# Integrating Nutrition into Medical Education in Saudi Arabia: A Narrative Review of Global Practices and Local Perspectives

**Sabah Saad Almaqbel[1] Zaid Hobailan Alsharary[2] Abdulaziz Zaidalhumaidan[3]arwa Abdulkarim Alhumeid[4] Meshal Mansour Mohammed Alqutaim[5] Abdarhman Abdulah Nasir Aldosary[6] Nadia Abduallah Asiri[7] Tahani Mohammed Almijher[8]**

[1.] Dietitian, Al Rabie Health Center, Riyadh

[2.] Nutrition Services Specialist,King Fahad medical city,Riyadh

[3.] Nutrition Services Specialist, King Fahad medical city,Riyadh

[4.] Nutritionist, Ministry of Health, Riyadh

[5.] Nutritionist, Wadi Al Dawasir General Hospital, Riyadh

[6.] Nutritionist,Wadi Al Dawasir General Hospital, Riyadh

[7.] Nutritionist, Ministry of Health, Riyadh

[8.] Dietitian,Ministry of Health, Riyadh

***Abstract*:** Integrating nutrition into medical education is critical for addressing the rising prevalence of non-communicable diseases (NCDs) and improving healthcare outcomes. This narrative review examines global practices and local perspectives in Saudi Arabia, emphasizing the gaps in nutrition education, barriers to integration, and strategies for reform. The study highlights the need for culturally sensitive approaches, faculty development, and resource allocation to overcome challenges in embedding nutrition in medical curricula. It also explores practical recommendations and successful international experiences to guide the development of nutrition education frameworks aligned with Saudi Vision 2030. The findings underscore the importance of interdisciplinary collaboration and continuous evaluation to enhance nutrition competencies among healthcare professionals.

***Keywords*:** Nutrition education, medical curriculum, Saudi Arabia, cultural dietary habits, healthcare training, curricular reforms, medical gastronomy, health promotion, non-communicable diseases (NCDs).

## 1. Introduction

Integrating nutrition into medical education is presently gaining international recognition as a crucial element in healthcare and patient well-being. Substantial evidence supports the urgency to equip future physicians with the knowledge and skills relevant to nutrition, as it significantly influences healthcare outcomes. This rationale underscores global and local practices for medical training in nutrition. In Saudi Arabia, pertinent evidence has come to support better recognition for the diversely growing field of nutrition. (Macaninch et al.2020)(Havercamp et al.2021)

It is essential to integrate nutrition into medical education owing to the recognition of nutrition as a pillar under the umbrella of healthcare. Nutrition is playing a growing role in health-seeking behavior in what is currently addressed as sociocultural medicine, rather than the exclusive absence of diseases. This narrative review aims to explore global practices in the integration of nutrition in the medical curriculum and provide local perspectives pertinent to Saudi Arabia and the Middle East. Evidence shows a gap exists in nutrition knowledge among health professionals across various fields. This gap can potentially impact patient care disproportionately due to a half-hearted approach that arises from the prioritization of curative and management outcomes. There is also growing evidence supporting the need for nutrition education tools to be integrated into medical curricula. (Ugai et al.2022)(Marshall et al.2022)

## 2. Importance of Nutrition Education in Medical Curriculum

In recent years, many organizations have highlighted the need to incorporate more nutrition

into the curricula of medical school programs, particularly in relation to patient care. This follows decades of evidence that demonstrates the positive impact of nutrition education on health professional practice and the potential of using nutrition in chronic disease care to improve patient and system outcomes. A growing body of research supports the incorporation of basic nutrition education and skills training into medical and healthcare provider curricula, helping medical students and practicing health professionals to better attend to their patients' needs. (Martin et al.2020)(Jones et al.2023)(Bassin et al., 2020)(Newman et al., 2023)(Eisenberg et al.2024)

Despite growing evidence and support for nutrition as part of basic healthcare, it has become clear that many medical students leave medical school unequipped to address or care for the nutritional needs of their patients, regardless of the direction their careers take. Nutrition-focused educational endeavors can enhance the nutritional practices of healthcare professionals and, in the longer term, improve public health. Consequently, many medical education authorities recommend that medical students and healthcare professionals get a baseline competency in nutrition. Prior studies have also shown that nutrition education can translate student learning into clinical practice and influence practitioner behavior. As each system is unique, authorities have recommended that each nation create its multi-disciplinary nutrition education plan for healthcare professionals. These shortcomings have clear consequences for public health and healthcare system efficiency. Additionally, medical school graduates who feel poorly prepared by their schools to use and understand nutrition are less likely to feel ready for their jobs. Overall, many health professionals find their nutrition skills inadequate to provide care. (Lufler& McNulty, 2022)(Kelley, 2024)(Kruger et al.2024)(Tait et al.2023)(Wilson et al.2021)

To better integrate nutrition education, Saudi medical schools can implement hands-on workshops and interdisciplinary collaborations with registered dietitians. A 2023 survey indicated only 15% of medical students felt confident addressing dietary concerns during consultations, highlighting the need for practical training tools and case-based learning to improve competency.

(References: Macaninch et al., 2020; Jones et al., 2023)

### 2.1. Global Trends and Recommendations

Medical education is undergoing a process of reform to adapt it to the 21st century, referring to the role of doctors in promoting and preventing future health. This has generated a growing international movement to incorporate nutrition as part of competencies and content in the medical curriculum. There are many global recommendations for the integration of nutrition as part of medical studies. Health and academic organizations have published different recommendations to be adopted by medical faculties regarding the roles and competencies for MDs in nutrition. A set of directives to implement nutrition education for students in the health sciences, including medical and nursing students, is being followed up on. The consensus paper explains why, when, where, and how nutrition should be incorporated into the curricula of undergraduate medical and nursing programs. (Clinton et al., 2020)(Health Organization, 2020)

Different efforts of individual countries in reforming medical education in favor of better nutrition knowledge and skills are carried out and summarized below. Member states recognize nutrition as a key driver of sustainable development and watch how much the compliance with the program achieves the goals on Medical Education through collaborative processes. The framework acknowledges that connected actions, involving medical associations, regulators, quality assurance bodies, and other stakeholders, are critical if evaluation efforts are to have a lasting impact. The international trend in the medical education landscape is increasingly evident as it has changed evidence-based medicine to include nutritional knowledge. Some of the progressive countries educate doctors to a level where graduates are able to apply therapeutic nutrition. The integration of nutrition as part of each module of the basic cycle of studies has significant social importance, prerequisites for leading local practice in health from a global perspective. It is expected that experts from abroad will contribute to improving the texts and thus finalizing our local opinion. (Lepre et al., 2021)(Vrkatić et al., 2022)(Lepre et al.2021)(Auld et al.2020)

### 2.2. Impact of Nutrition Education on Healthcare Outcomes

Nutrition is a major driver of non-communicable disease burden, and a significant percentage of all deaths globally are related to diet quality. Despite this prevalence, only a portion of medical schools report having the recommended curricular time commitment to nutrition in their medical programs. In this section, we briefly examine the evidence of the effect that prolonged nutrition education or dedicated preventive medicine consults have on healthcare outcomes at large. Undoubtedly, long-term integrative practices can take years to catalyze healthcare system change, and thus take years to sufficiently address nutrition education in medical programs. A review of current practices found that the knowledge and practicalities of nutrition used by healthcare professionals can contribute significantly to improving patient care in clinical healthcare management. Many qualitative and survey studies, which span various age groups and medical conditions, report that patients generally desire nutrition advice. This has been best highlighted in people with chronic diseases, as many of them have reported they believe that dietary fat intake is a major contributor to the progression of their condition. As thorough dietary assessments are resource-intensive, a common question has been asked: could the additional practice and knowledge surrounding dietetics bring a great benefit in medical consults? In fact, patients who receive a dietetic referral are more likely to adhere to and obtain greater clinical benefit from the dietary advice given in various clinics. Beyond functional foods, food supplementation can significantly enhance medical treatments in smoker populations and chronic disease. In oncological patients, for instance, patients receiving dietary counseling and fortification have a better quality of life. Other clinical insights were gained in a study using cachexia patients, in which cancer cachexia patients have an over-prevalence of cachexia and class 2 sarcopenia. These individuals have a significantly increased 6-month mortality; without the appropriate nutrition counseling and care, outcomes are unfavorable. Another patient case report has revealed that a person with an inherited condition has better managed cyst growth when the genetic factors and detailed dietetic management are analyzed by a multidisciplinary team including dietetics. (Omotayo et al.2024)(Gebremedhin & Bekele, 2021)(Peng et al.2024)(Grosso & Di Cesare, 2021) (Grosso & Di Cesare, 2021)

## 3. Current Status of Nutrition Education in Saudi Medical Schools

Nutrition plays an effective role in the prevention and management of common and epidemic noncommunicable diseases (NCDs). The median number of teaching hours allocated to nutrition education during the undergraduate medical course was 23, which is far from the set recommendations for nutrition competencies. Full integration defines a curriculum in which nutrition is embedded in the teaching activities throughout the whole course. Integration according to Spearman's coefficient was very weak in three teaching places of the western region: Prince Sultan Armed Forces Hospital, Prince Mohammed Bin Abdulaziz Hospital in Al-Madina City, and King Abdul-Aziz University Hospital in Jeddah City. There was also weak integration in the eastern region at Imam Abdulrahman Bin Faisal University in Dammam City and King Fahad University of Petroleum and Minerals in Dhahran. King Abdul-Aziz University Hospital had the highest representation ratio with a value of 9.09%, while Prince Sultan Armed Forces Hospital had the lowest at 1.22%. When analyzing the responses based on the different specialties of the questionnaires, only the OB-GYN specialists discussed nutrition issues in their workplace with most patients during the consultation. (Cotton et al., 2020)(Effendy et al.2020)(Davis et al.2021)(Abu-Baker et al., 2021)

Although there are national educational plans, most Saudi medical schools have no unified framework as a general reference. The need for nutrition education in medical training is self-evident given the current high prevalence of NCDs and clinical disorders in the Saudi community. Our previous investigation showed the inadequacy of physicians in their knowledge and communication competence in the prevention and management of common NCDs. A more structured curriculum plan and course material might increase the effectiveness of nutrition education and allow its benefits to reach the majority of graduates with sufficient competencies to respond to the actual community health needs. This might reflect a qualitative improvement in the outcomes and benefits of education, which warrants the inclusion of a more detailed course evaluation. Treating nutrition in a

systematic and graded manner and quantifying a representative output of nutrition content in the undergraduate medical curriculum are vital to highlight and accurately critique the current situation.

**4. Barriers and Challenges in Implementing Nutrition Education in Saudi Medical Curriculum** Despite existing national strategies, cultural dietary habits and misconceptions remain a barrier. For instance, traditional Saudi meals often emphasize rice and protein but may lack balanced micronutrient profiles. Educational interventions tailored to local dietary preferences and supported by culturally relevant materials can address these gaps effectively.(Macaninch et al., 2020; Alfheeaid, 2023)

The current medical education system creates several barriers that must be addressed to successfully integrate nutrition into the curriculum. First, cultural and dietary differences may shape the need and urgency of learning nutrition from the perception of students and faculty members. The traditional Saudi diet is based on fruits, vegetables, rice, and protein, unlike Western diets. Healthcare providers educated at Western schools may not understand the Saudi way of thinking but still feel the need for nutrition education, considering the increased rates of overweight and obesity. Second, faculty members and educators are currently not delivering nutrition education due to their own lack of training, expertise, and confidence in this area; overcoming this will require recruitment of skilled teachers or operationalized training for current staff. For those who advocate for a better focus on nutrition, there are potential barriers to dedicated time, funding for meals, and cost-effectiveness for the time spent. (Mariod et al.2024)(Ashraf &Alanezi, 2022)(Bawazeer et al.2021)(Alfheeaid2023)(Al-Mssallem et al.2024)

It is unclear whether nutrition education during medical school will reappear in licensing examination questions or clinical skills examinations or how it will practically translate into medical education. Medical education poses challenges due to funding and stringency of accreditation regulations. Nutrition education is currently not considered a priority due to a lack of patient demand for healthcare providers. To facilitate success across this continuum of care, the framework expands nutrition assistant health awareness of the diversity among healthcare providers in the use of nutrition services. Educational leaders at all medical schools in the region should act with urgency to break down these barriers. Every realistic effort should be made to integrate nutrition education at all levels of healthcare practice. (Jones et al.2023)(Macaninch et al.2020)(Brunner et al.2023)

### 4.1. Cultural and Dietary Differences

Saudi Arabia's diverse regional and ethnic dietary habits, shaped by religious and historical beliefs, highlight the need for culturally sensitive approaches to nutrition education. However, national nutritional guidelines often fail to account for cultural preferences, leading to negative attitudes among students and limited effectiveness in addressing community health needs (Macaninch et al., 2020; Hampshire et al., 2022; Davis et al., 2021).

Culturally customized nutrition education has proven more effective than universal approaches in various contexts. For example, tailoring nutrition therapy to local dietary habits can improve health outcomes, as evidenced by successes in culturally sensitive programs in South Africa and the United States. Conventional dietary guidelines, which ignore cultural and social variations, often lack practical relevance. Incorporating courses like medical gastronomy, which link dietary practices to behavior and lifestyle, could enhance nutrition education and care quality (Olinder et al., 2022; Cardenas et al., 2022; Cohen et al., 2021; Garcia, 2024).4.2. Faculty Training and Expertise

Nutrition educators in medical schools in Saudi Arabia emphasized the importance of faculty who can effectively teach nutrition and advocate for it. However, having research expertise or enthusiasm is not enough to develop an effective curriculum for medical students. Professors lack the essential skills and knowledge needed to develop an integrated nutrition program for medical colleges. Nutrition educators stressed the current inability of faculty to integrate nutrition into the medical curriculum and were overwhelmed by the amount of up-to-date knowledge required. Piloting faculty use by assessing multiple choices for the exam has shown this shortfall. The dissimilarity in exam outcomes suggests that teachers also believe they

are sharing basic knowledge with students. Medical educators are not adequately rewarded and lack continuing professional development, so the other side of this spiral is attrition and difficulty in recruiting full-time or part-time educators. Faculty resources to prepare, deliver, and evaluate effective nutrition education are also lacking, which is likely to be reflected in student learning. (Rivera et al.2020)(Griffin et al.2024)(Lee and Perret2022)

### 4.3. Resource Allocation

#### Faculty Limitations and Resource Constraints

Faculty shortages and limited expertise remain critical barriers to integrating nutrition education into medical curricula. Faculty members often lack the time or enthusiasm to develop up-to-date nutrition content, further impeding progress (Lewis et al., 2020; Beinert et al., 2021; Raikar et al., 2020).

#### Budget Constraints and Prioritization

Budget constraints in medical schools frequently prioritize core subjects over nutrition, limiting access to resources such as textbooks and practical infrastructure. This issue is compounded by the high cost of providing nutrition education that incorporates real food (Ngwenya, 2020; Akala, 2021).

#### Collaborative Efforts and Policy Interventions

Collaborative initiatives between healthcare organizations and educational institutions can address resource gaps. For example, policy interventions aimed at recruiting more dietitians and nutrition scientists have shown potential in expanding the nutrition workforce, though systemic resistance to change persists (Kaimara et al., 2021; Xie et al., 2020).

## 5. Strategies for Successful Integration of Nutrition Education in Saudi Medical Schools

The allocation of resources for nutrition education in medical schools faces significant challenges. Faculty shortages and limited expertise hinder curriculum development and the delivery of up-to-date content (Lewis et al., 2020; Beinert et al., 2021). Budget constraints exacerbate the issue, with schools prioritizing core subjects over nutrition and struggling to provide essential materials such as textbooks, technology, and practical learning spaces (Ngwenya, 2020; Akala, 2021). Collaborative efforts with healthcare organizations and policy-driven recruitment of nutrition professionals, such as dietitians and food scientists, are necessary to strengthen the workforce and address resource gaps. However, systemic resistance to change remains a persistent barrier, even in countries with successful initiatives (Kaimara et al., 2021; Xie et al., 2020).

### 5.1. Curricular Reforms and Innovations

To effectively integrate nutrition education into medical curricula, Saudi medical schools require comprehensive reforms aligned with global trends and local needs. Current curricula often rely on fragmented teaching methods, limiting students' ability to apply nutrition knowledge in clinical contexts. A unified, interdisciplinary approach emphasizing evidence-based practices and contemporary nutritional science tailored to Saudi Arabia is essential (Alsofayan et al., 2021; Alhur, 2024).

Active learning methods, such as case-based learning, role-playing, and collaboration with nutrition organizations, can enhance student engagement and bridge theoretical and practical applications. Feedback from stakeholders, including students and clinicians, is crucial to ensure relevance. For example, King Abdulaziz University students reported that community health promotion activities improved their understanding of local dietary challenges. Regular assessments, including competency-based evaluations, are necessary to measure the effectiveness of reforms (Allmnakrah& Evers, 2020; Quamar, 2020). Aligning these innovations with Vision 2030’s goals highlights their importance in improving public health and reducing the burden of non-communicable diseases.

### 5.2. Collaborations with Nutrition Experts and Organizations

The impact of well-maintained partnerships with a broader community of nutrition experts is considered essential in furthering the development of nutrition education in Saudi medical schools. These experts could include, but are not limited to, registered dietitians or nutritionists who have the ability and time to share their field expertise, skills, valuable resources, practical experiences, or sites. These collaborations with dietitians could provide medical schools, faculty, and students with

opportunities for direct, interactive, and sustained relationships. These organizations may also be able to provide students and trainees with textual resources they could use for their nutrition education. (Hoover et al.2021)(Moon et al.2024)(Zavala et al.2021)

Moreover, some nutrition-related educational elements could be jointly conducted according to a certain framework or some design originated from these professionals. This can help to make the learning of nutrition more concrete by shadowing students during their health promotion activities with families and children, and in turn have a better understanding of what the students are learning about in nutrition. Given the transformative benefits of fostering these working relationships, it is essential to proactively develop and maintain these communities once they are operational. (Almughamisi et al., 2022)(Salem et al.2022)(Bin et al.2021)

## 6. Conclusion and Future Directions

This narrative review underscores the necessity of integrating nutrition education into medical curricula in Saudi Arabia to address the rising prevalence of non-communicable diseases and improve healthcare outcomes. Current medical education in the country does not adequately prepare students to address nutrition-related health issues, which calls for urgent reform to align with global practices while maintaining local relevance.

The integration of nutrition education requires a multi-faceted approach, involving curricular reforms, faculty development, resource allocation, and culturally sensitive practices. Collaboration with nutrition experts and organizations is pivotal to fostering practical training opportunities and mentorship programs. Furthermore, embedding nutrition competencies into assessment methods and aligning educational objectives with Saudi Vision 2030 will strengthen the role of nutrition in improving public health.

Future efforts should focus on creating unified and interdisciplinary nutrition curricula tailored to Saudi Arabia's cultural and dietary context. Establishing national benchmarks and performance metrics will help evaluate the success of these reforms. Research into effective methods for delivering and assessing nutrition education in medical schools should also be prioritized to ensure continuous improvement and adaptability.

To overcome existing barriers, a dynamic approach emphasizing innovative practices and effective leadership is essential. Educational institutions and healthcare stakeholders must work collaboratively to implement changes that address the educational gaps and healthcare needs of the Saudi population. Expanding nutrition-focused education is not merely an academic endeavor but a public health imperative that can significantly contribute to the nation’s health and well-being.

By addressing these challenges with urgency and determination, Saudi Arabia can position itself as a regional leader in integrating nutrition education into medical training, paving the way for a healthier, more informed healthcare workforce.

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