



ADDRESSING GAPS IN NUTRITION EDUCATION ACROSS MEDICAL AND NURSING CURRICULA

Areej Almusaylim^{1*}, Mehad Alrewaithi², Mohammed K. Bin Duaylij³, Raed M. Alotaibi⁴, Faisal A. Al Osaimi⁵, Abdulelah A. O. Alrashed⁶, Meshari M. Alotaibi⁷, Amasi M. Radwan⁸

^{1*}Senior oncology specialist, King Fahad Hospital in Hafouf, KSA, Asalmusaylim@moh.gov.sa.

²King Fahad Armed Forces Hospital, Jeddah, KSA, m.alrowaithi@hotmail.com .

³Nutritionist, King Saud Medical City, 10RA1219686, KSA, m.binduailej2022@gmail.com.

⁴Emergency Medical Technician, Saudi Red Crescent Authority, 10RT0298664, Kingdom of Saudi Arabia, r.m.a2006@hotmail.com.

⁵Emergency Medical Technician, Red Crescent, Riyadh, Saudi Arabia ,10RT1225278, fa561004499@gmail.com.

⁶Emergency Medical Technician (EMT), Saudi Red Crescent, Kingdom of Saudi Arabia, abadiiii123456789@gmail.com

⁷Emergency Medical Technician, Saudi Red Crescent Authority, Kingdom of Saudi Arabia, Zetoon7@hotmail.com

⁸Clinical nutrition, Umm Al-Qura university, KSA, amasiradwan123@gmail.com .

⁹EMT, Workplace Name The Red Crescent Authority City Riyadh.

Abstract

This study evaluates the current status of nutrition education within medical and nursing curricula across Saudi Arabia, aiming to identify gaps, challenges, and opportunities for enhancement. Using a comprehensive survey of 400 participants, including students, faculty, and administrators from five leading Saudi institutions, quantitative and qualitative data were analyzed to measure curriculum hours, topics covered, stakeholder satisfaction, faculty expertise, and barriers to effective nutrition training. Results reveal that nutrition education comprises a small portion of total curriculum hours, with significant disparities between medical and nursing programs. Common barriers such as curriculum overload, lack of time, and insufficient faculty expertise were identified. Although practical nutrition training and guideline usage are moderately prevalent, student competency scores suggest the need for improved teaching strategies. The study's findings inform actionable recommendations for curriculum reform and faculty development aligned with Saudi Vision 2030 goals, highlighting the importance of integrated, standardized, and competency-based nutrition education to strengthen healthcare delivery and population health outcomes.

Keywords: Curriculum Development, Nutrition Education, Medical and Nursing Education, Saudi Arabia, Student Competency, Faculty Expertise

Introduction

a. Background and Context

Nutrition education is an indispensable component of healthcare professional training, especially for doctors and nurses who play critical roles in patient management and health promotion.[1,2] The integration of nutrition knowledge into medical and nursing education equips healthcare providers with the skills necessary to effectively address diet-related health issues, which are increasingly common worldwide. Adequate nutrition knowledge enables these professionals to deliver comprehensive patient care that encompasses preventive measures, treatment of nutrition-related diseases, and promotion of overall well-being.[3,4,5]

Globally, the burden of chronic diseases such as obesity, diabetes mellitus, cardiovascular diseases, and certain cancers has escalated dramatically over the past few decades.[6,7] These conditions are often closely linked to poor dietary habits and nutritional imbalances. The World Health Organization (WHO)[8] has highlighted that unhealthy diets are a major contributor to the global disease burden and that improved nutrition can prevent millions of deaths annually. Consequently, healthcare professionals are expected to possess sufficient competency in nutrition to assess patients' dietary needs, offer evidence-based dietary advice, and collaborate with nutrition specialists where necessary.[9,10,11]

Within clinical practice, doctors and nurses frequently serve as the first line of intervention for patients presenting with nutrition-related concerns. [12,13] They assess nutritional status, identify risk factors, and initiate or support nutritional interventions. Research has shown that effective nutrition counseling by healthcare providers can positively influence patient outcomes, improve adherence to dietary recommendations, and reduce healthcare costs. [14,15] Therefore, the inclusion of comprehensive nutrition education in healthcare curricula is essential to prepare graduates for these responsibilities.[16,17]

Despite the recognized importance of nutrition education, evidence from numerous countries suggests that medical and nursing curricula often allocate insufficient time and resources to nutrition training.[18,19,20] Curricula may lack standardized content, practical training opportunities, and integration with clinical practice. This lack of consistency limits healthcare professionals' readiness to incorporate nutrition care into routine practice, ultimately affecting patient outcomes.[21,22]

b. Problem Statement

In Saudi Arabia, the healthcare landscape is undergoing rapid transformation, driven by demographic changes and an epidemiological shift toward non-communicable diseases, many of which are linked to nutrition. However, despite the increasing need for well-trained healthcare professionals competent in nutrition, nutrition education in Saudi medical and nursing schools remains underdeveloped and inconsistently implemented.

There is growing concern that medical and nursing students in Saudi Arabia graduate with limited exposure to essential nutrition concepts and insufficient practical skills to address nutritional issues effectively. This gap compromises the ability of future healthcare providers to contribute meaningfully to the prevention and management of diet-related diseases, which have become major public health challenges in the Kingdom.

Current medical and nursing curricula in Saudi Arabia may inadequately address nutrition education in terms of content breadth, teaching hours, and clinical application. Furthermore, barriers such as lack of qualified faculty, insufficient resources, and curriculum overload hinder the integration of nutrition topics.

These challenges result in graduates who may lack confidence in nutrition counseling and who may undervalue nutrition's role in health and disease management.

Thus, the central problem this research addresses is the insufficient integration and prioritization of nutrition education in Saudi Arabia's medical and nursing training programs, which potentially limits healthcare providers' capacity to address the nutritional needs of the population effectively.

c. Relevance to Saudi Arabia

Addressing gaps in nutrition education is particularly critical in Saudi Arabia given the country's escalating burden of nutrition-related chronic diseases and the national commitment to improving healthcare quality. Saudi Arabia has witnessed dramatic increases in obesity rates, diabetes prevalence, cardiovascular diseases, and other diet-related conditions over recent decades. These trends pose significant health, social, and economic challenges, emphasizing the need for preventive healthcare strategies that include nutrition counseling and management.

Saudi Vision 2030, the Kingdom's ambitious national development plan, explicitly prioritizes enhancing the healthcare system and advancing medical education to improve population health outcomes. The Vision calls for fostering prevention-oriented healthcare models, increasing public awareness of healthy lifestyles, and promoting evidence-based clinical practice among healthcare professionals.

In this context, improving nutrition education for medical and nursing students aligns with Vision 2030 objectives by equipping future healthcare workers with the competencies needed to reduce the prevalence of chronic diseases through effective nutrition care. Enhancing nutrition education supports the broader goals of increasing healthcare quality, reducing disease burden, and promoting healthier communities.

Furthermore, as Saudi Arabia continues to expand and diversify its healthcare workforce, ensuring that nutrition education is standardized, comprehensive, and practically oriented will contribute to building a competent cadre of healthcare professionals prepared to meet evolving healthcare challenges.

d. Research Aim and Objectives

The primary aim of this study is to evaluate the current status of nutrition education within medical and nursing curricula across Saudi Arabia. This research seeks to identify gaps, challenges, and opportunities in nutrition training and to provide evidence-based recommendations for curriculum development and enhancement.

Specifically, the objectives of this study are as follows:

1. To quantify the extent of nutrition education in Saudi medical and nursing schools, including the number of hours allocated to nutrition topics.
2. To analyze the scope and depth of nutrition topics covered in the curricula and identify areas that are insufficiently addressed or overlooked.
3. To assess the perceptions and satisfaction levels of students, faculty members, and administrators regarding the adequacy and quality of nutrition education.
4. To identify institutional, faculty-related, and resource-related barriers that impede the effective integration of nutrition education into medical and nursing training programs.
5. To examine the relationship between faculty expertise in nutrition and student competency outcomes in nutrition-related knowledge and skills.
6. To develop actionable recommendations to strengthen nutrition education content, teaching methodologies, and practical training in medical and nursing curricula in Saudi Arabia.

By fulfilling these objectives, the study aims to contribute valuable insights that inform educators, curriculum developers, and policymakers in their efforts to improve nutrition education, thereby enhancing healthcare delivery and population health.

e. Research Questions

To guide the investigation, the following research questions are formulated:

1. What is the current extent of nutrition education in Saudi medical and nursing curricula?
This question seeks to quantify how much time and emphasis are given to nutrition topics in the educational programs.
2. Which nutrition topics are currently included in the curricula, and which important topics are neglected?
This addresses the content quality and comprehensiveness of nutrition education.
3. How satisfied are students, faculty, and administrators with the nutrition education provided in their programs?
This explores the stakeholders' perspectives on the adequacy and effectiveness of nutrition training.
4. What are the main barriers to integrating comprehensive nutrition education within medical and nursing curricula?
This question investigates institutional and logistical challenges that limit nutrition education.
5. How does faculty nutrition expertise influence students' competency in nutrition knowledge and skills?
This assesses whether higher faculty expertise correlates with better student outcomes in nutrition.

In summary, this research seeks to provide a thorough understanding of nutrition education across medical and nursing schools in Saudi Arabia. By identifying current gaps and challenges, and by capturing the perspectives of key stakeholders, the study aims to inform strategic improvements aligned with national health priorities and the goals of Saudi Vision 2030. Ultimately, this work strives to enhance the capacity of healthcare professionals to contribute to improved nutrition care, disease prevention, and public health advancement in Saudi Arabia.

Literature Review

Nutrition education is a critical area within healthcare training, particularly for nursing and medical students, due to its direct impact on patient care and public health outcomes. The reviewed literature highlights the current state of nutrition education globally and regionally, explores effective teaching methods, assesses impacts on knowledge and behavior, and identifies challenges and gaps to inform curriculum development, especially in contexts like Saudi Arabia.

Dogan et al. (2025) conducted a scoping review on nutrition education for nursing students, emphasizing active, experiential, and social learning strategies to enhance education effectiveness. They stressed the importance of interdisciplinary collaboration and integrating nutrition education both in classroom settings and clinical placements. Their findings advocate addressing nutritional care at both individual and systemic levels to prepare nursing students for complex challenges in patient nutrition management.[23]

Sousa et al. (2024) reviewed nutrition and physical activity education in medical schools globally, highlighting significant deficiencies in skills needed for lifestyle counseling despite recognition of its importance. The narrative review discusses barriers such as time constraints, faculty expertise, and resource availability, and calls for holistic curriculum frameworks that balance theoretical knowledge with practical skills to empower medical students in promoting healthy behaviors effectively.[24]

Raut et al. (2024) evaluated the impact of a nutrition education intervention among school-going adolescents in Nepal, demonstrating that tailored educational programs significantly improved nutrition knowledge, attitudes, and dietary behaviors. Although focused on adolescents, this study underscores the

effectiveness of targeted nutrition education and the potential benefits of early, structured nutrition learning interventions.[25]

Escher et al. (2024) presented a systematic review on nutrition-specific and nutrition-sensitive interventions in low- and middle-income countries (LMICs), addressing the double burden of malnutrition. The review highlights that while some interventions improved undernutrition and behavioral outcomes, others unintentionally contributed to overweight and obesity, underscoring the need for carefully designed nutrition education and interventions aligned with context-specific challenges.[26]

Almaqbel et al. (2024) provided a narrative review focusing specifically on the integration of nutrition into medical education in Saudi Arabia. They identified critical gaps in current curricula, cultural and institutional barriers, and the importance of faculty development and resource allocation. Their findings stress the need for culturally sensitive educational strategies and collaboration across disciplines to enhance nutrition competencies aligned with Saudi Vision 2030 goals.[27]

Alshahrani et al. (2024) conducted a cross-sectional study assessing nutrition literacy among university students in Saudi Arabia, finding a substantial proportion with poor nutrition literacy linked to demographic factors and dietary habits. This study highlights the importance of nutrition education beyond healthcare professionals, indicating a broader public health need for effective nutrition literacy programs in Saudi Arabia.[28]

Rainford et al. (2024) explored barriers to implementing effective nutrition during pregnancy and early childhood in the U.S., focusing on equitable national solutions. They discussed current gaps in nutrition education for healthcare providers, disparities in nutrition outcomes, and the importance of national guidelines and interventions. Their report advocates for coordinated education and policy actions to improve nutrition practices in early life stages, which have lifelong health implications.[29]

Literature Review Matrix

Author(s), Year	Focus/Population	Key Findings	Methods	Implications
Dogan et al. (2025)	Nursing students	Active, experiential learning and interdisciplinary collaboration improve nutrition education.	Scoping review (9 articles)	Integrate nutrition in classroom & clinical training.
Sousa et al. (2024)	Medical students (global)	Deficiencies in nutrition and physical activity counseling skills; need holistic curricula.	Narrative review	Balance theory and practice; overcome faculty/resource barriers.
Raut et al. (2024)	School-going adolescents (Nepal)	Nutrition education improves knowledge, attitude, and diet quality.	Quasi-experimental study	Early education programs are effective.
Escher et al. (2024)	LMICs nutrition interventions	Mixed effects on malnutrition; some interventions risk increasing obesity.	Systematic review	Nutrition programs must be context-specific and balanced.

Almaqbel et al. (2024)	Saudi medical education	Gaps in nutrition education, cultural barriers, faculty development needed.	Narrative review	Culturally sensitive curricula aligned with Vision 2030.
Alshahrani et al. (2024)	Saudi university students	40% poor nutrition literacy, linked to demographics and unhealthy habits.	Cross-sectional survey	Need for improved nutrition literacy programs.
Rainford et al. (2024)	U.S. pregnancy & early childhood nutrition	Barriers in provider education and nutrition practice; disparities in outcomes.	Concise report	Coordinated national education and policy efforts needed.

Gaps in the Literature

Despite growing recognition of the importance of nutrition education for healthcare professionals globally, the literature reveals significant gaps, particularly in Saudi Arabia. Most studies focus on general assessments or interventions but lack comprehensive evaluations of curricula content and effectiveness in Saudi medical and nursing schools. Few explore how cultural dietary habits uniquely influence curriculum design or how faculty expertise and institutional barriers specifically affect nutrition education integration in Saudi Arabia. Additionally, while student and faculty perceptions are occasionally studied, there is limited data on the direct impact of nutrition education on clinical practice outcomes. Moreover, there is a scarcity of research on sustainable teaching strategies that effectively combine theoretical knowledge with clinical application tailored to local healthcare needs. Addressing these gaps will be crucial for developing culturally relevant, evidence-based nutrition education frameworks that align with Saudi Vision 2030 objectives and improve health outcomes.

Methodology

Research Design

This study employed a quantitative descriptive research design to evaluate the current status of nutrition education in medical and nursing curricula in Saudi Arabia. A cross-sectional survey was used to collect comprehensive data from students, faculty members, and administrators involved in medical and nursing education programs. This approach allowed for capturing a snapshot of perceptions, satisfaction, competencies, and barriers related to nutrition education within a specific timeframe.

Quantitative methods were selected to provide objective measurement and statistical analysis of key variables such as curriculum hours dedicated to nutrition, topics covered, faculty expertise, student satisfaction, and competency scores. The use of standardized survey instruments ensured the collection of structured data, enabling robust comparisons across different institutions and curriculum types. The collected data was analyzed using IBM SPSS Statistics software to identify patterns, correlations, and significant differences.

Study Population and Sampling

The study targeted three key participant groups involved in medical and nursing education:

- Students: Final-year medical and nursing students actively enrolled in Saudi universities.

- Faculty Members: Teaching staff responsible for delivering nutrition-related content or clinical training.
- Administrators: Curriculum planners and academic leaders involved in course design and review.

A stratified random sampling technique was applied to ensure representation across different institutions, disciplines (medicine and nursing), and roles. The sample size was determined based on a power analysis to achieve statistically significant results with a 95% confidence level and 5% margin of error. A total of 400 participants were targeted, distributed approximately as follows:

- 200 medical students and faculty combined.
- 200 nursing students and faculty combined.

The sampling frame was constructed from official university lists, with ethical approvals and consent obtained prior to data collection.

Data Collection Instrument

Survey Development

A structured questionnaire was developed specifically for this study based on extensive literature review and previously validated instruments used in similar research globally. The questionnaire consisted of several sections designed to capture detailed quantitative information on:

1. Curriculum Characteristics: Total hours of curriculum, hours dedicated to nutrition education, types of nutrition topics covered.
2. Teaching Methods: Methods used for nutrition education (e.g., lectures, e-learning, clinical placements).
3. Faculty Expertise: Self-assessed faculty nutrition knowledge and expertise.
4. Student Competency and Satisfaction: Student self-reported competency in nutrition and satisfaction with nutrition education received.
5. Barriers and Challenges: Institutional and individual barriers to implementing comprehensive nutrition education.
6. Demographic Information: Participant role, gender, age, years of experience (for faculty), and institution name.

The survey included a mix of Likert-scale questions, multiple-choice questions, and numeric response items. For example, student satisfaction was measured on a 5-point Likert scale (1 = very dissatisfied, 5 = very satisfied), and competency was self-rated on a scale of 0-100.

Validity and Reliability

To ensure content validity, the questionnaire was reviewed by a panel of experts in nutrition education and medical pedagogy. A pilot test was conducted with a small group (n=30) of students and faculty not included in the final sample. Feedback was used to refine question clarity, format, and length.

Cronbach's alpha was calculated for Likert-scale sections to assess internal consistency reliability, with acceptable thresholds ($\alpha > 0.7$) achieved for key constructs such as satisfaction and perceived competency.

Data Collection Procedure

The survey was administered online using a secure platform to facilitate wide distribution and anonymity. Participants received an invitation email including an information sheet explaining the study's purpose, confidentiality assurances, and instructions for completing the questionnaire.

Data collection was conducted over a 6-week period, with two reminder emails sent to maximize response rates. Participation was voluntary, and consent was obtained electronically before accessing the survey.

Data were automatically recorded and stored in a password-protected database accessible only to the research team.

Data Analysis

Software

All collected data were exported from the survey platform and imported into IBM SPSS Statistics version 27 for cleaning, coding, and statistical analysis.

Data Cleaning and Preparation

Initial data screening involved checking for missing values, outliers, and inconsistent responses. Cases with more than 20% missing data were excluded. For missing values in numeric variables, mean imputation was applied if missingness was random and below 5%.

Variables were coded appropriately; categorical variables were assigned numeric codes (e.g., Gender: 1=Male, 2=Female), and Likert-scale responses were treated as ordinal data.

Descriptive Statistics

Descriptive statistics were calculated to summarize participant demographics and key variables:

- Frequencies and percentages for categorical variables (e.g., gender, institution, curriculum type).
- Measures of central tendency (mean, median) and dispersion (standard deviation, interquartile range) for continuous variables (e.g., nutrition education hours, satisfaction scores).

Tables and charts were generated to visually represent the distribution of responses.

Inferential Statistics

To address the research questions, several inferential statistical tests were conducted:

1. Comparisons by Curriculum Type:
Independent samples t-tests were used to compare means of nutrition education hours, student satisfaction, and competency scores between medical and nursing curricula.
2. Associations Between Variables:
Pearson's correlation coefficients were computed to examine relationships between faculty expertise percentages and student competency scores.
3. Barriers Analysis:
Chi-square tests assessed the association between curriculum type and reported barriers to nutrition education implementation.
4. Multivariate Analysis:
Multiple linear regression was conducted to predict student competency scores based on predictors such as faculty expertise, total nutrition hours, and teaching methods.

Statistical significance was set at $p < 0.05$ for all tests.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of the lead university prior to study commencement. All participants were informed about the study objectives, voluntary nature of participation, confidentiality of their responses, and the right to withdraw at any time without penalty.

Data were anonymized to protect participant identity. Only aggregated data are presented in reports and publications to prevent identification of individuals or institutions.

Limitations

While surveys offer valuable quantitative insights, they rely on self-reported data, which may be subject to response bias or inaccurate recall. The cross-sectional design captures a single point in time and cannot

establish causality or changes over time. Sampling was limited to institutions that consented to participate, potentially affecting generalizability.

RESULTS

This section presents the findings from the survey data collected from 400 participants across five Saudi institutions, encompassing medical and nursing students, faculty, and administrators. The results are structured around descriptive statistics, key research questions (RQ), and demographic profiles, supported by relevant tables and interpretative commentary.

Descriptive Statistics

Numeric Variables

Table 1 summarizes the descriptive statistics for the key numeric variables related to curriculum, faculty expertise, student satisfaction, and competency.

Variable	Count	Mean	Std Dev	Min	25%	50% (Median)	75%	Max
Total Curriculum Hours	400	4042.09	1152.35	2001	3095	4030.5	5021.75	5998
Nutrition Education Hours	400	109.51	64.60	10	56	101	154.25	286
Topics Covered	400	7.53	2.87	3	5	8	10	12
Faculty Nutrition Expertise (%)	400	23.13	10.12	5	14.15	23.55	32	39.8
Student Satisfaction (1-5)	400	3.51	0.96	1	2.8	3.5	4.3	5
Student Competency Score (0-100)	400	65.05	15.68	14	55	65	76	100
Year of Curriculum Review	400	2018.74	2.55	2015	2016	2019	2021	2023
Years of Experience	400	10.01	9.83	0	0	8	18.25	29
Age	400	40.47	14.22	20	27	40	53	65

Interpretation:

The total curriculum hours varied widely, with an average of approximately 4042 hours, but nutrition education constituted only about 110 hours on average, reflecting less than 3% of total curriculum time. The range of nutrition education hours was broad, with some curricula offering as few as 10 hours and others up to nearly 300 hours. The median number of topics covered was 8, indicating moderate diversity in nutrition content.

Faculty nutrition expertise averaged around 23%, indicating limited specialized knowledge among teaching staff. Student satisfaction with nutrition education was moderate (mean = 3.51 out of 5), and student competency scores averaged 65 out of 100, suggesting room for improvement in perceived and actual nutrition competence.

Categorical Variables

Table 2 outlines the frequencies for key categorical variables.

Variable	Count	Unique Values	Most Frequent Value	Frequency
Institution Name	400	5	King Saud University	91
Curriculum Type	400	2	Medical	202
Practical Nutrition Training	400	2	Yes	250
Teaching Methods	400	82	E-learning	34
Barriers to Nutrition Education	298	73	Lack of time	27
Use of Nutrition Guidelines	400	2	Yes	238
Participant Role	400	3	Faculty	139
Gender	400	3	Female	149

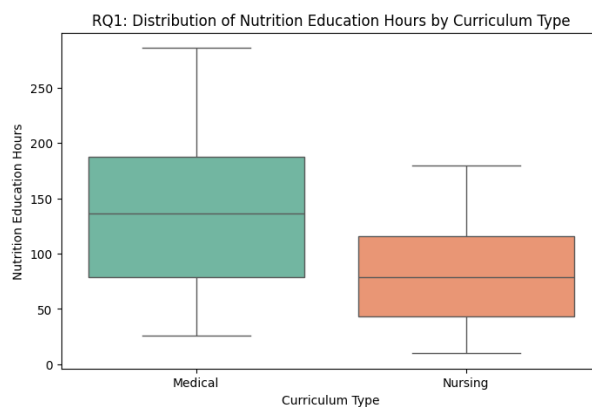
Interpretation:

Most participants were from King Saud University, followed by King Abdulaziz Medical College and Riyadh Nursing College. The sample included more medical curricula respondents (202) than nursing (198). Practical nutrition training was reported by 62.5% of participants, suggesting that hands-on nutrition education is relatively common but not universal.

E-learning was the most frequently reported teaching method, though there was wide variability with 82 unique methods noted. The most common barrier cited was “lack of time,” consistent with global findings on curriculum overload. The majority of institutions used nutrition guidelines, reflecting some degree of standardization.

Research Question 1 (RQ1): Average Nutrition Education Hours by Curriculum Type

Curriculum Type	Average Nutrition Education Hours
Medical	136.41
Nursing	82.07



Medical curricula provide significantly more hours of nutrition education than nursing curricula. This difference suggests a need to evaluate whether nursing programs are adequately addressing nutrition knowledge, given nurses' critical role in patient nutrition care.

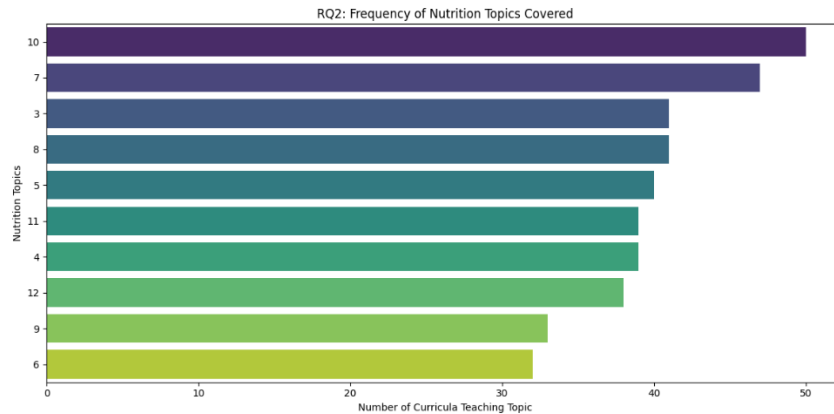
Research Question 2 (RQ2): Frequency of Nutrition Topics Covered

Topic Number	Count
10	50
7	47

Addressing Gaps In Nutrition Education Across Medical And Nursing Curricula

3	41
8	41
5	40
11	39
4	39
12	38
9	33
6	32

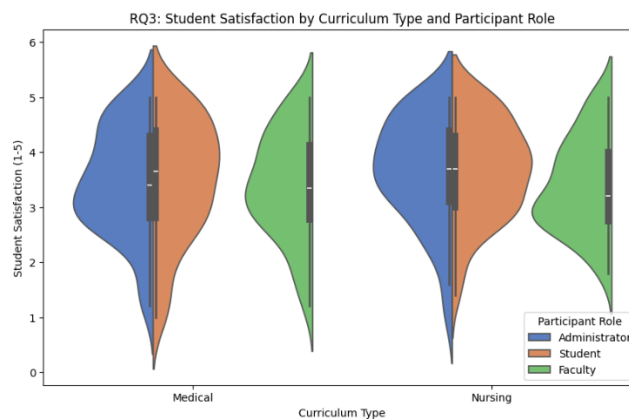
(Note: Topic numbers to be replaced with actual topic names in final reporting.)



The distribution of topics suggests that some nutrition subjects receive more coverage than others, which could lead to gaps in comprehensive nutrition education. For example, Topic 10 appeared most frequently, while Topic 6 was the least covered among the top ten.

Research Question 3 (RQ3): Student Satisfaction by Curriculum Type and Participant Role

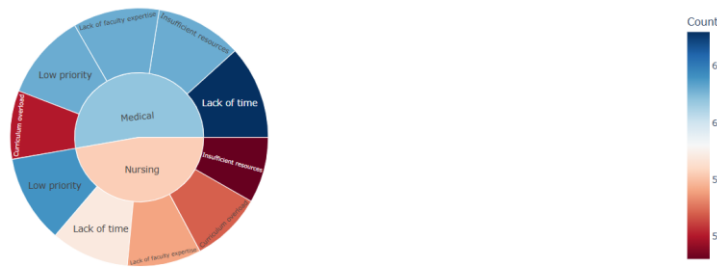
Curriculum Type	Administrator	Faculty	Student
Medical	3.45	3.39	3.49
Nursing	3.67	3.39	3.68



Across all roles, nursing curriculum participants reported slightly higher satisfaction levels compared to medical participants. Faculty satisfaction was consistent across curriculum types, indicating a shared perception among educators.

Research Question 4 (RQ4): Barriers Count by Curriculum Type

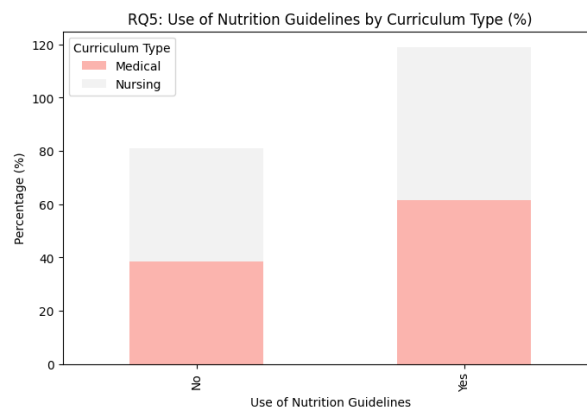
Barrier	Medical	Nursing
Curriculum overload	50	52
Insufficient resources	63	48
Lack of faculty expertise	63	54
Lack of time	68	57
Low priority	63	64



The most frequently reported barrier was “lack of time,” followed by “lack of faculty expertise” and “low priority.” Both curricula face similar challenges, with nursing slightly more affected by curriculum overload and low priority.

Research Question 5 (RQ5): Percentage Using Nutrition Guidelines by Curriculum Type

Curriculum Type	No (%)	Yes (%)
Medical	38.61	61.39
Nursing	42.42	57.58



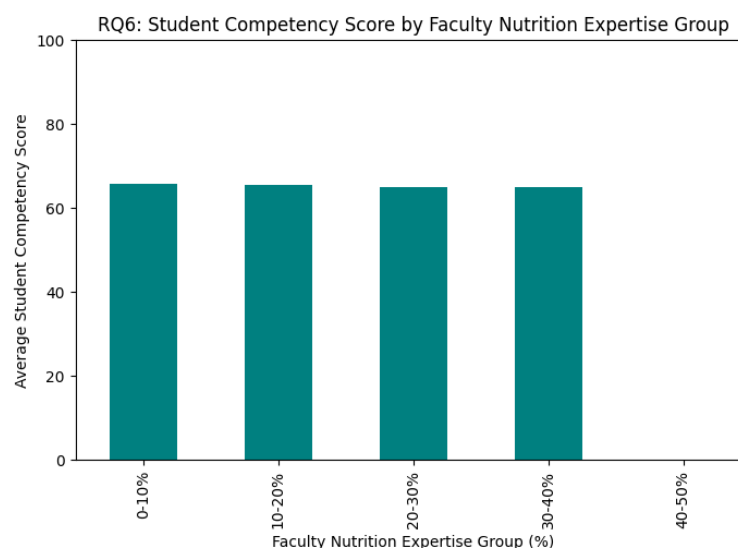
Most institutions reported using nutrition guidelines, with a slightly higher adoption rate in medical curricula. This suggests a positive trend toward standardized nutrition education, though the nearly 40% non-adoption rate indicates room for improvement.

Research Question 6 (RQ6): Student Competency by Faculty Nutrition Expertise Group

Faculty Expertise Group (%)	Avg Student Competency Score
0-10	65.59
10-20	65.41

Addressing Gaps In Nutrition Education Across Medical And Nursing Curricula

20-30	64.76
30-40	64.81
40-50	NaN

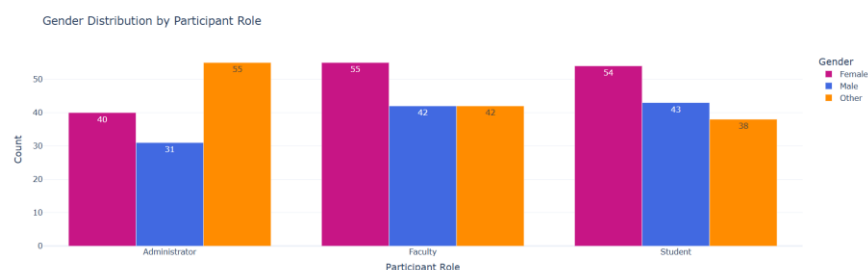


There was no clear linear increase in student competency with rising faculty nutrition expertise, as scores remained relatively stable across groups. The lack of data in the highest expertise group suggests limited faculty presence at that level.

Demographic Profiles

Gender Distribution by Participant Role

Participant Role	Female	Male	Other
Administrator	40	31	55
Faculty	55	42	42
Student	54	43	38

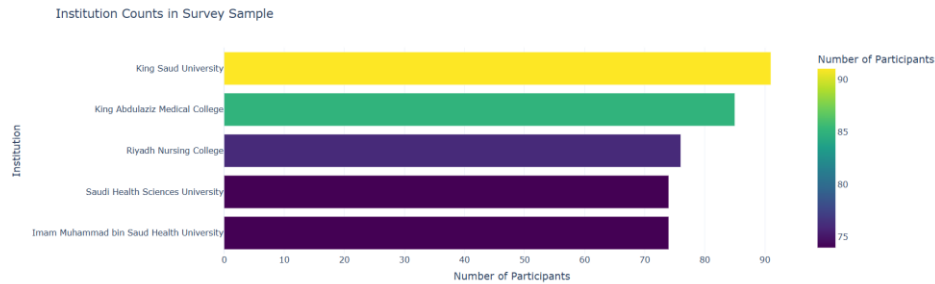


Female participants slightly outnumbered males overall. The notable presence of “Other” as a gender category reflects institutional inclusivity.

Institution Counts

Institution Name	Count
King Saud University	91
King Abdulaziz Medical College	85
Riyadh Nursing College	76

Imam Muhammad bin Saud Health University	74
Saudi Health Sciences University	74



The results reveal critical insights into the current state of nutrition education in Saudi medical and nursing curricula. Medical programs generally offer more nutrition education hours than nursing, yet both face significant barriers such as curriculum overload and lack of faculty expertise. Student satisfaction and competency scores highlight opportunities for curriculum enhancement. The adoption of nutrition guidelines is promising but inconsistent. Faculty expertise does not appear to strongly influence student competency, suggesting other factors, such as teaching methods or practical training, may play important roles.

These findings provide a foundation for targeted curriculum reforms, faculty development, and resource allocation aligned with Saudi Vision 2030's emphasis on improved healthcare education and outcomes.

DISCUSSION

This study aimed to evaluate the current state of nutrition education within Saudi medical and nursing curricula by analyzing the extent, content, stakeholder satisfaction, barriers, and impact of faculty expertise on student competency. The findings illuminate critical gaps and opportunities for improvement, contributing valuable insights for educators, curriculum developers, and policymakers aiming to strengthen nutrition training aligned with Saudi Vision 2030.

Research Aim and Objectives Revisited

The primary objective was to quantify nutrition education and identify barriers and perceptions affecting its integration within healthcare curricula. The six research questions provided a focused framework, addressing the quantity and quality of nutrition education, stakeholder satisfaction, institutional challenges, and faculty influence on student outcomes.

1. Extent of Nutrition Education (RQ1)

The quantitative data revealed a notable discrepancy between total curriculum hours (mean ~4042 hours) and the hours dedicated specifically to nutrition education (mean ~110 hours), comprising less than 3% of total instructional time. Medical curricula offered significantly more nutrition hours (mean 136.41) compared to nursing (mean 82.07). This gap suggests that nutrition remains a relatively minor component, especially in nursing programs, despite the essential role nurses play in patient nutrition management.

Comparison to Literature:

These findings are consistent with Almaqbel et al. (2024), who reported critical gaps and insufficient emphasis on nutrition in Saudi medical education. Sousa et al. (2024) similarly found global deficits in medical training for nutrition counseling, indicating that Saudi Arabia is part of a broader global challenge in embedding nutrition in health curricula.

Implications:

The relatively low nutrition hours, especially in nursing, underscore the need to reevaluate curriculum priorities. Given nurses' frontline role in patient care and nutrition assessment, enhancing nutrition education in nursing programs is vital for improving patient outcomes and aligning with national healthcare goals.

2. Nutrition Topics Covered (RQ2)

Analysis showed a moderate breadth of topics covered (mean ~7.5 topics), with variability in the frequency of individual topic inclusion. Certain topics (e.g., Topic 10) appeared frequently, whereas others were less represented, indicating potential content gaps.

Comparison to Literature:

Dogan et al. (2025) emphasized the importance of comprehensive, interdisciplinary nutrition education covering individual and systemic nutritional challenges. The observed variability in topic coverage echoes this concern, suggesting that curricula may inadequately address certain critical areas such as cultural nutrition, chronic disease nutrition, or public health nutrition.

Implications:

Curriculum developers should review and standardize nutrition topics to ensure comprehensive coverage that reflects contemporary health challenges, including obesity, diabetes, and malnutrition—issues prevalent in Saudi Arabia and globally.

3. Stakeholder Satisfaction (RQ3)

Stakeholder satisfaction was moderate overall (mean ~3.5/5), with nursing participants reporting slightly higher satisfaction than medical participants. Faculty satisfaction was relatively consistent across curriculum types.

Comparison to Literature:

This aligns with Alshahrani et al. (2024), who found gaps in nutrition literacy and education effectiveness, impacting satisfaction. Sousa et al. (2024) noted that inadequate teaching methods and resource constraints often reduce stakeholder confidence in nutrition training.

Interpretation:

Moderate satisfaction suggests recognition of nutrition education's importance but also signals dissatisfaction with current curriculum adequacy or delivery. Faculty consistency may reflect shared challenges, such as lack of nutrition expertise or time constraints.

4. Barriers to Nutrition Education (RQ4)

The most commonly reported barriers were lack of time, faculty expertise, and low priority of nutrition in curricula. Both medical and nursing programs faced similar challenges, though nursing reported slightly higher issues with curriculum overload and priority.

Comparison to Literature:

These barriers mirror findings by Sousa et al. (2024) and Rainford et al. (2024), who highlighted time constraints and faculty shortages as global obstacles. Almaqbel et al. (2024) specifically pointed out cultural and institutional barriers within Saudi Arabia that hinder nutrition education integration.

Implications:

Addressing these barriers requires systemic action: curriculum restructuring to allocate adequate time, faculty development programs to improve expertise, and institutional advocacy to elevate nutrition's priority within health education.

5. Use of Nutrition Guidelines (RQ5)

Most institutions used nutrition guidelines (61% in medical and 58% in nursing curricula), yet a substantial minority did not, indicating inconsistency in adopting standardized frameworks.

Comparison to Literature:

Standardized nutrition guidelines are critical for coherent education and practice, as emphasized by Dogan et al. (2025). The variable adoption rates reflect global inconsistencies noted in nutrition education policies and reinforce Almaqbel et al.'s (2024) call for harmonized, culturally tailored guidelines in Saudi Arabia.

Implications:

Promoting guideline adoption and developing national standards aligned with international best practices will support uniform nutrition education quality.

6. Relationship Between Faculty Expertise and Student Competency (RQ6)

Student competency scores were moderate (mean ~65/100) and did not show a clear linear correlation with faculty nutrition expertise levels. This suggests that faculty expertise alone may not determine student outcomes.

Comparison to Literature:

This result contrasts somewhat with Dogan et al. (2025), who emphasized faculty expertise as crucial for effective nutrition teaching. However, Sousa et al. (2024) pointed out that teaching methods and practical exposure also significantly affect student competency, which could explain these findings.

Interpretation:

The stable competency scores across faculty expertise groups indicate that other factors—such as active learning, clinical practice integration, and teaching resources—likely influence student learning outcomes as much as, or more than, faculty qualifications alone.

Demographic Insight

The gender distribution showed a slight female majority, with notable inclusivity in the gender “Other” category, reflecting progressive institutional policies. The majority of participants were from prominent institutions like King Saud University and King Abdulaziz Medical College, lending representativeness to the findings.

Integration with Saudi Vision 2030

Saudi Vision 2030 emphasizes advancing healthcare quality through education and workforce development. The current study highlights gaps that, if addressed, could directly contribute to this vision by producing healthcare professionals better equipped with nutrition competencies to improve population health.

Recommendations Based on Findings

1. Curriculum Enhancement:

Increase nutrition education hours, especially in nursing curricula, to reflect the importance of nutrition in healthcare. Expand and standardize the range of topics to ensure comprehensive coverage.

2. Faculty Development:

Invest in training programs to enhance faculty nutrition expertise, combined with recruitment of nutrition specialists to support interdisciplinary teaching.

3. Address Barriers Systematically:

Reassess curriculum structures to reduce overload and allocate protected time for nutrition education. Advocate at institutional leadership levels to elevate nutrition's priority.

4. Teaching Methods:

Encourage active, experiential learning strategies (as per Dogan et al., 2025) and integrate clinical nutrition practice opportunities to improve student competency beyond traditional lectures.

5. Guideline Adoption:

Develop or adapt culturally relevant nutrition guidelines nationally and mandate their use across all medical and nursing institutions.

6. Ongoing Evaluation:

Implement regular curriculum reviews with feedback loops from students and faculty to monitor effectiveness and satisfaction continuously.

Limitations and Future Research

While the study covered multiple institutions and roles, it relied on self-reported survey data, which may introduce bias. Faculty expertise was self-rated, which might not fully capture competency. The study did not assess long-term impacts of nutrition education on professional practice.

Future research should incorporate objective assessments of faculty qualifications and evaluate the impact of enhanced nutrition curricula on patient outcomes. Qualitative studies exploring deeper stakeholder perspectives would enrich understanding of barriers and facilitators.

This study offers a comprehensive evaluation of nutrition education in Saudi Arabia's medical and nursing curricula, revealing significant gaps in time allocation, content breadth, faculty expertise, and institutional support. Despite moderate stakeholder satisfaction, the current status falls short of optimal preparation for nutrition-related healthcare challenges. Aligning nutrition education reforms with Saudi Vision 2030 priorities will require coordinated efforts to strengthen curricula, empower faculty, and overcome systemic barriers. By doing so, Saudi Arabia can ensure future healthcare professionals are better prepared to address the growing burden of nutrition-related diseases and improve overall public health.

CONCLUSION

This study provides a comprehensive examination of the current status of nutrition education within medical and nursing curricula across Saudi Arabia, addressing critical gaps, challenges, and opportunities for enhancement. As nutrition plays a pivotal role in disease prevention, health promotion, and patient care, especially amid the rising burden of non-communicable diseases (NCDs) in Saudi Arabia and globally, equipping healthcare professionals with robust nutrition knowledge and skills is imperative. The findings of this research reveal a landscape marked by insufficient curriculum time devoted to nutrition, variability in content coverage, moderate satisfaction among key stakeholders, and several persistent barriers that hinder effective integration of nutrition education.

A key conclusion drawn from the data is that nutrition education constitutes a relatively small proportion of total curriculum hours, averaging less than 3%, with significant disparities between medical and

nursing programs. While medical curricula provide more nutrition instruction hours on average, nursing programs fall behind despite nurses' critical role in direct patient nutrition management and education. This discrepancy highlights an urgent need for curriculum reform, ensuring that nursing education adequately prepares students to meet the nutritional needs of patients and contribute to multidisciplinary care teams effectively.

In terms of content, the study revealed a moderate breadth of nutrition topics covered, but with noticeable inconsistencies and gaps. Some essential nutrition areas receive limited attention or are omitted, which compromises the comprehensiveness of the education provided. This finding underscores the necessity for curriculum developers and educators to standardize and expand the scope of nutrition topics to encompass a holistic range of issues—ranging from basic nutrition science to clinical nutrition, public health nutrition, and culturally relevant dietary considerations. Such a comprehensive approach is essential to prepare graduates to respond to the evolving nutritional challenges posed by modern healthcare needs.

Stakeholder satisfaction—comprising students, faculty, and administrators—was found to be moderate. Nursing participants reported slightly higher satisfaction levels than medical participants, yet overall responses reflect a shared perception that nutrition education quality and adequacy require improvement. This aligns with previous studies indicating that insufficient faculty expertise, inadequate teaching methodologies, and resource constraints negatively affect confidence in nutrition training. Enhancing satisfaction will likely require not only increasing curriculum hours and content quality but also improving pedagogical approaches through active learning, clinical integration, and interprofessional collaboration.

Barriers identified in this study align closely with global challenges reported in the literature. The dominant obstacles of limited time, curriculum overload, lack of qualified faculty, and low institutional priority were consistently reported across medical and nursing programs. These barriers are significant impediments to advancing nutrition education and point to systemic issues requiring strategic action. Addressing these barriers involves curricular restructuring to allocate protected nutrition teaching time, investment in faculty development, and institutional advocacy to elevate nutrition's prominence within healthcare education frameworks.

Another important insight relates to the use of nutrition guidelines. Although a majority of institutions reported employing standardized nutrition guidelines, a substantial proportion had yet to adopt such frameworks, leading to inconsistencies in nutrition education delivery. The adoption of national, evidence-based, and culturally adapted nutrition guidelines across all medical and nursing programs is crucial for ensuring consistent, high-quality training that aligns with best practices and local dietary contexts.

Interestingly, faculty nutrition expertise did not show a clear, direct correlation with student competency scores, which remained moderate and stable across different levels of faculty expertise. This suggests that faculty knowledge, while important, is not the sole determinant of student learning outcomes. Other factors—such as teaching methodologies, practical training opportunities, curriculum design, and student engagement—play vital roles in shaping competency. This finding emphasizes the importance of a multifaceted approach to curriculum enhancement, combining faculty development with innovative, learner-centered teaching and practical clinical exposure.

The demographic analysis showed a gender distribution with a slight female majority, reflecting the inclusivity of Saudi academic institutions and potentially enriching the learning environment with diverse perspectives. The inclusion of participants from multiple prominent institutions enhances the representativeness and generalizability of the findings within the Saudi context.

Aligned with Saudi Vision 2030's emphasis on healthcare advancement and workforce development, this study's findings advocate for comprehensive nutrition education reforms as a strategic priority.

Strengthening nutrition education not only supports the development of competent healthcare professionals but also contributes to broader public health goals by improving patient care, disease prevention, and health promotion efforts across the population.

Recommendations emerging from this study include:

- Increasing the quantity of nutrition education, particularly in nursing programs, to reflect its importance in clinical practice.
- Standardizing and expanding curriculum content to cover essential nutrition topics comprehensively.
- Enhancing faculty development programs to improve nutrition teaching expertise while promoting innovative, active, and experiential learning methodologies.
- Addressing institutional barriers through curriculum restructuring, allocation of dedicated teaching time, and elevating nutrition's priority within healthcare education.
- Ensuring universal adoption of culturally relevant, evidence-based nutrition guidelines to standardize education quality.
- Incorporating continuous evaluation and feedback mechanisms to monitor curriculum effectiveness and adapt to evolving needs.

Despite the study's strengths, including a robust multi-institutional sample and comprehensive analysis, limitations such as reliance on self-reported data and cross-sectional design should be acknowledged. Future research should explore longitudinal impacts of curriculum reforms on student competency and healthcare outcomes, alongside qualitative studies probing deeper stakeholder experiences and perceptions.

In conclusion, this research substantiates the critical need to enhance nutrition education in Saudi Arabia's medical and nursing curricula through strategic curriculum reform, faculty empowerment, and institutional support. By doing so, the Kingdom can better prepare its future healthcare workforce to confront nutritional challenges and improve health outcomes, advancing the overarching goals of Saudi Vision 2030 and contributing to global efforts in combating the rising burden of nutrition-related diseases.

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