

Knowledge, Attitudes, Practices, and Prevalence of Dietary Supplement Use Among Medical Students at the National University.

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ABSTRACT

Background: The use of dietary supplements (DS) among university students is increasing globally, yet knowledge and safe usage remain limited. Students often rely on unverified information, which may pose health risks. Objectives: To assess the prevalence of DS use among undergraduates at the National University of Science and Technology (NU), and evaluate their knowledge, attitudes, and practices (KAP), including factors influencing consumption.

Methods: A descriptive cross-sectional study was conducted from March to April 2025. A self-administered questionnaire was completed by 152 students from three colleges, capturing demographics, DS use, and KAP. Data were analysed using SPSS.

Results: DS use was reported by 27.6% of students, with iron (11.2%), multivitamins (9.2%), and vitamins C and D (5.9% each) most common. While 82.2% correctly defined DS, over 60% relied on peers or the internet for information. Although 89.5% supported professional guidance, only 17.1% were tested before use, and just 15.8% adhered to prescriptions. College affiliation was significantly associated with reported side effects ($p = 0.012$).

Conclusion: While students possess basic knowledge of DS, gaps in safe practices and evidence-based guidance remain. Structured education and professional supervision are recommended, particularly for future healthcare professionals.

Keywords: *Dietary supplements; university students; knowledge, attitudes, and practices (KAP); Vitamins; health education*

1. INTRODUCTION

1.1 Background

Dietary supplements (DS) are defined by the Dietary Supplement Health and Education Act (DSHEA) of 1994 as consumable products—such as pills, capsules, or tablets—comprising dietary constituents, including vitamins, minerals, amino acids, herbs, or other botanicals, designed to augment the diet [1].

Dietary supplements are primarily intended to augment the nutritional intake of individuals by providing additional micronutrients or bioactive compounds that support overall health and well-being. They are particularly valuable in addressing specific nutritional deficiencies, especially among individuals with dietary restrictions, increased physiological demands, or medical conditions that limit adequate nutrient acquisition through diet alone.

Despite their potential benefits, dietary supplements should not be regarded as substitutes for a balanced and diverse diet. It is essential for consumers to seek guidance from qualified healthcare professionals prior to initiating any supplement regimen, as nutritional requirements vary considerably according to health status, lifestyle, and dietary patterns. When used appropriately and under professional supervision, dietary supplements can serve as a complementary component of a comprehensive strategy for promoting and maintaining optimal health.

1.2 Literature review

The use of dietary supplements (DS) among university students is increasingly recognized for its implications on health and well-being. Consumption patterns are influenced by gender, academic discipline, and health motivations. Male students

frequently use protein supplements for muscle development, whereas female students mainly consume multivitamin and mineral (MVM) supplements for overall health. Students in health-related fields exhibit higher DS usage, reflecting greater nutritional knowledge [2].

MVM supplements are the most used, addressing micronutrient deficiencies and potentially lowering chronic disease risk [3]. In Saudi Arabia, 42.9% of female students reported higher DS use than males (25.7%) [4]. Despite 43% demonstrating adequate knowledge of DS and their risks, 44.6% engage in unsafe practices, and nearly two-thirds lack guidance on correct usage [5].

A substantial proportion of students rely on non-scientific sources, such as social media (56.3%) and peers (50.7%), highlighting the need for targeted education. Given these gaps in knowledge and practice, further research is essential to assess students' DS-related behaviour's and to develop evidence-based interventions that promote safe and informed use among undergraduates [6].

1.3 Research gap

Global consumption of dietary supplements has risen markedly, accompanied by significant commercial growth, reflecting a robust market across populations. However, research on dietary supplement use among college students in National university is limited, representing a critical gap in the literature. Understanding the motivations, perceptions, and practices of this group is essential, along with evaluating potential benefits, risks, and prevalent misconceptions. Addressing these gaps will support informed decision-making, promote safe use, and enhance overall student well-being.

1.4 Objectives

Despite the growing use of dietary supplements among young adults, evidence regarding undergraduate students' consumption patterns, knowledge, and attitudes remains limited. This study investigates the prevalence of dietary supplement use in this population, identifies associated demographic and behavioural factors, and examines students' knowledge, attitudes, practices, motivations, and information sources related to multivitamin and supplement intake. Insights from this study aim to guide the development of targeted educational interventions and policies to promote safe, informed, and evidence-based supplement use among university students.

2. METHODOLOGY

2.1 Study design and setting

A descriptive cross-sectional study was carried out over a two-month period (March–April 2025) to investigate dietary supplement consumption and related awareness among students enrolled at the National University.

2.2 Study population

The study population consisted of undergraduate students from diverse academic disciplines at the National University of Science and Technology (NU). To ensure representation across fields of study, participants were recruited from three colleges: the School of Foundational Studies (SoFS), the College of Medicine and Health Sciences (CoMHS), and the College of Engineering (COE).

2.3 Sample size calculations

The sample size was calculated using the Raosoft online calculator [7], with a minimum of 353 participants required to achieve a 95% confidence level and 5% margin of error for the total student population of 4,200. A total of 150 students completed the questionnaire, representing a lower response rate than planned. While this provides preliminary insights, caution is warranted when generalizing the findings to the entire student population.

2.4 Sampling technique

Inclusion (eligibility) criteria:

Students above 16 years

Can speak and understand Arabic or English

Enrolled in NU

Both male and female

Students willing to participate

Exclusion criteria (ineligibility)

Students who are not from NU

Cannot speak Arabic or English

Students not willing to participate

2.5 Data collection method

The questionnaire was developed through a comprehensive literature review and iterative consultations with subject experts to ensure clarity, relevance, and content validity. A pilot study involving students not included in the main study confirmed its feasibility and comprehensibility. Most items were closed-ended, designed to capture socio-demographic characteristics and participants' knowledge, attitudes, and practices regarding dietary supplement use. Reliability analysis during the pilot phase indicated acceptable internal consistency, supporting the instrument's robustness for the main study.

The questionnaire was structured to assess several key variables. The first section collected demographic and personal information, including age, gender, nationality, academic year, body mass index, and socio-economic status. The second section evaluated participants' knowledge, attitudes, and practices concerning dietary supplement use, capturing their awareness, perceptions, and behavioural patterns.

2.6 Ethical considerations

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the university's Ethics Committee. Prior to participation, all students were provided with a comprehensive informed consent form and invited to participate voluntarily. Only those who provided explicit consent were included in the study. Robust measures were implemented to ensure the anonymity and confidentiality of all participants, with no personally identifiable information collected or disclosed at any stage of the research process.

2.7 Data analysis

Data were reviewed and verified daily to ensure completeness and consistency. They were then coded, entered, and analysed using SPSS version 21. Descriptive statistics, including frequencies, percentages, and means, summarized the findings, which are presented in tables as absolute values and percentages. Associations between categorical variables were examined using the chi-square test, with significance set at $p < 0.05$.

3. RESULTS

3.1 Demographic Data

A total of 152 students participated in the study, with the sample predominantly female (94.7%) and mostly Omani (90.8%). The majority were aged between 18 and 25 years, with 52.0% aged 18–21 and 44.1% aged 22–25. Medicine students comprised the largest academic group (76.3%), particularly those in the fourth year (26.3%), followed by students from Medical Laboratory Sciences (10.5%), Engineering (8.6%), and Foundation programs (4.6%).

Over half of the participants (53.9%) reported coming from middle-income households (1000–2500 OMR), while 25.7% and 20.4% were from high-income (>2500 OMR) and low-income (<1000 OMR) families, respectively. Most students engaged in light physical activity, such as occasional walking (71.7%), whereas 18.4% reported moderate exercise, 2.6% vigorous activity, and 7.2% no physical activity. BMI data indicated that 38.8% of students were within the normal range, 13.8% were underweight, 10.5% overweight, and 4.6% obese, while BMI information was unavailable for 32.2% of respondents.

Table 1: Demographic profile of the study population included in the analysis (N = 152)

Category	Subcategory	N (%)
Age Group	<18 years	3 (2.0)
	18–21 years	79 (52.0)
	22–25 years	67 (44.1)
	>25 years	3 (2.0)
Gender	Female	144 (94.7)
	Male	8 (5.3)
Nationality	Omani	138 (90.8)
	Non-Omani	14 (9.2)
College	Engineering	13 (8.6)
	Foundation	7 (4.6)
	Medicine (MD)	116 (76.3)
	Medicine (MLS)	16 (10.5)
Academic Year	Unspecified	7 (4.6)

	MD1	24 (15.8)
	MD2	11 (7.2)
	MD3	20 (13.2)
	MD4	40 (26.3)
	MD5	14 (9.2)
	MD6	7 (4.6)
	Year 1 (MLS)	4 (2.6)
	Year 2 (MLS)	15 (9.9)
	Year 3 (MLS)	1 (0.7)
	Year 4 (MLS)	9 (5.9)
Family Income	Low (<1000 OMR)	31 (20.4)
	Middle (1000–2500 OMR)	82 (53.9)
	High (>2500 OMR)	39 (25.7)
Physical Activity	Never	11 (7.2)
	Light (occasional)	109 (71.7)
	Moderate (2–3×/week)	28 (18.4)
	Intense (>4×/week)	4 (2.6)
BMI	Underweight	21 (13.8)
	Normal	59 (38.8)
	Overweight	16 (10.5)
	Obese	7 (4.6)
	Unknown	49 (32.2)

*MD – Doctor of Medicine; *MLS – Medical Laboratory Sciences; (1) Classified according to the Family Income Support Benefit criteria (Oman Vision 2040)

3.2 Knowledge Data

Figure 1 summarizes students' knowledge, information sources, and practices concerning dietary supplements (DSs). A substantial proportion of students (82.2%) correctly identified DSs as vitamins, minerals, herbs, or nutrients in pill or powder form. The internet (63.8%) and family or friends (61.2%) were the most frequently reported sources of information. The primary motivations for DS use were enhancing overall health (74.3%) and correcting nutrient deficiencies (73.0%). Most participants (89.5%) indicated that DS dosages should adhere to label instructions and be guided by consultation with healthcare professionals. While the vast majority (90.8%) recognized the risk of toxicity from excessive intake, only 65.8% were aware of potential interactions between DSs and medications or certain foods. These findings highlight both a foundational understanding of DSs among students and important gaps in knowledge regarding safety and interactions.

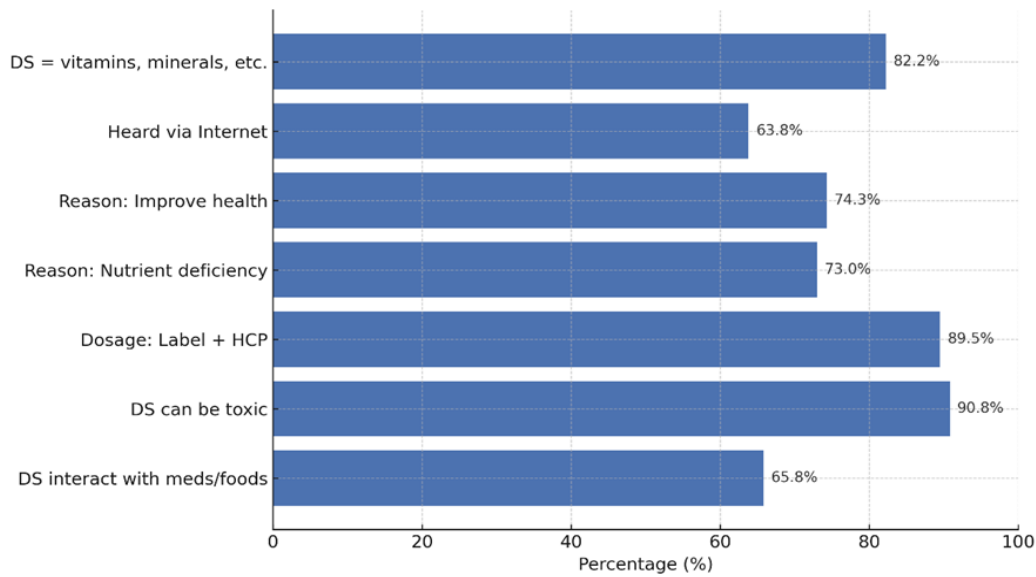


Figure 1: Distribution of Knowledge Scores Among Study Participants (N = 152)

Source: Data collected from NU Students through a survey from march to April 2025

3.3 Attitude Data

Figure 2 summarizes participants' attitudes toward dietary supplements. Half of the respondents (50.0%) disagreed or strongly disagreed that supplements are safe for all age groups, while 17.8% agreed and 32.2% were neutral. Regarding prevention of chronic diseases, 34.8% agreed, 20.4% disagreed, and 44.7% were neutral. Opinions were also split on the necessity of supplements with a healthy diet (35.6% agreed, 30.3% disagreed, 34.2% neutral) and on recommending supplements to healthy individuals (21.1% agreed, 40.8% disagreed, 38.2% neutral). Overall, these results indicate limited confidence in the safety, necessity, and health benefits of dietary supplements among participants.

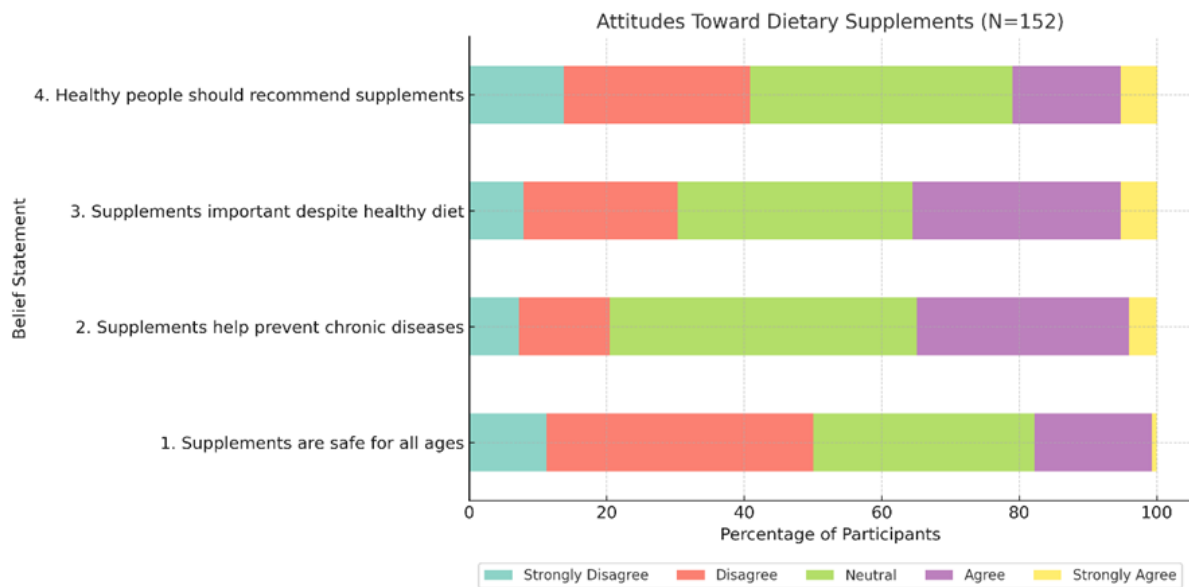


Figure 2: Distribution of attitude responses among study participants (N = 152)

Source: Data obtained from National University students through a survey conducted between March and April 2025.

3.4 Practice Data

Figure 3 shows that 61.9% of participants underwent medical testing before using dietary supplements, with the highest rates among MD students and high-income individuals. Professional recommendations were followed by 57.14%, and 88.09%

adhered to label instructions, while 30.95% maintained a specific diet during use. Regarding side effects, 64.28% reported none, 26.19% mild, and 9.52% severe effects. Responses included consulting a doctor (11.9%), ignoring symptoms (14.24%), reducing dosage (2.38%), or discontinuing use (9.52%). Statistical analysis revealed no significant associations between most demographic factors and supplement behaviour's, except for significant link between college affiliation and response to side effects ($p = 0.012$).

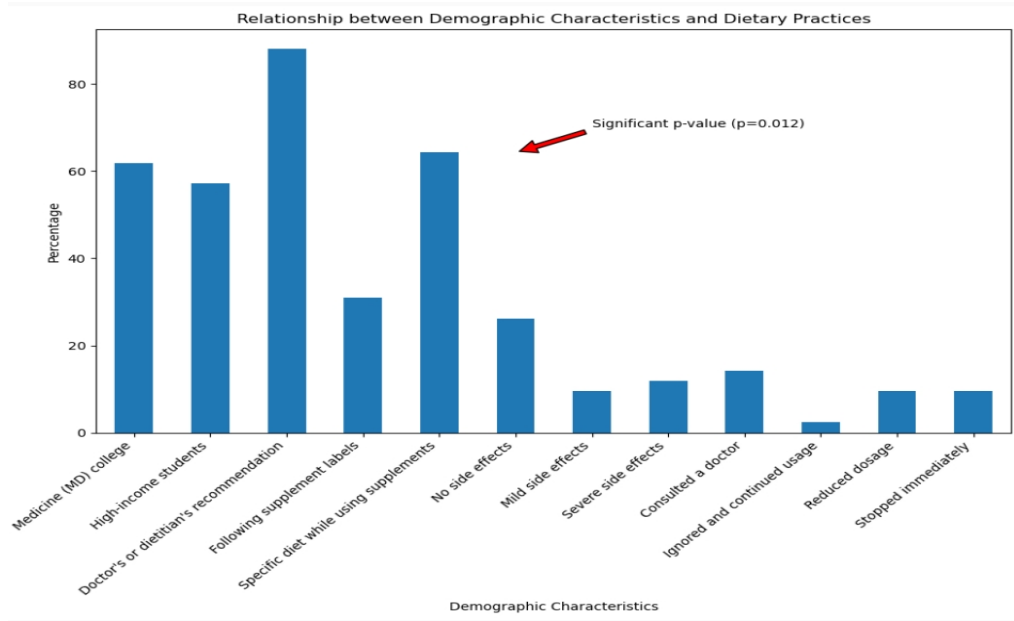


Figure 3: Distribution of practice-related variables among the study participants (N = 152)

Source: Data obtained from a student survey conducted at the National University between March and April 2025

3.5 Prevalence Data

Table 2: Distribution of prevalence-related characteristics among the study participants (N = 152)

Category	Supplement	N	%
No supplement	None	110	72.4
Minerals	Iron	17	11.2
	Zinc	5	3.3
	Calcium	4	2.6
Vitamins	Multivitamins	14	9.2
	Vitamin C	9	5.9
	Vitamin D	9	5.9
	Vitamin B complex	6	3.9
	Vitamin B12	5	3.3
	Vitamin A	3	2.0
Herbal/Other	Ashwagandha	1	0.7
Protein/Performance	Protein	1	0.7
	Creatine	1	0.7
Fatty acids	Omega-3	3	2.0
Probiotics	Probiotics	1	0.7
Iron supplement brands	Ferroglobin	1	0.7

B. Reported Reasons for Dietary Supplement Use

Reason	N	%
No use reported	110	72.4
Promote health, nutrition, and fill dietary gaps	27	17.8
Enhance appearance	11	7.2
Meet increased energy demands	11	7.2
Based on doctor's prescription	10	6.6
Prevent diseases / boost immunity	9	5.9
Treat minor illnesses	8	5.3
Due to family influence	2	1.3
No specific reason	2	1.3

Note: Students could report multiple reasons for supplement use; percentages may exceed 100.

*(N) Number of responders, *(%) Percentage, *(Non) Don't take Dietary supplement

As shown in Table 2, most participants (72.4%) reported not using dietary supplements. Among those who did, iron was the most frequently consumed (11.2%), followed by multivitamins (9.2%) and vitamins C and D (5.9% each), while other supplements—including vitamin B12, B complex, zinc, calcium, and magnesium—were less commonly used (0.7–3.9%). The predominant motivation for supplement use was to improve nutrition, support overall health, and address dietary gaps (17.8%), whereas smaller proportions reported using supplements to meet increased energy requirements or enhance appearance (7.2% each), prevent illness (5.9%), or follow medical guidance (6.6%). Other reasons, such as managing minor health issues or family influence, were reported infrequently.

4. DISCUSSION

This study is, to our knowledge, the first in Oman to evaluate knowledge, attitudes, and practices (KAP) related to dietary supplement (DS) use among university students, thereby addressing a critical gap in regional research. A standardized, validated questionnaire was administered to undergraduate students from both medical and non-medical programs at the National University of Science and Technology, ensuring heterogeneous representation.

Among the 152 participants, only 27.6% (\approx 42 students) reported DS use, suggesting that supplement consumption is not widespread. This prevalence is lower than that reported in neighbouring countries, including a UAE study with 35.6% of college students using DS [3] and a Saudi study reporting DS use in nearly half of health sciences students [8]. Other international studies also indicate higher prevalence rates among young adults [5,9,10], suggesting that cultural, educational, or behavioural factors may contribute to lower usage in Oman.

Participants primarily relied on the internet (63.8%) and family or friends (61.2%) for DS information. In contrast, UAE students reported family members as the predominant source (53.7%), followed by online platforms (49.9%) [11]. The heavy reliance on digital media highlights the importance of disseminating accurate, evidence-based information online [12].

The main reported reasons for DS use were improving overall health (74.3%) and correcting nutritional deficiencies (73%), aligning with global trends [5,9]. Most participants (89.5%) correctly indicated that DS dosage should follow label instructions and be discussed with healthcare providers, and 90.8% recognized potential toxicity from excessive intake. More than half (65.8%) were aware of possible interactions with drugs or foods, reflecting a reasonably solid foundational knowledge. Nevertheless, dependence on internet sources may perpetuate misconceptions, emphasizing the need for validated digital health education strategies [13,14].

Attitudinally, only 17.8% believed DS are safe for all age groups, while 50.0% disagreed and 32.2% were neutral. About 35% believed DS are beneficial even when following a healthy diet and can prevent chronic diseases; however, 39.4% were neutral and 25.3% disagreed. These findings suggest that knowledge does not necessarily translate into confidence or positive attitudes toward DS, echoing regional and international studies showing moderate knowledge but cautious or conflicting perceptions [15–18].

Demographically, there was no correlation between age, body mass index (BMI), or socioeconomic status and DS use. Supplementation was more common among men (62.5%) than women (25.6%), although male participants were fewer. Iron supplements were most used (11.2%), followed by multivitamins (9.2%) and vitamins C and D (5.9% each). The pattern likely reflects the high prevalence of iron deficiency anaemia in Oman and the availability of ferritin testing in public hospitals, whereas routine vitamin testing remains limited despite widespread vitamin D deficiency [19,20].

DS use has wide-ranging implications for health services, the pharmaceutical and food industries, and education. Multi-sectoral coordination could optimize public health outcomes and reduce budgetary burdens. Public awareness campaigns—through social media, traditional platforms, and school curricula—can correct misconceptions, improve label literacy, and promote the consumption of nutrients from natural food sources [21,22].

Policy interventions are recommended: the Ministry of Health should ensure reliable DS availability in hospital pharmacies and provide free DS testing services in public hospitals. While such programs may incur initial costs, they could reduce long-term healthcare expenditures associated with nutrient deficiency-related diseases. Simultaneously, the Ministry of Industry and Trade should prioritize the development of safe, effective DS formulations.

Given the limited regional evidence, clinical studies evaluating DS safety, efficacy, and cost-effectiveness are urgently needed. Evidence-based data would support policy decisions, ensure sustainable healthcare, and provide both public health and economic benefits [23–25].

5. LIMITATIONS

This study had several limitations that may have influenced the results and their generalizability. First, practical challenges in accessing students from colleges located farther from the main campus resulted in a lower response rate from these institutions. Second, the study was conducted over a relatively short period, which limited the opportunity to recruit a larger and more diverse sample.

Many participants were fourth-year medical students (MD4) from our own academic cohort, potentially introducing sampling bias and affecting the representativeness of the findings. Additionally, our limited proficiency with statistical software, such as SPSS, restricted the scope of data analysis, particularly regarding complex correlation assessments and multivariate analyses.

Despite these constraints, the study provides valuable preliminary insights into dietary supplement knowledge, attitudes, and practices among university students. Future research should aim to include a broader, more representative sample across all university colleges and employ more advanced analytical methods to strengthen the validity and reliability of the findings.

6. CONCLUSION

This study examined the knowledge, attitudes, practices, and prevalence of dietary supplement (DS) use among undergraduate students at the National University of Science and Technology. While participants demonstrated a basic understanding of DS—particularly regarding dosage, potential toxicity, and interactions with medications—considerable gaps in knowledge were observed. A substantial proportion of students reported relying on informal sources of information, such as the internet and peers, rather than consulting professional or evidence-based guidance.

The prevalence of DS use among the study population was relatively low, with only 27.6% of students reporting current consumption. Iron supplements and multivitamins were the most used products. Although students generally exhibited cautious attitudes toward DS use, their actual practices varied considerably. Notably, only a minority reported undergoing medical testing or using supplements under professional supervision, raising concerns regarding self-medication and the reliability of the information influencing their decisions.

The study successfully achieved its objectives through systematic data collection and rigorous analytical procedures. The findings underscore the critical need for targeted educational programs and professional guidance to support the safe and evidence-informed use of dietary supplements, particularly among university populations and prospective healthcare professionals.

7. ETHICS STATEMENT

Ethical approval was granted by an Institutional research and ethics committee (IREC). The registration number for the ethical approval is NU/COMHS/ EBC0033/ 2025.

8. CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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