCPM) provide for global standards and was adopted by the Academy of Nutrition and Dietetics. NCPM is widely used to assist in assessment and interventions for individuals [4]. It is continuing to be proven that adhering to healthy eating benefits one's health, including lessening physical impairment [5].

Because nutrition is so expansive a science, it is seen as a separate industry to medicine. It is considered a science its own. It is structured, well researched and has a professional track complete with degrees as well as licensure for credentials. Professional registered dietitians may assist in healthcare, particularly for those with malnutrition or those at risk of poor nutrition. In the United States and many other industrialized nations, registered dietitians are licensed personnel. In contrast, other nutrition professionals do not have the same credentialing. Registered dietitians may or may not be aligned with one's medical home or primary care provider. There may be medical models that fund registered dieticians by health insurance, depending on primary care referral, but registered dietitians are not licensed to prescribe or care for individuals in nursing or physician scope of practice. Pathways to proper nutrition vary depending on the food issue and the population needs.

Nutrition is such a broad topic that the three main branches of libraries under the U.S. Library of Congress have published a table on how they collect and divide the subcategories of nutritional publications. These approaches are different, and the array of nutrition is vast. While each individual category in nutrition is specific, and many fall under different social and legal purview, one simple truth remains: all aspects of nutrition directly and urgently affect human health [1].

There is ample opportunity to shift concepts of nutrition to benefit human health. Nutrition science is currently a component of health and wellness yet not a component of medicine, particularly in Western medicine culture. A globalized harmony of approach can be realized with better science, evidence and acceptance. Research must be optimized and best designs must be planned for impactful nutritional health. There continues to be a significant amount unknown in nutrient science, despite technology and expertise available. Research must improve and nutrient understanding as well as the greater food science must be a priority.

Additionally, nutrition is both a separate scientific entity and a medical specialty, and this specialty must be formally recognized by medicine. Nutrition is uniquely broad, the science has a clinician foundation not rooted in physician charge and nutrition is a science that touches all medical components and specialties. Still, nutrition must be made a specialty that medicine sees as any other: equal in access, services, referral, physician input and clinical research. It must not only be seen as pharmacology, it must be seen as a medical specialty with general practice implications.

Creating a culture of nutrition as a component of medicine takes three major steps. First, it is crucial to acknowledge the current state and potential opportunities a culture change can bring to nutrition and medicine. Second, operational opportunities such as medical education, healthcare service delivery and inclusion need to be addressed because they are feasible. Finally, continuous ongoing evaluation of nutritional health are critical and must be driven by accountability and global expectation.

Main Body

Nutrition is strongly rooted in professional science and is often driven in conjunction with national associations. In the United States, the Academy of Nutrition and Dietetics, formerly the American Dietetic Association, provides comprehensive resource and policy analysis [6]. Mirroring organizations are found abroad, with the Federation of European Nutrition Sciences (FENS) [7] providing a unified voice for European organizations and the Federation of Asian Nutrition Sciences (FANS) [8] providing the same. Middle Eastern and North African countries have been associated with the The Middle East and North Africa Nutrition Association (MENANA) [9], African nutrition associations include the Nutrition Society based in South Africa [10] as well as the African Nutrition Society, an African country member organization [11].

Major nutritional topics regarding individual and population health include healthy weight, vitamin and essential nutrient intake, development, food intake alongside physical activity, prevention of chronic illness and impact of food safety. Some of these topics can be addressed with global inter-agency partners at the helm. Others are

best placed under the jurisdiction of medicine.

In example, access to quality food is an important nutritional concept and lead by several expert organizations. Food access and quality around access are generally part of nutrition conversation, a crucial aspect to public health and guided by international organizations such as the Food and Agriculture Organization (FAO) of the United Nations [12]. Access and quality of this access are continually evaluated with adjusted programs, including within organizations like the World Bank [13]. These inter-industry agencies provide a global effort, taking the responsibility of delivery of nutrition. Thus, healthcare can pivot focus as needed.

Food protection, securing and safeguarding the development, storage, processing and preparation of food is another major aspect of nutrition science. National agencies are often tasked with the responsibility of food safety. In the United States, jurisdiction over food safety, regulation and enforcement vary depending on type of food and supplier. The two primary U.S. food safety agencies are the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) [14]. International associations like the International Association for Food Protection (IAFP) assist in worldwide guidance [15]. Additionally, the FAO and WHO have a longstanding Food Standards Programme, driven primarily by the 170 country member alliance titled the Codex Alimentarius Commission (CAC). This Codex Alimentarius provides standards and guidelines to ensure that food is safe when traded [16].

The structure, organization and governance of global food and nutrition is structured by country and globally. Additionally, this governance is vertically, bidirectionally driven. There are multiple cornerstones of food health that are monitored, from labor in the agricultural fields to antibiotic resistance to food additives. Safety and inspections, regulations, pricing and impact on access are also a part of global consideration. In fact, food demand, commodities and pricing outlooks are reported by the United Nations in conjunction with the Organization for Economic Co-operation and Development (OECD) [17]. Finally, hunger, access, malnutrition and nutritional needs are also well studied and continuously scrutinized at multiple international agencies, including the WHO [2] and FAO [18].

With serious, ongoing energy provided to food and nutrition safety, access and quality assurance, the medical community must place trust in global partners. A primary means to this trust is through continued dialogue between medical professionals in clinical roles and medical professionals representing medicine at these agencies. Another primary means to trust, therefore, is for clinicians and scientists to be assured in these efforts in safety and quality. Once assured, medical professionals may feel more comfortable moving to clinical leadership for total nutrition incorporation in medicine.

Preventative, primary, secondary and tertiary care medicine all require nutritional attention, and this direct care is best managed by the medical and clinical community. More than 36.5% of U.S. adults and 17% of U.S. children are obese [19]. In comparison, 13% of the global adult population is obese, 39% of the global adult population is overweight and over 340 million children under the age of 19 are overweight or obese throughout the world [20]. Obesity has tripled since 1975 worldwide, and national and international efforts to combat this costly trend have been numerous. Obesity and overweight conditions contribute to cardiovascular disease, musculoskeletal problems, diabetes and cancer, among other negative health issues. The CDC has several resources for state and local stakeholders to utilize for healthy intake and eating, healthy exercise and weight management programs. Guidance for promoting healthy eating and exercise to combat obesity is found at almost every level and every department in the United States Health and Human Services, as well as in medical associations such as the American Medical Association (AMA) [21]. Programs, interventions and studies of obesity, health eating and physical exercise behaviors are found among a wide range of populations.

The CDC and WHO have dedicated resource to the science of nutritional requirements as best possible. Nutrients are classified in two subsects: macronutrients, essential for growth and development and required regularly, and micronutrients, needed in small amounts and essential for organs and cellular systems [22]. Micronutrient malnutrition is well recognized as a major nutritional concern worldwide, as a third of the world' population lacks sufficient intake of these micronutrients. The CDC currently works with global partners to assist in ensuring the public has adequate nutrient intake for nutrients such as iron, folate, iodine, vitamin A and zinc. WHO also has significant resource and focus on micronutrient malnutrition.

Programs and interventions are found throughout literature, though the CDC has a steady, sustained partnership for global micronutrient assistance in its International Micronutrient Malnutrition Prevention and Control (IMMPaCt) Program [23]. Development through proper nutrition also includes the promotion of breastfeeding, a public health nutritional priority. WHO, the CDC, almost every public health and pediatric practice promote breastfeeding and strive for best interventions to assure best breastfeeding outcomes. It is abundantly clear that the promotion of breastfeeding is a WHO and UNICEF goal [24]. Breastfeeding benefits, education and population interventions are widespread, with successes realized [25,26].

A primary focus of dietetic associations and clinical nutritional science collaboratives is the management of nutrition alongside clinical disease. The American Society for Parenteral and Enteral Nutrition (ASPEN) pro-

vides clinical nutritional guidance for adult and pediatric disease [27]. Similarly, the European Society for Clinical Nutrition and Metabolism (ESPEN) provides guidance and research scholarship for nutritional science in clinical medicine [28]. These agencies bring together research, awareness and policy advocacy to advance patient care through proper nutritional care.

Food safety includes the understanding of chemicals, additives, microbiological issues, technology and environmental impact. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) is the international body responsible for assuring food additives and contaminants are safe for human consumption. Only JECFA food additives can be traded, a formal regulation method. To date there is ongoing debate over many food additives and impact on health is just one area of concern. Food coloring additives have been studied for decades, with countries determining various levels of risk to childhood ADHD and thus various degrees of regulation [29]. Contaminants, pesticides and chemicals are assessed, monitored and reviewed by the agencies such as Global Environment Monitoring System - Food Contamination Monitoring and Assessment Programme, (GEMS) under WHO authority, as well as FAO under UN authority. These reviewers institute policies that are regulated in global food trade. Foodborne illness and safe handling of food is, as previously mentioned, a top priority internationally. Of significant interest is microbial change and emerging resistance in foodborne illness. Finally, food technology is of current debate under the food safety umbrella. Issues such as genetically modified food, genetically modified organisms (GMOs), cause public alarm and distrust. Lack of evidence for safety create hotly debated and often reactionary policies in regional areas [30]. Much can be improved upon in food safety, with evidence and research driving recommended change. Again, medical expertise has a seat at the food safety table, able to lead on issues such as foodborne illness, antimicrobial stewardship and chemical impact assessments. This reassurance to medicine is a calm hand, allowing clinical healthcare to focus on the direct body impact of nutrition science.

Current issues on global nutrition center on logistics, public policy, technological innovation and access. As previously mentioned, much of food safety is operational, and medicine must trust their representation to create the best partnerships possible. Therefore, turning attention on what medicine can control, change, and improve in nutrition for health means observing the two standard foci: nutritional health delivery and nutritional health research. In both these categories, medicine can no longer afford to silo nutrition as its own expertise, away from everyday medicine. Nutrition must be viewed as a specialty of medicine, to be included as any other specialty.

Finally, there is much unknown about nutrition and nutrient science. In discussing certain amino acids, research acknowledges that identity of this amino acid sensor remains unknown [31]. Adding to that, recent literature reviews in nutrient sensing report that science is only at the beginning stages of comprehension in nutrient sensing [22]. There have been major advances in genomics and nutrition, particularly on molecular levels. There is evidence that effects of diet and physical activity are influenced by epigenetics. In fact, nutrients may influence gene expressions. Studying these can be difficult, given the limitations in animal model applications to humans. Too, humans have more than 200 cell types with the same DNA but unique gene expression patterns. Epidemiology of population scale in nutrition often relies on poor data collection methods, such as surveys and recall. There have also been improvements in technology for protein science in nutrition, and technology seeks to focus on improved direct protein study. Metabolites are often studied in large data sets, and literature has called for better research in this field. Metabolics coupled with protein or transcriptomics analyses would be beneficial, as would a public database open to all. There are many unknown metabolics, and therefore many unknown signals that render data less meaningful. Nutrition and intestinal microbiota is also poorly understood. Additionally, the molecular mechanisms for nutritional regulation of gene expression in skeletal muscle is a continual challenge for researchers [32]. There is an overwhelming amount of nutrition science that we do not yet have evidence of, nor understand.

Nutrition and its components are often thought of similar to pharmacology, and rightfully so. Cellular and nutrient interactions should be studied, with future tailored approaches to the body. While the biological science can be viewed similar to pharmacology, the clinical, operational and trial design must understand nutrition as a unique medical specialty, not just a physical treatment. Additionally, nutritional science must and can be flexible for various cultures. In example, the Diabetes Nutritional Algorithm was recently adopted for Brazilian culture, providing structure, recommendations and clinical applicability [33]. Successes can be realized cross-culturally, with collaboration, time, resource and the right medical approach.

Inclusion of nutrition as a medical subspecialty is unique in that nutrition is also a general component to health. A nutritionist is often part of the team in some U.S. healthcare deliveries. However, the inclusion of nutritionists and registered dietitians are not always truly collaborative, particularly in primary care referral or in reimbursement. For example, it is accepted in medical research as well as in current care delivery for countries like the United States to include nutrition therapy for diabetics [34]. Yet the continued, standard medical assessment of nutrition before chronic conditions emerge remains elusive.

Medical and health researchers should agree on all aspects of nutrition, terminology and guidance. Nutrition science can gain traction in clear definition as a science fully involved in medicine, and as an accepted partner presence in academic medicine, specialty clinics and inpatient care. There is enough structure from local to international scholar, on all levels of food and nutrition science, to attain this clarity. The majority of food and nutrition science is well defined. Still, in health research there is often unnecessary grey areas that hinders nutrition science understanding, interpretation and threatens clinical and public health judgement. In example, major research on inadequate nutritional adherence of United States youth produced opportunities for clear and tailored interventions designed around specific ages. However, interpretations of this research and subsequent analysis must be done with the understanding that white potatoes were classified as a vegetable in the research data subset. French fries and hash browns must then be counted as a vegetable in research striving for comparison, threatening child and adolescent population nutrition strategies moving forward [35]. This research was reliant on secondary data. Had food and nutrition classifications been clear, automatic and strict in all forms of data collection, the journal would have been able to provide stronger comparative future design. Too, views on what constitutes healthy eating differ across cultures. Significant differences were noticed in American and Chinese counterparts, with Americans focused more on balanced diet and avoidances of certain foods while their Chinese counterparts detailed immunity, digestive health and timing of meals [36]. Nutrition science must be clearly defined in terminology for future research and practice.

Clinical trials for nutrition are often seen as difficult due to current research climate, and research design must be improved. While the randomized controlled trial continues to be a gold standard in design, it no longer remains uncontested as the perfect fit for science research. As such, limitations in nutrition trials must be addressed and designed for as best possible, without disregarding the research altogether. In example, it is often difficult to complete double blind clinical research in nutrition science. It is also difficult to obtain assured accuracy of intake when reliant on personal dietary journals and individual home records. This has become so apparent that some researchers have called for a complete paradigm shift in nutritional research. Memory based dietary assessment methods have been proven to be significantly unreliable, in that many dietary patterns go underreported, altering whole bodies of research and rendering other data completely unreliable [37]. Instead, limitations should be foreseen and avoided through design. Additionally, dietary scoring methods should be standard. A recent major literature review found that high quality, prudent dietary intake was associated with lower mortality in cancer survivors, and Western diets had the opposite effect. The scoring utilized in individual research reports varied widely in this review, however [38]. Scoring standards must be clearer and more standard for future confidence in interpretation. Finally, it is difficult to control for external and accompanied variables, such as other food intake and unknown interactions around this intake. These limitations should be planned for using expert templates, toolkits, and biological technology, which is another benefit of nutrition as an onsite medical specialty.

Of critical importance is the improvement on nutritional research through eliminating unknowns. It has been noted that a challenge in understanding molecular mechanisms includes how they influence peripheral signaling to control mental processes [39]. All aspects of nutritional science at the cellular and molecular level can be improved upon, and much is unknown about nutritional effects on gene expression [32] as well as the effect of food on the brain and on cognition [39]. Providing better tools and technology for human application, instead of relying on animal models, will assist. Additionally, application of research in multiple cultures and multiple diets can only strengthen understanding. Unknown metabolites should be accounted for through publicly available, open data and research. Open data is recommended in literature review as well [32].

Finally, much of nutritional interventions are resource intensive and focused on supplying adequate intake. Indeed, breastfeeding is a prime example. Human milk is widely regarded as the best option and most nutritious for newborns and infants [40]. Breastfeeding campaigns, education and interventions are rightfully a public health priority, worldwide. Still, science should focus on understanding the biologic and cellular reasons for this optimal formula, in spirit of knowledge and logic of human need. A recent report on milk oligosaccharides discussed the difficulty in studying biosynthetic pathways as well as uniqueness to humans, a challenge to animal model studies. The authors detailed the importance of understanding human milk oligosaccharides (HMOs), especially as they are not found in infant formula [41]. Bonding and maternal-newborn emotional effects aside, the full scope of human milk superiority should be understood through nutrition science.

Energy expenditure has been recommended as a basis for all food energy requirement assessments, yet energy expenditure is rarely considered in research. Because data and research conclusions do not often consider energy individually, interpretation for clinicians is general instead of tailored. Nutrition as an onsite medical specialty provides for continued individual and tailored culture. Additionally, if primary care physicians or specialists account for energy expenditure at all medical visits, the discussion not only allows for full medical intervention. The discussion opens the door for healthy weight and lifestyle at every medical visit, creating a culture of ex-

pectation. Like a temperature or blood pressure check, energy expenditure and nutritional health should be assessed as part of the medical visit. This concept is true for both preventative, primary medicine and clinical disease management. While current climates provide for registered dietician counseling in some instances, nutrition should be wholly integrated as expected conversations at medical visits. This can only be accomplished when nutritional health is pulled out of the science silo and into the medical home.

Low- and middle-income countries are facing significant challenges with change in dietary habits. As such, chronic conditions must be at the forefront of surveillance, research and health communication. Correlations and links between nutrition and cancer continue to be monitored in high income countries. In effort to expand research, address dietary changes immediately and plan for long term population health in low- and middle-income countries, recommendations in literature are detailed. The majority of these recommendations are tailored to medical and clinical research that must be under the responsibility of licensed medical professionals. In example, bioinformatics, genome studies, laboratory build out and biological sampling are all technologically driven [42], and all require oversight from medical professionals. These countries can benefit from researcher clinician partnerships, particularly in local, remote health facilities.

Socioeconomic issues are often a concern in medical home discussions, as there may not be a clear solution for adequate health resource. A nutritional specialty in medical homes provides for expertise not only in biological processes but will become well versed with social concerns that arise. Food insecurity, known to contribute to poor diet quality and increased chronic disease risk [43], can be discovered, discussed and problem solved as part of health prevention.

Malnutrition risks many health issues, including stunting in children. Stunting and development issues have been widely studied and continue to remain a research priority, rightfully. Because stunting has been reported in 26% of under 5-year-old children in low and middle income countries [44], ongoing evaluation and improvements to interventions will continue. As this research continues, global academic medical partners and laboratories could and should assist in biological understanding, while simultaneously providing structure, economic and social response from their institutions. It is important to acknowledge that environmental enrichment can help in catch up and significant development achievements in stunted populations [44], but it is also crucial to understand if biological interventions can be included in future potential strategies.

Ongoing evaluation of the priorities in biological, cellular and molecular nutritional science should include global evaluation of publicly open access data, ongoing assessments on applicability of current research and proactive design that avoids limitations and addresses shortcomings in advance. National and international partners can assist and research must be held accountable, as well as afforded adequate resources, to provide quality information. Ongoing, long term evaluation by clinical researchers may provide stronger foundation in medical homes, early diagnosis and intervention for medical conditions as well as crucial well child follow up. Thus, ethical clinical research presence may provide for several global health goals in a region.

Interventions in healthy eating, exercise and nutrition are abundant and often found in pockets. If evaluation is undertaken, and it should always be undertaken, then movement forward must be anticipated. Nutritional interventions can be scaled, and recent journals address the importance of scaling nutritional development as well as policy and leadership in nutrition, There are so many interventions that can be scaled and maximized, given the right circumstances, and critical elements such as goals, barriers, actions, context, capacity, governance, processes of monitoring and learning are all aspects identified in scaling up. Instead of continued indecision and rework, it is vital to take some of the decades of interventions and move to scale up [45].

Quality of life must be addressed as part of nutrition research. In a recent large quality of life study from France, several aspects of nutrition, adherence to guidelines and physical activity incorporation were evaluated, with mixed results on quality of life changes [46]. The consideration of quality of life is crucial to nutrition health and medical research, including when research seeks to identify physical and biological outcomes.

Additionally, the elimination of confusing and contradicting recommendations must be priority, It becomes fatiguing to the public, as well as to general clinicians, to consume and process changing nutritional advice based on weak evidence. Too, it has been reported that epidemiologically significant studies of potential nutritional impact differ greatly from outcomes of nutritional intervention studies. This continued issue is wasteful to research and health interventions, globally. It is also disheartening to scientists and causes doubt among the public. If science cannot account for individuality in nutrition, nor remedy the major discrepancy in nutritional epidemiology and intervention outcomes, the argument in behavior change is weakened. Viewing nutrition as a medical specialty would improve individuality, as well as provide for potential physician identified remedies in epidemiological issues.

Ongoing evaluation of nutritional research impact should be measured using standard impact scores that are initiated as soon as possible. Impact scoring becomes an easier feat with comprehensive warehouses of data. The Academy of Nutrition and Dietetics has a warehouse of nutritional academic journals and re-

search. Impact scoring could and should include stronger metrics. Once the inclusion of nutrition as a medical specialty becomes standard, evaluation of research for both service delivery and biological, cellular discovery could be completed through impact score analyses. Additionally, patient outcomes, chronic disease epidemiology and clinician response surveys can assist in fine tuning nutrition integration in medicine. Research methodology must be tightened, consistent and firm, from basic cellular and molecular technology to energy expenditure recommendations. As an example, much nutrition science calculates energy expenditure with indirect calorimetry, despite indirect calorimetry relying on assumption instead of tested proof [32]. Scoring of evidence should be created in conjunction with experts already providing guidance, such as ASPEN and ESPEN.

Recommendations must also be continually evaluated by expert associations and third party analysis for evidence, logic and consistency. Again, it is prudent and conscientious of science to move forward, even in human milk analytics. One may argue for behavioral intervention in breastfeeding, however one should understand that the limitations some mothers have with breastfeeding (ability, time, socioeconomic interplay) should not create an inferior nutritional outcome. A component of ongoing evaluation includes the internal acceptance of biomedical science improvement priorities alongside health behavior interventions. Research and nutrition science must get better, and by doing so will create a better future for all. This can and should be done with major change in medical provider specialty science.

Conclusion

Nutrition science continues to evolve and shape healthcare delivery. Countries vary in delivery methods for nutritional health, depending on resources available, current priorities and cultural norms. Global governance, however, has determined and summarized comprehensive food and nutritional goals for the public. In effort to achieve these goals, it is crucial for the medical community to have a voice at the table of many food topics. It is also crucial that the medical community allow inter-agency governance to lead efforts in some of the food subcategories. This move provides the medical community freedom to reshape and realign nutritional health in medicine.

Nutritional health is provided through intake, just as pharmaceutical science does. However, nutritional health is not an added science, it is a natural component of human bodies and wellbeing. As such, nutrition science must be a specialty in medicine, viewed as an equal in medicine and taught just as any other component is. Nutrition science must also be designed in like manner, with standard, accessible presence in medical offices, hospitals and specialty care.

By addressing the current state and potential operations opportunities in medicine, medical education, health service delivery, this culture shift will begin to transform the landscape. Revising and planning for best research design will also assist in optimal nutritional medicine. Of critical importance is emphasis on the unknowns in biological nutritional research, and these unknowns should be of priority to the science. Through continuous, ongoing evaluation of nutrition healthcare in medicine, this shift will shape to lasting, sustained new medicine. The power of medicine as a leader prevails, through regulatory, delivery, policy and economic. This power must include nutrition science as a specialty within the medical group, so that the global public finally realizes the potential of nutrition in health.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

The author consents to publication of this article.

Availability of data and material

There is no original data to aggregate or report.

Competing interests

There are no competing interests to declare.

Funding

There are no funding contributions to declare.

Authors' contributions

The author is the sole author of this manuscript.

Compliance with Ethical Standards

There are no funding sources to name and no conflicts of interest to declare. There was no direct research applicable and thus no informed consent to be obtained.

References

1. U.S. National Library of Medicine (1998) Joint Collection Development Policy: Human Nutrition and Food.
2. World Health Organization (2017) Nutrition.
3. Centers for Disease Control and Prevention (2016) Nutrition, Physical Activity, and Obesity: Prevention status report.
4. Academy of Nutrition (2008) Practice Applications, Nutrition Care Process and Model Part I: The 2008 Update.
5. Hagan KA, Chiuve SE, Stampfer MJ, Katz JN, Grodstein F (2016) Greater adherence to the alternative healthy eating index is associated with lower incidence of physical function impairment in the nurses' health study. J Nutr 146: 1341-1347.
6. https://www.eatright.org/.
7. European Nutrition Societies (2016) Federation of European Nutrition Societies.
8. Federation of Asian (2017) Federation of Asian Nutrition

Sciences Executive Council.

9. (2012) The Middle East and North Africa Nutrition Association (MENANA).
10. The Nutrition Society of South Africa (2017) The Nutrition Society of South Africa.
11. African Nutrition Society (2017) African Nutrition Society.
12. (2017) The Food and Agriculture Organization of the United Nations.
13. World Bank Group (2017) Food Security.
14. Administration FAD (2017) Investigations Operations Manual.
15. IAFP (2017) The International Association for Food Protection.
16. http://www.fao.org/fao-who-codexalimentarius/en/.
17. OECD, FAO (2017) OECD-FAO Agricultural Outlook 2017-2026. OECD Publishing.
18. The Food and Agriculture Organization of the United Nations (2017) Themes.
19. Centers for Disease Control and Prevention (2017) Overweight and Obesity.
20. World Health Organization (2017) Obesity and Overweight.
21. American Medical Association (2017) AMA adopts policy to help physicians, students prevent, manage obesity.
22. Miyamoto T, Wright G, Amrein H (2013) Nutrient sensors. Current Biology 23: 369-373.
23. Centers for Disease Control and Prevention (2017) International Micronutrient Malnutrition Prevention and Control (IMMPaCt).
24. World Health Organization (2017) Exclusive breastfeeding.
25. Haroon S, Das JK, Salam RA, Imdad A, Bhutta ZA (2013) Breastfeeding promotion interventions and breastfeeding practices: A systematic review. BMC Public Health 13: S20.
26. Sankar MJ, Sinha B, Chowdhury R, Bhandari N, Taneja S, et al. (2015) Optimal breastfeeding practices and infant and child mortality: A systematic review and meta-analysis. Acta Paediatrica 104: 3-13.
27. American Society for Parenteral and Enteral Nutrition (ASPEN) (2018) Clinical Guidelines.
28. The European Society for Clinical Nutrition and Metabolism (ESPEN) (2018) Scientific Activities.
29. Arnold LE, Lofthouse N, Hurt E (2012) Artificial food colors and attention-deficit/hyperactivity symptoms: Conclusions to dye for. Neurotherapeutics 9: 599-609.
30. Bawa AS, Anilakumar KR (2013) Genetically modified foods: Safety, risks and public concerns-a review. J Food Sci Technol 50: 1035-1046.
31. Chantranupong L, Wolfson RL, Sabatini DM (2015) Nutrient-sensing mechanisms across evolution. Cell 161: 67-83.
32. Norheim F, Gjelstad IMF, Hjorth M, Vinknes KJ, Langleite TM, et al. (2012) Molecular nutrition research: The modern way of performing nutritional science. Nutrients 4: 1898-1944.
33. Moura F, Salles J, Hamdy O, Coutinho W, Baptista DR, et al. (2015) Transcultural diabetes nutrition algorithm: Brazilian application. Nutrients 7: 7358-7380.
34. Franz MJ (2016) Diabetes Nutrition Therapy: Effectiveness, macronutrients, eating patterns and weight management. Am J Med Sci 351: 374-379.
35. Banfield EC, Liu Y, Davis JS, Chang S, Frazier-Wood AC (2016) Poor adherence to US dietary guidelines for children and adolescents in the national health and nutrition examination survey population. J Acad Nutr Diet 116: 21-27.
36. Banna JC, Gilliland B, Keefe M, Zheng D (2016) Cross-cultural comparison of perspectives on healthy eating among Chinese and American undergraduate students. BMC Public Health 16: 1015.
37. Archer E, Pavela G, Lavie CJ (2015) The inadmissibility of what we eat in America and NHANES dietary data in nutrition and obesity research and the scientific formulation of National Dietary Guidelines. Mayo Clinic Proceedings. Mayo Clinic 90: 911-926.
38. Schwedhelm C, Boeing H, Hoffmann G, Aleksandrova K, Schwingshackl L (2016) Effect of diet on mortality and cancer recurrence among cancer survivors: A systematic review and meta-analysis of cohort studies. Nutr Rev 74: 737-748.
39. Gómez-Pinilla F (2008) Brain foods: The effects of nutrients on brain function. Nat Rev Neurosci 9: 568-578.
40. Jeurink PV, van Bergenhenegouwen J, Jiménez E, Knippels LMJ, Fernández L, et al. (2013) Human milk: A source of more life than we imagine. Benef Microbes 4: 17-30.
41. Bode L (2006) Recent Advances on Structure, Metabolism, and Function of Human Milk Oligosaccharides. J Nutr 136: 2127-2130.
42. Romieu I, Margetts B, Barquera S, Gomes F da S, Gunter M, et al. (2016) Strengthening the evidence base for nutrition and cancer in low and middle income countries. J Glob Health 6: 020306.
43. Leung CW, Epel ES, Ritchie LD, Crawford PB, Laraia BA (2014) Food insecurity is inversely associated with diet quality of lower-income adults. J Acad Nutr Diet 114: 1943-1953.
44. Black MM, Pérez-Escamilla R, Rao SF (2015) Integrating nutrition and child development interventions: Scientific basis, evidence of impact, and implementation considerations. Advances in Nutrition 6: 852-859.
45. Gillespie S, Menon P, Kennedy AL (2015) Scaling up impact on nutrition: What will it take? Advances in Nutrition 6: 440-451.
46. Germain L, Latarche C, Kesse-Guyot E, Galan P, Hercberg S, et al. (2013) Does compliance with nutrition guidelines lead to healthy aging? A quality-of-life approach. Journal of the Academy of Nutrition and Dietetics 113: 228-240.